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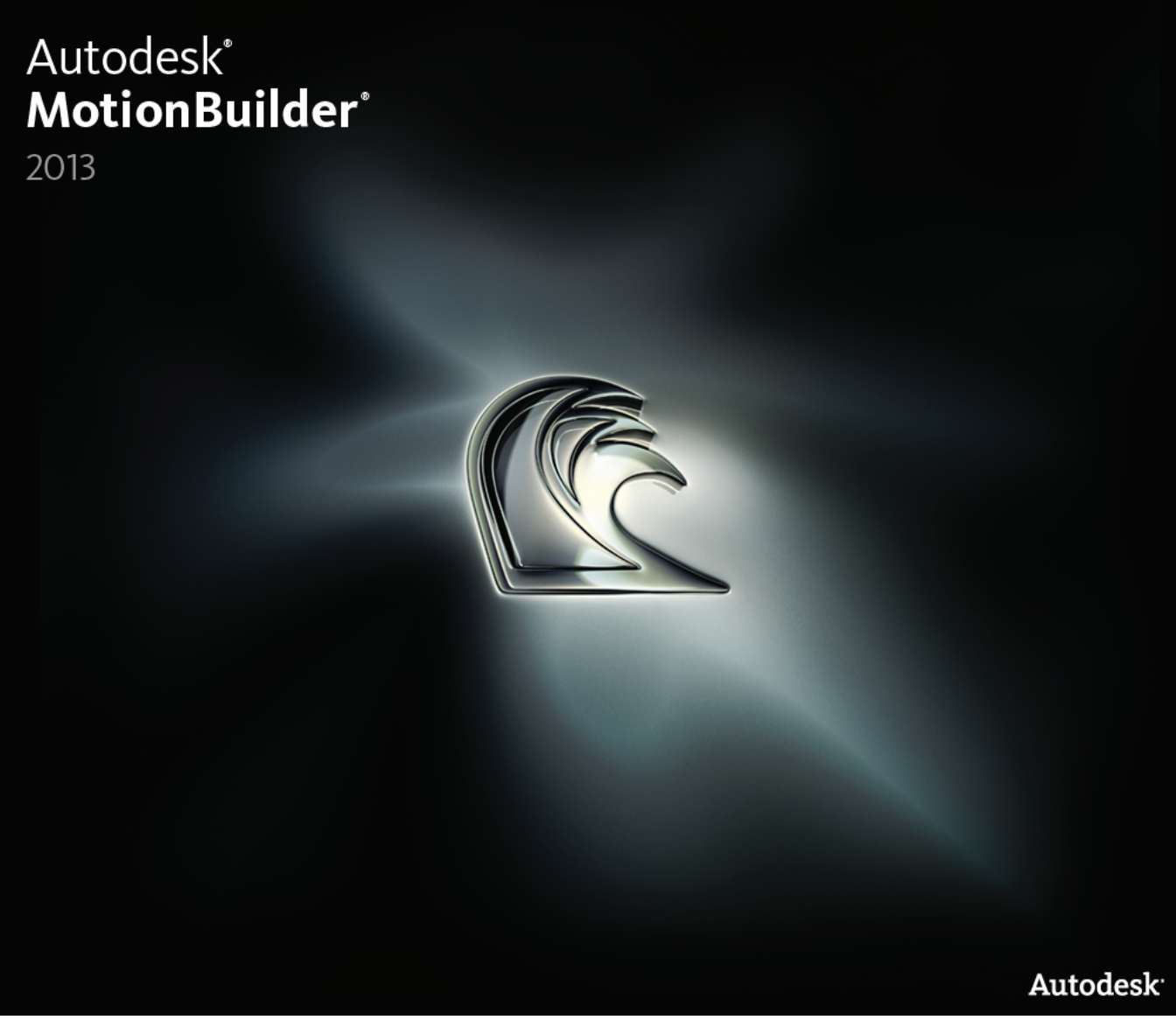
2013



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What's New

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Contents

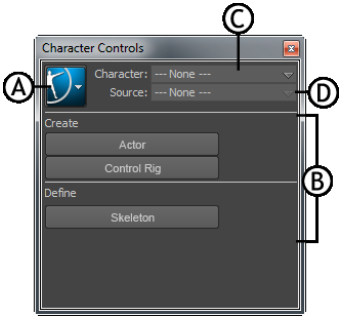
New Features and Enhancements

1

This book provides an overview of the new features and enhancements, and changes to the workflows in this release of the software product.

Enhancements to the Character Controls

The unified **Character Controls** window help to perform multiple character setup tasks. The following figure shows the **Character Controls** window, in the default mode.



A. **Character Controls menu button** ***B.*** **Start pane** ***C.*** **Character menu** ***D.*** **Source menu**

Character menu

Lets you select from a list of characters in the scene, and displays the name of the active character.

The options in this menu are:

- **--- None ---** — Displays when there are no HumanIK characters in the scene.

  NOTE Select this option to return to the Start pane.

- **Character** — Sets the current character to the selected HumanIK character. Characters are listed by name.

Source menu

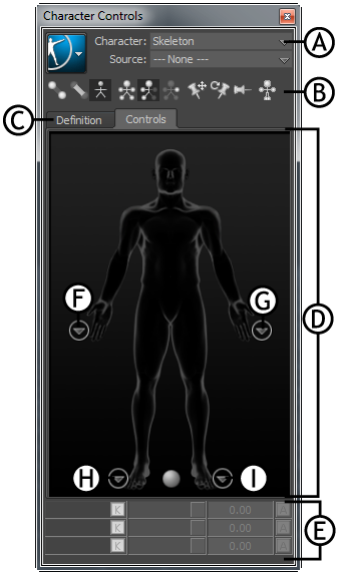
The **Source** menu:

- Provides feedback about the type of source driving a character. This menu is available in the **Character Controls** window, regardless of the HumanIK tool that is active.
- Updates after various operations to reflect changes to the character state. You can also set the source type of a character by manually selecting an option from the drop-down list.

Start pane

Quickly begin the character setup process using the **Start** pane in the **Character Controls** window. Whether you are defining a skeleton, creating a HumanIK skeleton, or importing a motion capture example into a scene, this pane is designed to guide you through the setup process.

When you load a character in MotionBuilder, the **Character Controls** window appears as shown below:



A. **Name of the current character** ***B.*** **Character Controls toolbar** ***C.*** **Definition and Controls tabs** ***D.*** **Skeleton representation** ***E.*** **Go to Right Hand view** ***F.*** **Go to Left Hand view** ***G.*** **Go to Right Foot view** ***H.*** **Go to Left Foot view**

As you set up your character, the previously independent HumanIK tools appear as tabs in the consolidated **Character Controls**, simplifying the character set up process.

Each tab contains a different HumanIK tool. The **Skeleton**, **Definition**, and **Controls** tabs appear when you select particular options from the **Start** pane, **Source** menu, or the **Character Controls** menu button.

Character Controls menu button

Menus such as **Create**, **Define**, **Edit**, and **Add to Selection** are added for better categorization of character controls.

Create >

Provides options to create an **Actor** or a **Control Rig**.

Actor Lets you create an **Actor** for mapping optical motion capture data to be used as the Source for your defined character.

Control Rig Let you create a Control rig for the current character, with IK and FK effectors based on the defined skeletal structure. The character must have a valid skeleton definition before you create a Control rig.

Define >

Skeleton Lets you create a definition for a skeleton. This is required, to create a Control Rig and/or retarget animation to and from the skeleton of a character.

Edit >

Lets you edit the parameters for the Actor, skeleton definition, and control rig.

Actor >

Lock Locks the current position and rotation of the selected **Actor** and its Marker set. You can also turn on this option from **Resources** window **> Properties > Actor** properties.

IK Manip Manipulates the **Actor** using Inverse Kinematics. By default, this checkbox is turned off to manipulate individual body segments on the **Actor**.

Symmetry Edit Simultaneously scales and translates the limbs of an **Actor**. By default, this checkbox is turned on. Turn off this checkbox to independently change the size or length of a limb.

Stance Pose Positions the **Actor** in its default stance position. You can use this pose to reset and modify the position of the **Actor**. **Stance Pose** only resets rotational offsets. These offsets remain, if you translate or scale the model.

Collapse Rejoins any detached limb segments of an **Actor** without resetting the size or stance of the **Actor**. This may be necessary when adding position offsets to an **Actor** or when translating source markers further than their initial definition. Some limbs may detach to reach all the markers defined by its Marker set.

Reset Size Resets the scale of the selected **Actor** to its default size. If a scaling offset affects the position of a segment, then **Reset Size** resets the scale of the **Actor**, but leaves the segment at its new location.

Find Size Select this option when the **Actor** is in a T-stance to calculate and size each segment of the **Actor** based on the selected Marker set and source markers.

Reset Pivot Points Returns all **Actor** pivot points to their original positions.

Reset All Resets the **Stance Pose**, **Collapse**, and **Reset Size** options, simultaneously. This option returns the **Actor** to its default stance position, reconnects any detached limb segments, and resets the scale of the **Actor** to the default size.

Edit Properties Displays the properties of current character in the **Properties** window. The properties shown in the **Properties** window are the same as the options in the **Character Settings**.

Switch To Actor Lets you switch between the current character and its Actor. If you select **Switch To Actor**, then the **Character Controls** window changes to the **Actor** tab. The **Switch to Actor** option is enabled in the **Character** menu, only when the source of the current character is an **Actor**.

Definition >

Lock Definition Locks the current setup of the skeleton, as it is mapped in the **Definition** tab. The skeleton definition must be valid before it can be locked.

Rename Lets you change the name of the HumanIK character.

Delete Deletes the current HumanIK character.

Skeleton Lock Sel Locks or unlocks the skeleton for selection. When this option is active, you cannot select the skeleton.

Skeleton Lock Trs Lets you select the skeleton, but locks the position and rotation so that you cannot transform it.

Edit Properties Displays the properties of current character in the **Properties** window. The properties shown in the **Properties** window are the same as the options in the **Character Settings**.

Reset Properties Resets the definition and/or solving properties of current character back to their default values. Selecting **Reset Properties** creates the same result as clicking the **Reset All Properties** button in the **Navigator** window **> Character Settings** pane.

Mirror Matching Enables the mirror matching mode. When this option is turned on, the **Definition** tab checks for a mirror match on the opposite side of the body for every bone that you map. For example, if you map the L_upperLeg bone, then the tool automatically checks the skeleton for an R_upperLeg bone and automatically maps that bone if exists. By default, mirror matching mode supports the following pairs of substrings:

Left side	Right side
Left	Right
L (followed by a single space)	R (followed by a single space)
L_	R_
_L	_R

If you use a different substring in your bone naming conventions to indicate the left and right sides of the body, then select  **> Edit > Definition > Configure Mirror Matching** to add your own strings.

Configure Mirror Matching Displays the **Mirror Configuration** window, which lets you add pairs of strings to the list that the **Definition** tab checks for mirror matching bone names. If you use a different substring in your bone naming conventions to indicate the left and right sides of the body, then select this option to add your substrings.

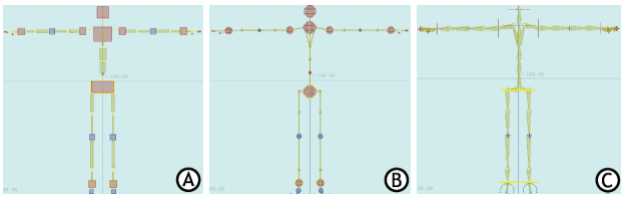
Load Skeleton Definition Displays the **Load Skeleton Definition** window, which lets you map bones by applying a naming template of your own. If your current character is locked, then clicking this option displays a message to unlock your character.

Save Skeleton Definition Displays the **Save Skeleton Definition** window to save your skeleton details.

Switch to Actor Lets you switch between the current character and its **Actor**. This option is enabled in the **Character** menu, only when the source of the current character is an **Actor**. If you select this option, then the **Character Controls** window changes to the **Actor Controls** window.

Controls >

Rig Look Lets you select what style of Control rig effectors to work with.



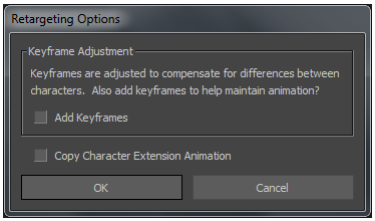
Rig Look *A.* Box *B.* Stick *C.* Wire

Stance Pose Resets the **Control Rig** to its default T-stance pose.

NOTE The Stance for a biped and quadruped character is different.

Retarget Rig Copies keyframe animation from the Control rig of the character selected as the Source to the Control rig of the current character. Selecting this option displays the **Retargeting Options** dialog box. The options in this dialog box lets you decide whether you want to allow added keyframes during retargeting, and whether you want to copy the Character Extension

animation. Turning on the **Add Keyframes** option is recommended, if you are concerned with retargeting your original animation as precisely as possible. While the retargeting process copies animation nearly exactly, slight adjustments to the data are required to compensate for differences between the source and target characters. If you can tolerate these slight changes and you do not want any added keyframes, then disable the **Add Keyframes** option.



Rename Renames the control rig for the current character.

Delete Deletes the control rig for the current character.

FK Lock Sel Lets you lock or unlock FK markers for a selection. When activated, you cannot select the FK markers. Disable this option to select FK markers.

FK Lock Trs Locks or unlocks FK markers for transformation. When this option is active, you cannot transform the FK markers, although you can still select them.

Reach Override Determines the state of the effector pinning and how your character behaves in conjunction with Pull values during manipulation. This option is active by default, which means that each Pull value of effector is ignored during character manipulation. You can only view your Pull settings when you play the animation.

To view the effects of Pull while applying transformations to your character, disable **Reach Override**. Effector pinning is also disabled since the behavior of a character is based on each Pull values of effector rather than its effector pinning.

Reach Override is only effective in **Full Body** or **Body Part** mode.

Stiffness Override Determines how a character behaves when it is manipulated in relation to the Stiffness values.

Stiffness Override is active by default, which means that the character does not use the Stiffness values during character manipulation. Stiffness settings are only applied when you play your animation.

Stiffness Override is only effective when in the **Full Body** or **Body Part** mode.

Rig Connect >

Attach Rig Displays the Control rig(s) in a scene. Selecting a Control rig displays the **Attach Control Rig** and **Reset Control Rig Hierarchy** dialog boxes.

- Select **Yes** to reset the Control rig hierarchy to the default structure. For more information about the default rig, see the *Control rig hierarchy* topic in the Help.

  or

- Select **No** to keep the current Control rig structure, including any reparenting or customization created previously.

If the structure of the Control rig does not match the character, then the effectors are created or disabled, as needed, to make the Control rig fit. For example, if you connect a Control rig from a character that contains fingers which do no fit, then the finger effectors are disabled. If the character had an original Control rig, then it is detached and replaced with the new Control rig. The original Control rig is still available and listed in the **Scene** browser, but no longer connected to the character.

Load UI Configuration Displays the **Select new configuration file** window. It lets you select a custom configuration file to be used as the new default layout for the **Controls** tab.

Update UI Configuration Reloads the **Controls** tab configuration file. Use this option to view the changes made to your configuration file, after it is loaded using the **Load UI Configuration** command.

Add to Selection >

IK Adds all IK effectors to your selection.

FK Adds all FK effectors to your selection.

Skeleton Adds all joint objects to your selection.

Show/Hide >

The options in this menu lets you enable or disable the display of each component of the selected character.

IK The IK rig is an Inverse Kinematics system that lets you transform the character using IK effectors. Manipulating a character using this system moves the body relative to its hierarchy, similar to the way a human body reacts.

FK The FK rig is one-half of the Control rig. It is based on the original skeleton of your model.

Skeleton Use the skeleton to define the nodes used by the character. The Control rig is created based on the skeleton of your model.

Floor Contact Lets you define how the feet, hands, fingers, and toes of a character should react when they are in contact with the floor of your scene.

Finger Tips Hides or displays the contact spheres used for the finger tips or toes of a character.

Actor (All) Five options let you hide or display the interface items related to an **Actor**. These options are available only when your current Character or Source is an **Actor**.

Actor Body Displays (default) or hides the body of an **Actor**. Disable this option to hide the body of the **Actor**.

Actor Skeleton Displays a set of connecting lines representing the bones of the **Actor**. To display only the bones, activate **Actor Skeleton** and disable **Actor Body**.

Marker Set Hides or displays the markers that belong to the defined Marker set. This option displays as white markers around the body of the **Actor**. Disable this option to hide the Marker set.

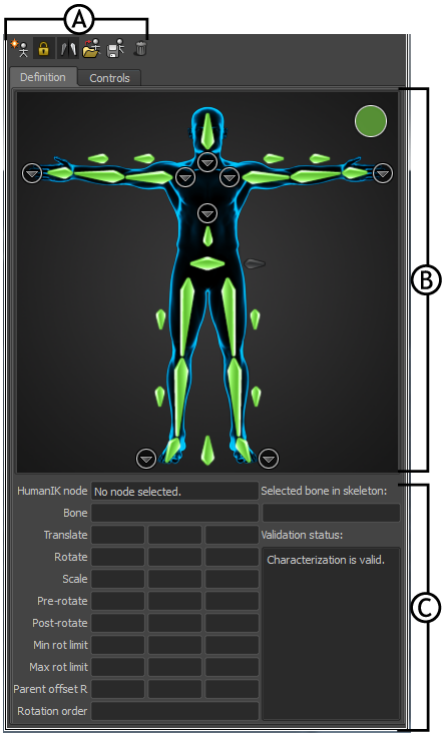
Source Markers Displays (default) or hides the markers containing motion data. Disable this option to hide the source markers. When the Marker set and the Source markers are both active, the markers belonging to the Marker set display inside the source markers by default.

Pivot Points Hides or displays the pivot points for the **Actor**. Disable this option to hide the pivot point markers. By default, the pivot points display as orange crosses. To change the way pivot points display, use the **Actor Settings** in the **Properties** window. You can also adjust the position of the pivot points using the **Body Part Pivots** properties.

See the *Character Controls menu button* topic in the Help.

Definition tab

This tab provides a visual interface for mapping the structure of a skeleton. This process results in a HumanIK Skeleton Definition, which is required to create a Control Rig and/or retarget animation to and from the skeleton of this character. This is what is referred to as a HumanIK defined character.



Definition tab *A*. Toolbar *B*. Character and Name Match views *C*. Skeleton properties

To create a skeleton definition, click  .

To map a bone, navigate from the:

- **Definition** tab to your skeleton: Double-click a cell in the **Character** view (cells turn blue when picked), then click the corresponding bone in the scene.

  or

- Skeleton to the **Definition** tab: Select a bone, right-click the corresponding cell in the **Character** view, and select **Assign Selected Bone**.

To change a mapped bone:

1. Right-click the cell and select **Change Assigned Bone**. , then
2. From the drop-down list, select from the listed bone names or type the name of the bone you want to use instead.
3. Press **Enter** or click **Ok**.

To clear a mapped bone:

1. Right-click the cell in the **Character** view and select **Clear Assigned Bone**.

   The name of the selected bone appears in the drop-down list.
2. Press **Enter** or click **OK**.

To clear all mapped bones in the current view (full body, hands, feet, or spine view):

1. Right-click anywhere in the view.
2. Select **Clear All in View**.

To clear all mapped bones for the current character:

1. Right-click anywhere in the view.
2. Select **Clear All**.

To map mirror pairs of bones:

1 Select  > **Edit** > **Definition** > **Mirror Matching**.

TIP Alternatively, click  in the **Definition** toolbar.

2 Select  > **Edit** > **Definition** > **Configure Mirror Matching** to open the **Mirror Configuration** window.

This window contains a list of all sub-string pairs currently configured for mirror matching mode.

3 Click the + or - button to add or remove substrings, respectively.

See the *Definition tab* topic in the Help.

Definition tab toolbar

This toolbar provides a set of global controls for managing skeleton definitions such as saving and loading skeleton definitions to and from files, locking the current skeleton definition. It also offers controls for enabling and configuring mirror matching mode, and for applying and saving mapping templates.

	Creates a blank skeleton definition.
	Locks and unlocks the current skeleton definition. **NOTE** Locking the character definition automatically updates the mapping list in the Character Definition pane.
	Toggles mirror matching mode.
	Displays the **Load Skeleton Definition** window for applying a mapping template and mapping multiple bones automatically by name.

	Displays the **Save Skeleton Definition** window for saving a mapping template, which can be loaded at a later date.
	Deletes the current skeleton definition.

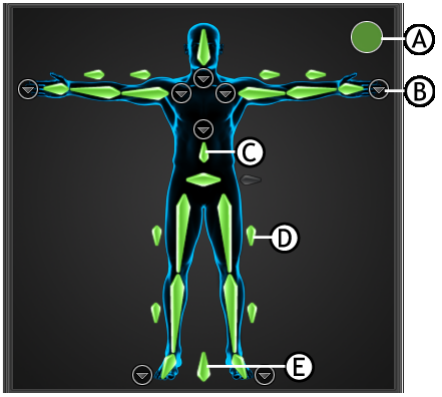
See the *Definition tab toolbar* topic in the Help.

Character and Name Match views

You can use the **Character** and **Name Match** views to map the bones in your character to their corresponding HumanIK nodes, and to view the information about the current mappings. Both views offer the same controls for mapping nodes, but display the nodes using different layouts.

Toggle between the views by right-clicking anywhere in the view and selecting either the **Character View** or the **Name Match View** option from the contextual menu.

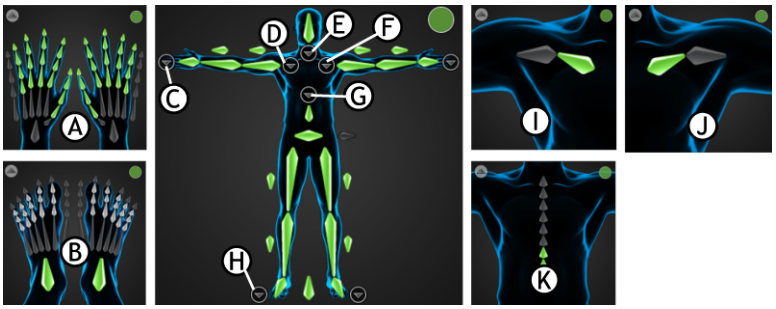
Character view The main Character view lays out the HumanIK nodes in a schematic arrangement that indicates the placement of each bone in a biped. It provides a visual tool for mapping out the structure of your character, and provides feedback on the status of the skeleton definition.



Character view *A*. Validation status *B*. To other views *C*. Required bones *D*. Roll bones *E*. Reference

Hand, Foot, Spine, Shoulder, and Neck views You can switch to detailed views of the hands, feet, spine, shoulders, and neck to map additional bones

for those body parts. Click  to switch views to a particular body part, or  to return to the full Character view.

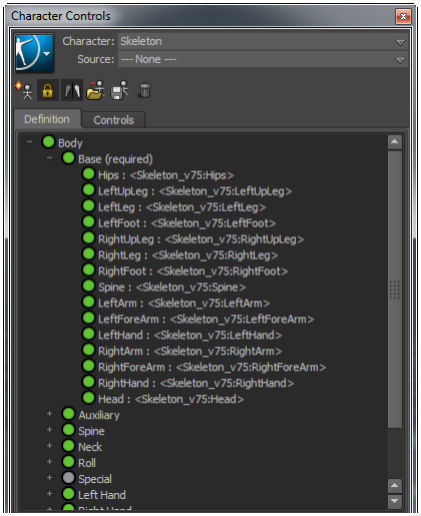


Different views of a character *A*. Hands *B*. Feet *C*. To Hands *D*. To Right Shoulder *E*. To Neck view *F*. To Left Shoulder *G*. To Spine *H*. To Feet *I*. Right Shoulder *J*. Left Shoulder *K*. Spine

Validation status A validation status indicator displays at the top-right of the Character view.

	Valid	Skeleton definition is valid.
	Warning	Refer to the Validation status error message field for information on areas of the character that require attention. A yellow symbol can indicate that the position of a mapped bone is not correct. For example, if you rotate a roll bone so it does not point down the X-axis. The Character view also updates to highlight which bone is out of position.
	Not Valid	The skeleton definition is not valid. Some required bones may be missing, or multiple bones may be out of position.

Name Match view Displays all bones in a list, grouped according to their related body part or IK effector. Use this view to get an overview of your skeleton definition, and to view the names of the bones assigned to multiple different nodes. You can map bones to the **Name Match** view using the same methods as in the Character view.



See the *Character and Name Match views* topic in the Help.

Load Skeleton Definition and Save Skeleton Definition windows

Load Skeleton Definition window Lets you select a naming template to automatically map multiple bones by name. To open this window, click  in the **Definition** tab toolbar.

Template This drop-down list provides several common bone naming conventions. Select the naming template you want to apply.

- **HIK** — Use with skeletons created using the HumanIK naming conventions.
- **CAT** — Use with biped skeletons created using the Character Animation Toolkit (CAT).
- **Biped** — Use with biped skeletons created in 3ds Max Biped.

Or select **<Browse>** to select your own saved naming template.

Match Scope Select whether you want to match bones based on a prefix convention, or match only selected bones.

Save Skeleton Definition window Lets you extract a naming template based on the bone names in the current skeleton definition. To open this window, click  in the **Definition** tab toolbar.

Template Name Enter a name for the template. This name is added to the list of templates in the **Load Skeleton Definition** window.

Example Bone Lists the name of the first valid bone in the current character hierarchy.

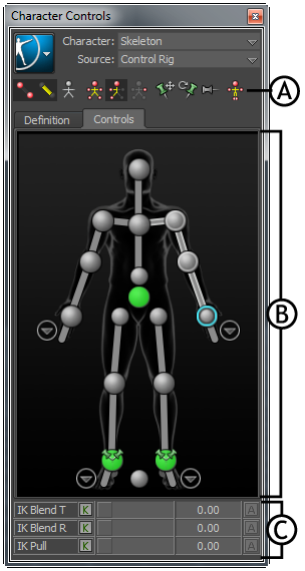
Prefix Enter any prefix string that you want to remove from the beginning of all bone names to be added in the template. This is useful if the bone names for the current character include a standard prefix meant to identify that specific character. For example, if you have the name of the character appended to the start of each bone name. Entering that prefix automatically removes the prefix from all bone names added to your template.

See the *Definition tab toolbar* topic in the Help for more information on the Load Skeleton and Save Skeleton Definition windows.

Controls tab

The Controls tab contains:

- Controls toolbar
- Character representation
- HumanIK Controls



Controls tab *A*. Toolbar *B*. Character representation *C*. HumanIK Controls

The following table provides a brief overview of tasks using the **Controls** tab.

To...	Do this
Create a Control rig	Select **Control Rig** from the **Source** menu or Select  > **Create** > **Control Rig**.
Change the appearance of rig effectors	Select  > **Edit** > **Controls** > **Rig Look**, then select an effector style.
Change to Full Body keying and manipulation mode	Click  .
Change to Body Part keying and manipulation mode	Click  .
Display the skeleton of the character	Click  .
Set the animation source for the current character	Select another HumanIK defined character by name from the **Source** menu.
Create an auxiliary or pivot effector	Right-click an IK effector cell and select **Create Aux Effector** or **Create Aux Pivot**.
Remove an auxiliary or pivot effector	Select the effector in the scene and press the **Delete** key.
Pin an effector in Translation	Select the corresponding IK effector cell, then click  .

To...	Do this
Pin an effector in Rotation	Select the corresponding IK effector cell, then click  .
Temporarily release all pinning	Click  .
Bake the active Source onto the current Character	Select  > **Bake** > **Bake To Skeleton** (or) Select  > **Bake** > **Bake To Control Rig**
Edit retargeting parameters in the **Attribute Editor**	Select  > **Edit** > **Definition** > **Edit Properties**.

See the *Controls tab* topic in the Help.

Controls toolbar

The toolbar in the **Controls** tab contains:

- Show/Hide buttons
- Manipulation and keying modes
- Pinning
- Other buttons

Show/Hide

These icons let you toggle the display of FK effectors, IK effectors, and the skeleton.

	**Show/Hide IK**	Shows or hides the character's IK effectors.
	**Show/Hide FK**	Shows or hides the character's FK effectors.
	**Show/Hide Skeleton**	Shows or hides the character's skeleton.

See the *Controls tab toolbar* topic in the Help.

Manipulation and keying modes

These icons let you set manipulation and keyframing modes for working with the Control rig of the character. You can manipulate and set keyframes on the entire body (**Full Body**) of the character, a part of the body (**Body Part**), or only on the selected effector (**Selection**).

	Full Body	Sets the tool to **Full Body** keying and manipulation mode, letting you select individual effectors to manipulate the entire character. For example, translating the wrist effector of a character in the **Full Body** mode affects the whole body as it moves to reach that effector. Forcing a stance pose in this mode will force the entire character into a stance pose and the character will be offset relative to its reference node.
	Body Part	Sets the tool to **Body Part** mode, letting you manipulate and set keys on a single body part, based on the selected effector. Forcing a stance pose in this mode will force the selected body part(s) into a stance pose. If the hips are part of the selection, the character will be offset relative to its reference node.

	Selection	Sets the tool to **Selection** mode, letting you manipulate and key only the selected effector(s). In this mode, you can manipulate one effector without solving the rest of the character, then use the HumanIK controls to adjust how much the rest of the character reaches for that effector.

The **Character** representation displays white highlighting on cells to show which part of the character is active for manipulation and keying. For example, in the **Body Part** manipulation mode, when you select a left wrist effector, all left arm cells in the **Character** representation highlight in white.

Pinning

These icons let you activate, disable, or temporarily release pinning on effectors.

Pinning gives you more control over character manipulation, letting you constrain specific effectors from moving or rotating as you make adjustments to the rest of the character position. For example, you can pin the wrist in rotation but let it move in translation, so that as you adjust the wrist position or arm position, the wrist can move but does not twist.

When you create a HumanIK Control rig, IK effectors on the character's feet are pinned in translation and rotation by default.

Pinning feedback displays on each cell in the **Character** representation.

	**Pin Translation**	Pins and unpins the selected effector in translation. When pinned, the selected effector cannot be moved, and a T displays on its corresponding cell in the **Character** representation.
	**Pin Rotation**	Pins and unpins the selected effector in rotation. When pinned, the selected effector cannot be rotated, and an R displays on its corresponding cell in the **Character** representation.
	**Release All Pinning**	Temporarily releases all translation or rotation pinning for the selected effector and effectors down the chain.

See the *Manipulation and keying modes* topic in the Help.

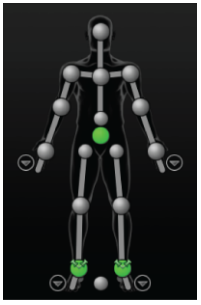
Stance Pose The Stance Pose icon () resets the Control rig to its default T-stance pose. Selecting this icon in the **Full Body** mode forces the entire character into a stance pose and the position of the character if offset, relative to its reference mode. In the **Body Part** mode, the selected body part(s) are forced into a stance pose. If the hips are part of the selection, then the character will be offset, relative to its reference node. Note that this feature does not apply to the **Selection** mode.

TIP You can also force a stance pose by selecting  > **Edit** > **Controls** > **Stance Pose**.

Controls Character representation

Displays an image of a biped character and all the effectors you can use to animate a HumanIK Control rig.

Once you create a Control rig for your skeleton definition, the Character representation displays cells for each IK and FK effector in the rig. These cells provide visual feedback on the pinning, IK blend, and IK pull defined for each effector, and also let you create and select auxiliary effectors and pivot effectors.



IK cell status

Each IK cell of the Character representation updates to reflect the status of the corresponding effector. The following tables describe the various states of each cell.

Selection

Cell	Effector state

	Selected
	Not selected
	Selected as part of the active keying group - **Full Body** or **Body Part**.

Pinning

Cell	Effector state
	Pinned in translation
	Pinned in rotation
	Pinned in translation and rotation

Ik Blend and IK Pull

Cell	Effector state
	**IK Blend T** set to 1.00
	**IK Blend R** set to 1.00
	**IK Blend T** and **IK Blend R** set to 1.00

Cell	Effector state
	**IK Pull** set to 1.00 (with **IK Blend T** and **IK Blend R** set to 1.00)
	**IK Pull** set to 0.50

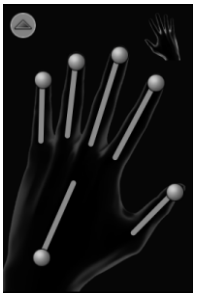
Auxiliary and pivot effectors

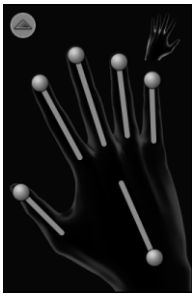
Cell	Effector state
	Main effector has auxiliary effectors. Click the + icon to view.
	Main effector has pivot effectors. Click the + icon to view.
	Auxiliary effector
	Pivot effector

Body Part views

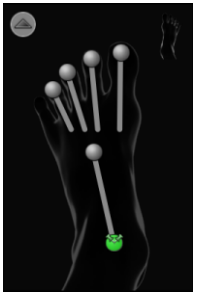
Arrow icons  next to the hands and feet in the **Character** representation let you switch to zoomed in views where you can select individual effectors within the character's hands and feet. Clicking on the hand or foot icon in the upper right corner of each view toggles between the left and right body part.

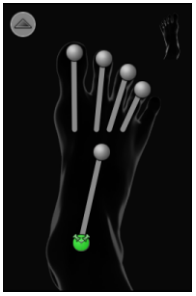
Hands





Feet





See the *Character representation* topic in the Help.

HumanIK Controls

The **IK Blend T** and **IK Blend R** (previously called **Reach**) sliders in the **HumanIK Controls** let you decide which solution (IK or FK) your skeleton follows. When you set keyframes on the Control rig, both the IK and FK solutions are keyed.

Streamlined window size

The image of a biped character in the **Controls** tab contains a new **A-frame** layout, which makes this tab smaller than the **Definition** tab.

Stance pose on body parts

You can force a stance pose on selected body parts. The active manipulation and keying mode determines how your Control rig reacts when you force a

stance pose by selecting the quick access icon  or  **> Edit > Controls > Stance Pose**.

This is useful during the pose-to-pose character animation, when only specific body parts need to be reset to create a character pose.

See the *Blend and Pull controls* topic in the Help.

Heads Up Display

A motion picture must not only contain 3D assets, but also additional information to communicate various aspects involved within a scene or shot. Heads Up Display (HUD) is useful to display the title, take name, frame rate, scene name, and so on regarding a specific scene to the viewer.

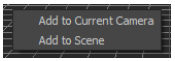
The HUD is available as an asset in the **Asset Browser > Templates > Elements** sub-directory.

Adding the HUD asset to the current camera or a scene

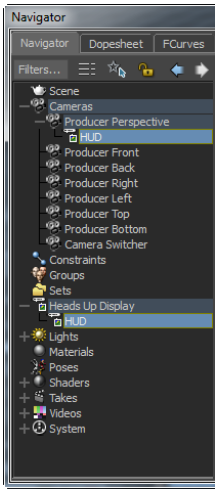
You need to add the HUD asset in the **Asset Browser** to a camera or a scene. Only then, you can add a HUD element to the HUD asset and display the information in the element in the **Viewer**.

To add a HUD asset to the active camera or the scene:

1. Drag the HUD asset from the **Asset Browser** to the **Viewer** window.



2. From the contextual menu, select **Add to Current Camera** or **Add to scene**.
   - **Add to Current Camera** — Selecting this option adds one HUD asset to the current camera and another HUD asset to the scene.

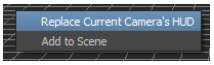


The HUD asset added to the current camera acts as a parent to the HUD asset added with it in the scene.

- **Add to scene** — Adds a HUD asset only to the scene. This HUD asset does not have a parent in any camera.

NOTE You can add multiple HUD assets to a scene but only one HUD asset to a camera.

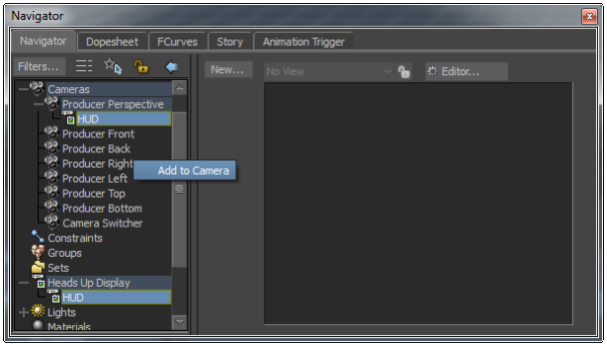
If you try to add a second HUD asset to the current camera, then the **Replace Current Camera's HUD** option appears in the contextual menu.



Selecting this option replaces the HUD asset in the current camera, and adds another HUD to the scene. In this case, the name of the replaced and added HUD assets is HUD 1.

To add a HUD asset from the scene or a camera to another camera:

1 Drag a HUD asset from the scene or a camera onto the desired camera.

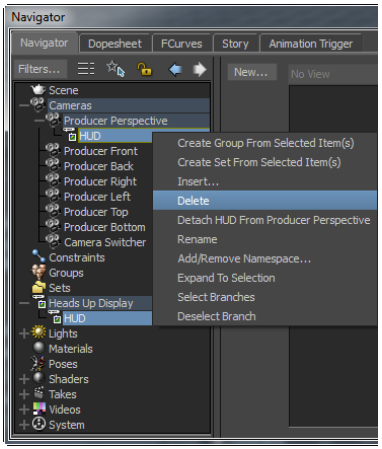


2 Click the **Add to Camera** contextual menu option.

To delete a HUD asset from the scene or a camera:

1 Right-click on the HUD asset in the scene or a camera.

2 From the contextual menu, select **Delete**.

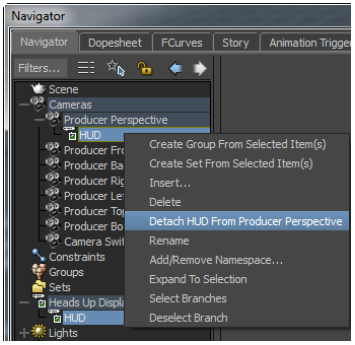


If the HUD asset in a camera is a parent of another HUD asset in the scene and vice versa, then both the HUD assets are deleted.

TIP Clicking a HUD asset, in the scene or in a camera, highlights its parent or child HUD asset. This helps to know whether a HUD asset that you want to delete is independent or attached to another HUD asset.

To detach a HUD asset from a camera:

1. Right-click on the HUD asset in a camera.
2. From the contextual menu, select **Detach HUD From <camera_name>**.



The **<camera_name>** displays the name of the camera to which the HUD asset belongs.

Selecting the **Detach HUD From <camera_name>** option detaches the HUD asset only from the camera, even though it contains a child HUD asset in the scene.

See the *Adding the HUD asset to the current camera or a scene* topic in the Help.

Understanding HUD elements

There are 14 HUD elements, which you can add to a HUD asset to display additional information (static and dynamic) regarding a scene in the **Viewer**.

Text	Text that you enter in the **Content** property text box. See the *Properties of HUD Element* section.
Texture	Image, image sequence, or a video
Rectangle	Vector graphic, which you can use as a background or mask for static or dynamic content.
Flash	Flash animation saved in the *.swf* file format.
Record Light	Record light

Texture HUD element When you import an image, image sequence, or a video (**File > Import Video**), it appears under the **Navigator** window > **Textures** folder.

To display a texture from the HUD Texture element in the Viewer:

1. Click the  button in the **Texture** property.
   The **Textures** folder with all the imported textures appear.
2. Turn on the checkbox of a texture.

Alternatively, drag a texture from the **Navigator > Textures** folder and drop it in the **Viewer**.

Flash HUD element

To display a flash animation from the HUD Flash element in the Viewer:

1. Click the  button in the **Flash File Path** property.
   The **Open Directory** window appears.
2. Select the flash animation (*.swf* format).
3. Click **Open**.

Record Light HUD element The record light let a stage operator know the recording status of a scene. By default, the color of the record light is grey (). However, the color changes to indicate the stages in recording.

Record Light Color	What button should you click in Transport Controls to make it appear?	What does it indicate?
Green ()	Record	Ready to record
Red ()	Play	Recording is in progress
Red with a white, X mark ()	Stop	Stopped recording, and MotionBuilder is busy in the post-recording process. After the post-recording process, the record light turns grey (returns to the default state).

The following table lists the dynamic HUD elements and the information they display in the **Viewer**:

EditTime	The current time of edit Timeline in frames or Timecode.
EditFrame	The current time of the edit Timeline in frames, by default.
ActionTime	The current time of action Timeline in frames or TimeCode (minimum value is 0 and maximum value is the length of the scene).
SceneFrameRate	The selected frame rate per second (*fps*). The *fps* lowers with heavy scenes and raises with light scenes. The highest possible frame rate optimizes to experience smooth playback.
TakeName	The name of current take. Value can be a number or string.
CameraName	Name of the camera to which the HUD belongs
CameraFocalLength	Focal length of the camera to which the HUD belongs
SceneName	Name of the current scene
FreeMemory	The free memory in your system. Helps to determine whether you can load heavy scenes or not.

You can also add any property of an object (cube, character, stereo camera, and so on) into a HUD element, and refer the value of the property in the scene.

See the *Understanding HUD elements* topic in the Help.

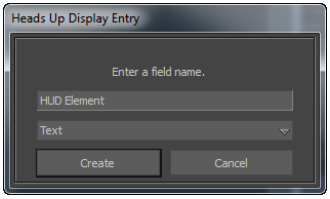
Adding a HUD element to a HUD asset

You need to add a HUD element to the HUD asset in the current camera to display the element information in the **Viewer**.

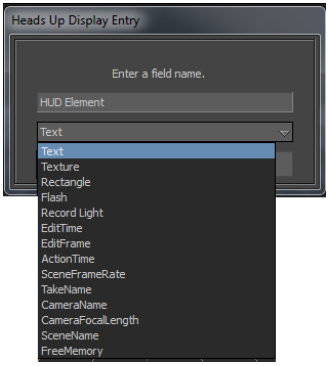
To add a HUD element to the HUD asset in the current camera:

1. Select the HUD asset in the current camera.
2. From the right pane of the **Navigator** window, click **New...**

   The **Heads Up Display Entry** dialog box appears.



   The drop down list contains 14 HUD elements to select. By default, the **Text** element is selected.



3. (Optional) Change the default name (HUD Element) in the **Enter a field name** text box.

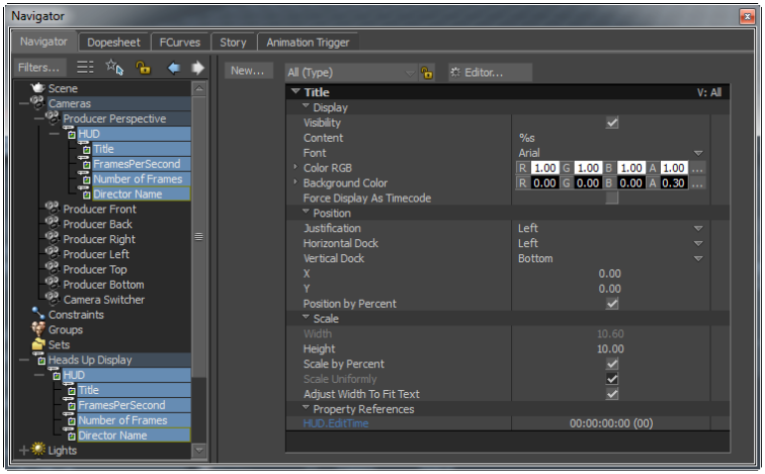
   NOTE If you add more than one HUD element without changing the default name, then the name for the second element is assigned as HUD Element 1, third element as HUD Element 2, and so on.

4. Click Create.

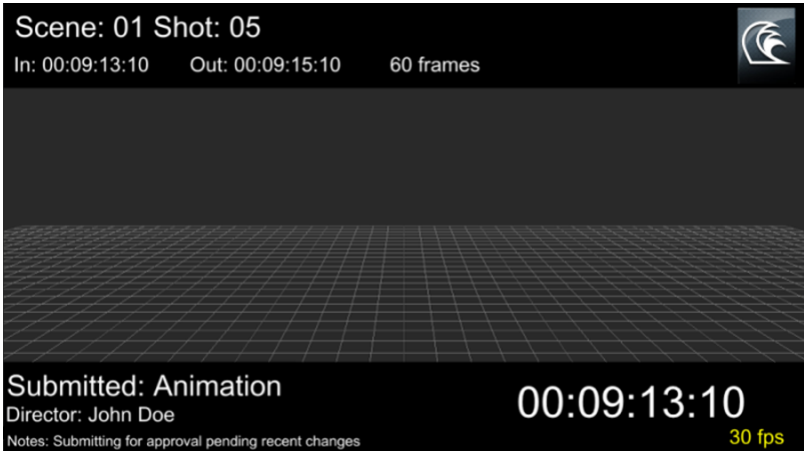
   In the Navigator window, the HUD element appears under the HUD asset in the current camera.

   If the HUD asset in the current camera is a parent of a HUD asset in the scene, then all the HUD elements added to the current camera also appear under the child HUD asset in the scene.

By following the above procedure, you can add multiple HUD elements to a HUD asset to convey useful details regarding a scene.



For example:



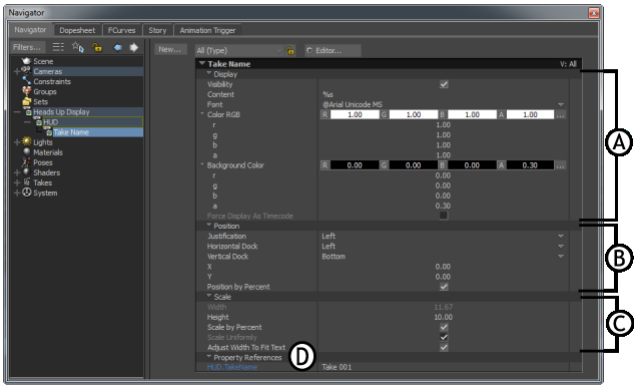
NOTE You can also add and edit all the HUD element types using the Python SDK and C++ ORSDK. See the MotionBuilder*SDK Help*.

See the *Adding a HUD element to a HUD asset* topic in the Help.

HUD element properties

The properties of HUD element are useful to modify the appearance, position, and size of the content it displays in the **Viewer**. When you click a HUD element under a HUD asset, the element properties appear in the right pane of the **Navigator** window.

The HUD element properties are organized into four categories.



Properties of a HUD element *A.* Display *B.* Position *C.* Scale *D.* Property References

- **Display** — To modify the appearance of an element
- **Position** — To change the position of an element in the scene
- **Scale** — To increase or decrease the size of an element, along the X and Y axis
- **Property References** — Displays the property name, which is referred by the HUD element to display the property value in the **Viewer**. For example, to display the current take name, the **TakeName** HUD element refers the value (Take 001) in the *HUD.TakeName* property.

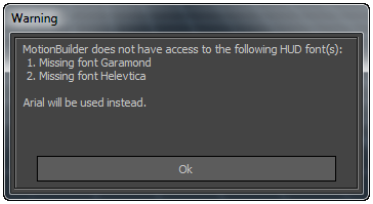
  NOTE The **Property References** category appears only for the dynamic HUD elements.

The following tables explain each property within the Display, Position, and Scale category:

Display Properties	Description
Visibility	To control the visibility of a HUD element content in the **Viewer**. By default, this property is turned on for all HUD elements. Turn off the checkbox to hide the content in the **Viewer**.
Content	To enter the text that you want to display. For dynamic elements, enter text before or after the variable %s or %d.
Font	To choose a font in which the text or dynamic content should appear. The default font is Arial.
Color RGB	To increase or decrease the visibility of the HUD element content and change the font color. The default color of the content is white.
Background Color	To increase or decrease the visibility of the HUD element content background and change the background color. Background for the content is visible, only if the value of A, in this property, is more than 0. The dimensions of the background are directly proportional to the scaling of the content.
r, g, b, a	The r, g, b, a sub-properties are functionally similar to the R, G, B, and A color boxes in the **Color RGB** and **Background Color** properties.
Force Display As Timecode	To forcefully change the format of a HUD element content from Frames to Timecode. This property is enabled only for the **EditTime** and **ActionTime** HUD elements.

Consider that you create a scene in MotionBuilder installed on the Microsoft Windows operating system. The scene contains many HUD **Text** elements, each using different font (Garamond, Helevtica, and so on). Save the scene,

and then load it using MotionBuilder installed on the UNIX operating system. If the UNIX operating system does not contain one or more fonts used in the scene file, then the following **Warning** dialog box appears.



This dialog box lists the fonts that are unavailable and informs which font is used, instead. At first, MotionBuilder checks for the availability of the (default) Arial font. If the Arial font is not available, then it checks for the availability of the following fonts in the given order and uses them if available:

1. Helevtica
2. Sans
3. FreeSans

If none of the four fonts (Arial, Helevtica, Sans, and FreeSans) are available, then the first font that appears in the HUD **Text** element font list is used.

To change the HUD element content font color:

- Click on the R, G, or B color box and drag the cursor

  or

- Double-click on any of the R, G, or B boxes and enter a value from 0.00 to 1.00 (default value is 1.00)

  or

- Click the  button to open the **Color** window and pick a color of your choice. See the *Color window* topic in the Help.

NOTE Perform any one of the above actions to change the background color of the HUD element content as well.

To increase or decrease the visibility level of the HUD element content:

- Click on the A (Alpha) box and drag the cursor

  or

■ Double-click the A box and enter a value from 0.00 to 1.00 (default value is 1.00).

Position Properties	Description
Justification	To set the effective position for a HUD element content in the **Viewer**. For example, if you want to display the content of a HUD element at the center of the **Viewer**, then you need to select **Center** from the **Justification** and **Horizontal Dock** drop down lists..
Horizontal Dock	To dock an element content horizontally to the left, center, or right of the **Viewer**. Docking is the global reference point, which is referred by the **Justification** property.
Vertical Dock	To dock an element content vertically to the bottom, center, or top of the **Viewer**.
X	To change the horizontal position of the HUD element content, relative to the docked and justified position. Click on the property value and drag to change the position of an element along X axis. You can also double-click the box and enter a value.
Y	To change the vertical position of the HUD element content, relative to the docked and justified position. Click on the property value and drag to change the position of an element along Y axis. You can also double-click the box and enter a value.
Position by Percent	To display the value of X and Y in percentage. X is the horizontal position of the HUD element as a percentage of the width of the **Viewer**. Turn off the checkbox to display the value in pixels.

Scale Properties	Description
Width	To increase or decrease the width (horizontal scaling) of a HUD element content or background.

Scale Properties	Description
Height	To increase or decrease the height (vertical scaling) of a HUD element content or background.
Scale by Percent	To scale the width and height of a HUD element content in percentage. Deselect this checkbox to scale the element in pixels.
Scale Uniformly	To uniformly increase or decrease the width and height of a HUD element content.
Adjust Width to Fit Text	To: ■ Maintain the size when you add or delete text ■ Disable the **Width** property ■ Disallow to deselect the **Scale Uniformly** property

See the *HUD element properties* topic in the Help.

Customizing HUD element properties

You can customize the HUD element properties by adding a property of another asset or custom property. This helps to display more information regarding a scene in the **Viewer**.

Adding an object property to the HUD element properties

You can customize the HUD element properties by adding a property of another asset under the **Resources > Asset Browser > Templates** directory.

NOTE You cannot add the properties of command objects under the **Resources > Asset Browser > Templates > Commands** directory, since they do not appear in the **Resources > Properties** directory.

Each property of an object is referred as object_name.property_name in the **Properties** window. For example, the **Field Of View** property of the **stereoCamera** object is referred as stereoCamera.Field Of View.

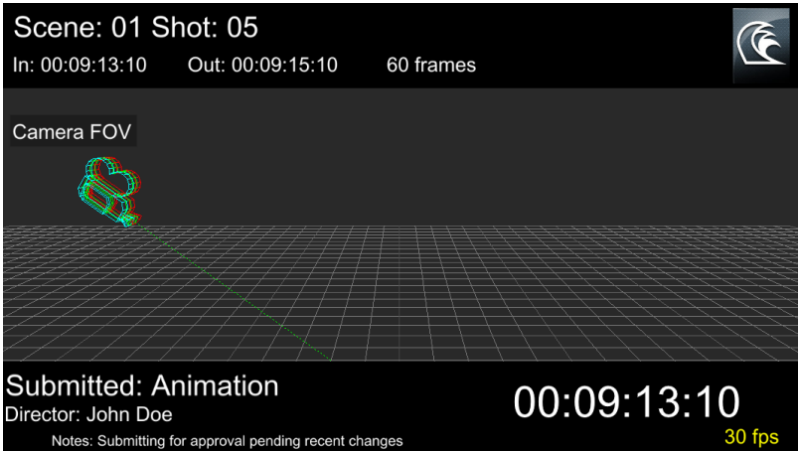
To add a property of another object to the HUD element properties:

1. From the **Resources > Asset Browser > Templates > Elements** folder, drag and drop the **stereoCamera** object in the **Viewer**.

   The stereo camera appears in the **Viewer**.

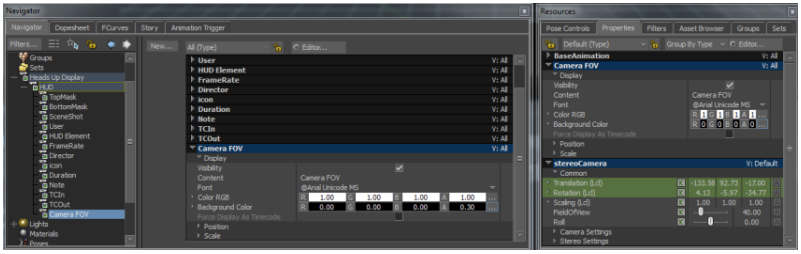
2. Create a **Text** HUD element called Camera FOV.

3. From the **Text** HUD element properties, change the value of **Y** property to position of the text (Camera FOV) at the top of the stereo camera.



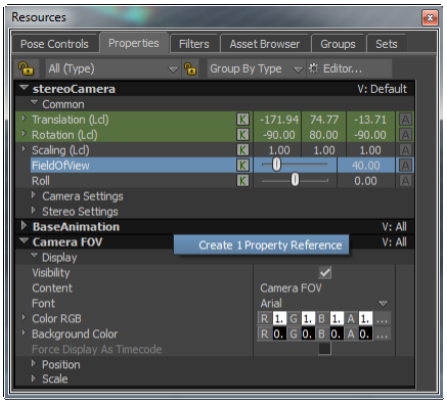
4. By pressing the `Ctrl` key, click the Camera FOV HUD element in the **Navigator** window.

   Both the properties of the Camera FOV HUD element and the **stereoCamera** asset appear in the **Resources > Properties** window.

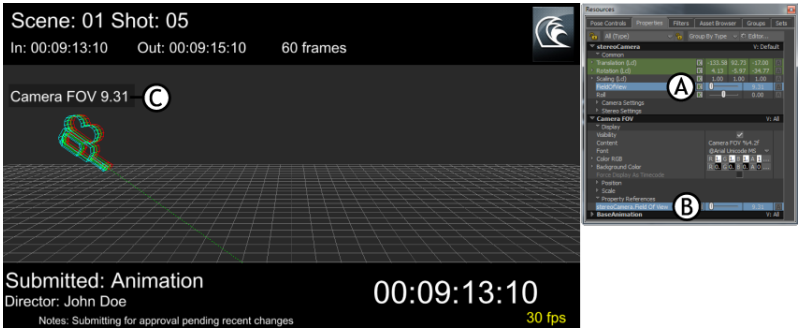


5 Click the **Field Of View** property under the **Resources > Properties > stereoCamera** properties, and then drag it and drop on the Camera FOV HUD element properties.

The **Create 1 Reference Property** contextual menu option appears.



6 Click the contextual menu option to add the **Field Of View** property to the Camera FOV HUD element properties. The value of the **Field Of View** property appears in the **Viewer**.



Viewer and Resources windows *A.* Field Of View property *B.* Field Of View property added to Camera FOV HUD element properties *C.* Field Of View property value

When you adjust the value of the **Field Of View** property, the change in value appears dynamically in the scene.

TIP Alternatively, drag an object property from the **Resources** > **Properties** window and drop it on a HUD element in the **Navigator** window.

When you save a scene (in *.fbx* format), all the added HUD elements and their properties are also saved to reuse them in another scene.

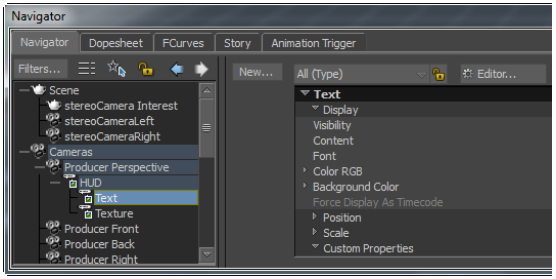
Adding a custom property to the HUD element properties

You can customize the HUD element properties by adding a custom property from the **Property Editor > Custom Properties** window. This helps to display more information in the **Viewer**.

See the *Custom Properties pane* topic in the Help.

To add a custom property to the HUD element properties:

1 Click the **Editor** button in the right pane of the **Navigator** window.



The **Property Editor** window appears.

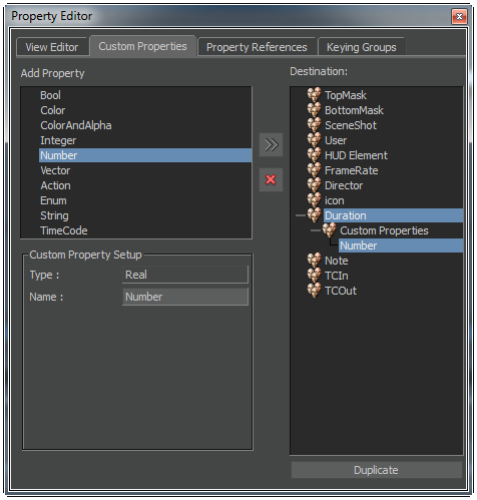
2 Click the **Custom Properties** tab.
- The **Add Property** pane displays the custom properties.
- The **Destination** pane displays all HUD elements that you added.

3 In the **Add Property** pane, select a custom property.

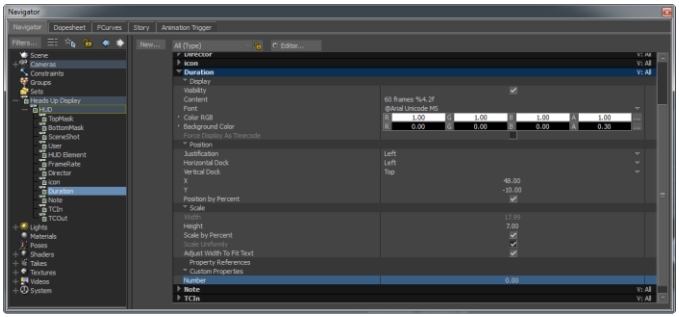
4 In the **Destination** pane, select a HUD element to which you want to add the custom property.

5 Click **Create Custom Properties of the selected type** button .

In the following figure, the **Number** custom property is added to the **Duration** HUD element.



The **Number** custom property appears in the **Duration** HUD element properties.



See the *Customizing HUD element properties* topic in the Help.

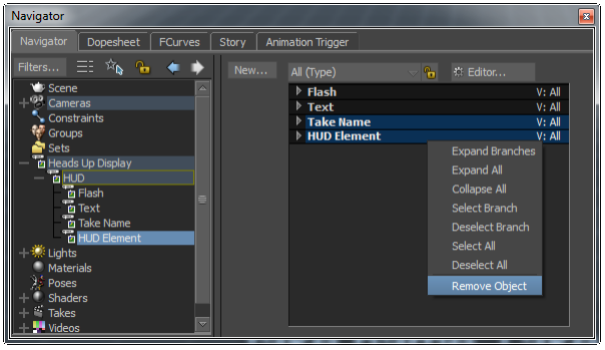
Deleting a HUD element

You can delete a HUD element under a HUD asset in the **Navigator** window. If you delete a HUD element, then all its properties are also deleted.

To delete a HUD element under a HUD asset in the Navigator window:

1. Select a HUD element in the **Navigator** window.
2. Right-click and select **Delete** from the contextual menu.

If you want to temporarily hide one or more HUD elements from the **Properties** pane, right-click on the element(s) and select **Remove Object**.



See the *Deleting a HUD element* topic in the Help.

Displaying HUD elements in the Profiling Center

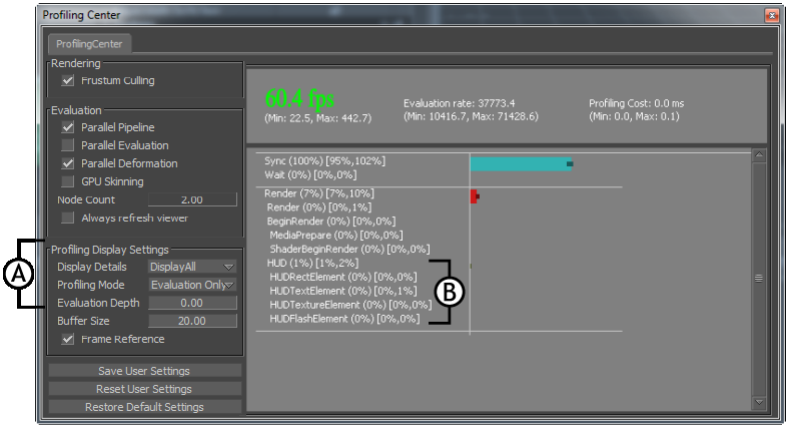
When you add HUD elements to a HUD asset, it is important to know the impact of HUD elements on the MotionBuilder performance. This is possible by viewing the performance metric of HUD and its elements in the **Profiling Center**.

To view the HUD and its elements in the **Profiling Center**:

1. From the **Window** menu, select **Profiling Center**.

   The **Profiling Center** window appears. By default, the **Profiling Center** does not display the HUD and its elements in .
2. From the **Profiling Display Settings** pane **>Display Details** drop-down list, select **Rendering**.
3. From the **Profiling Display Settings** pane **>Profiling Mode** drop-down list, select **Rendering Only**.
4. Double-click the **Profiling Display Settings** pane **>Evaluation Depth** text box, and enter 10 (the maximum value for evaluation depth).

   Alternatively, increase the value of evaluation depth by clicking the left or right mouse button and dragging towards right.



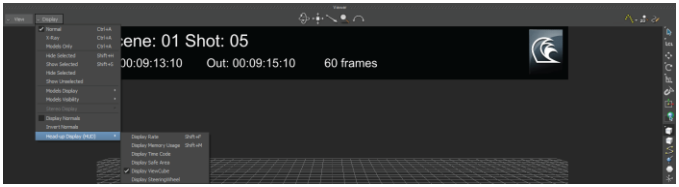
Profiling Center window *A*. Settings to display HUD and its elements *B*. HUD and added element types

TIP Turn off the **Frame Reference** checkbox in the **Profiling Display Settings** pane to view the performance impact in milliseconds (ms).

See the *Displaying HUD elements in the Profiling Center* topic in the Help.

Legacy HUDs in the Display menu

In addition to the HUD elements in the **Heads Up Display Entry** dialog box, there are six legacy elements in the **Viewer > Display > Head-up Display (HUD)** menu.



NOTE When you select a legacy HUD element from the **Display** menu, it displays the intended information in the scene and does not appear under the HUD asset in the **Navigator** window. Therefore, the HUD elements in the **Display** menu do not contain any properties to position, scale, or change the font and their color.

For more information regarding:

- Display Rate, Display Memory Usage, Display Time Code, and Display Safe Area — see the *Display menu* topic in the Help
- ViewCube — see the *ViewCube* topic in the Help
- SteeringWheel — see the *SteeringWheels* topic in the Help

See the *Legacy HUDs in the Display menu* topic in the Help.

Selecting occluded textured geometric elements via the Viewer window

Selecting textured geometric elements in a dense scene via the **Viewer** window can be challenging and time consuming especially if the elements are occluded by other elements. You can change the camera view or use the **Navigator** window to access and select elements behind other elements but this workflow may be quite inefficient particularly with large scenes.

This release optimized the selection of occluded textured geometric elements by providing the following capabilities:

- Selecting an occluded textured geometric element through alpha channels

- Selecting an occluded textured geometric element through alpha channels and selection override color via the API

  See the MotionBuilder SDK Help at: *http://www.autodesk.com/motionbuilder-sdkdoc-2013-enu*.
- Selecting an occluded textured geometric element through partially transparent textures
- Selecting an occluded textured geometric element by using a selection override color

Keyboard shortcuts for selecting and displaying occluded textured geometric elements in the Viewer window

The following table lists the keyboard shortcuts and User Interface (UI) elements associated with the selection and display of occluded textured geometric elements in the **Viewer** window. The keyboard shortcuts are supported in all default and custom cameras.

NOTE All keyboard shortcuts associated with actions within the **Viewer** window require the **Viewer** window to be in an active state.

Action	Keyboard Shortcut	UI Element	State / Alternative to Keyboard Shortcut
To toggle the EZ Selection button on.	Alt + Shift + A		Enable the **IDBufferPicking** property in the Renderer Properties Resources.
To toggle the EZ Selection button off.	Alt + Shift + A		Disable the **IDBufferPicking** property in the Renderer Properties Resources.
To display the transparency threshold of textures.	Shift + A	**IDBufferDisplay**	Enable the **IDBufferDisplay** property in the Renderer Properties Resources.
To define the transparency threshold of textures.	Shift + A + scroll mouse wheel	**IDBufferPickingAlpha**	Adjust the value of the **IDBufferPickingAlpha** property in the Renderer Properties Resources.

Action	Keyboard Shortcut	UI Element	State / Alternative to Keyboard Shortcut
To enable the selection override color for selecting occluded geometric elements.	Alt + Shift + Q	**SelectionOverride**	Enable the **SelectionOverride** property in the Renderer Properties Resources.
To disable the selection override color for selecting occluded geometric elements.	Alt + Shift + Q	**SelectionOverride**	Disable the **SelectionOverride** property in the Renderer Properties Resources.
To define the selection override color for selecting occluded geometric elements.	None	**SelectionOverrideColor**	Define the selection override color in the **SelectionOverrideColor** property fields or button in the Renderer Properties Resources.
To define the selection override color transparency for selecting occluded geometric elements.	None	**SelectionOveride-Transparency**	Adjust the value of the **SelectionOverrideTransparency** property in the Renderer Properties Resources.
To select and cycle through textured geometric elements with a selection override color.	Click a geometric element and press Shift + 1 + scroll mouse wheel	None	Define the selection override color in the **SelectionOverrideColor** property fields or button in the Renderer Properties Resources.
To cycle through textured geometric elements with a selection override color and hide the geomet-	Click a geometric element and press Shift + 2 + scroll mouse wheel	None	Define the selection override color in the **SelectionOverrideColor** property fields or button in the Renderer Properties Resources.

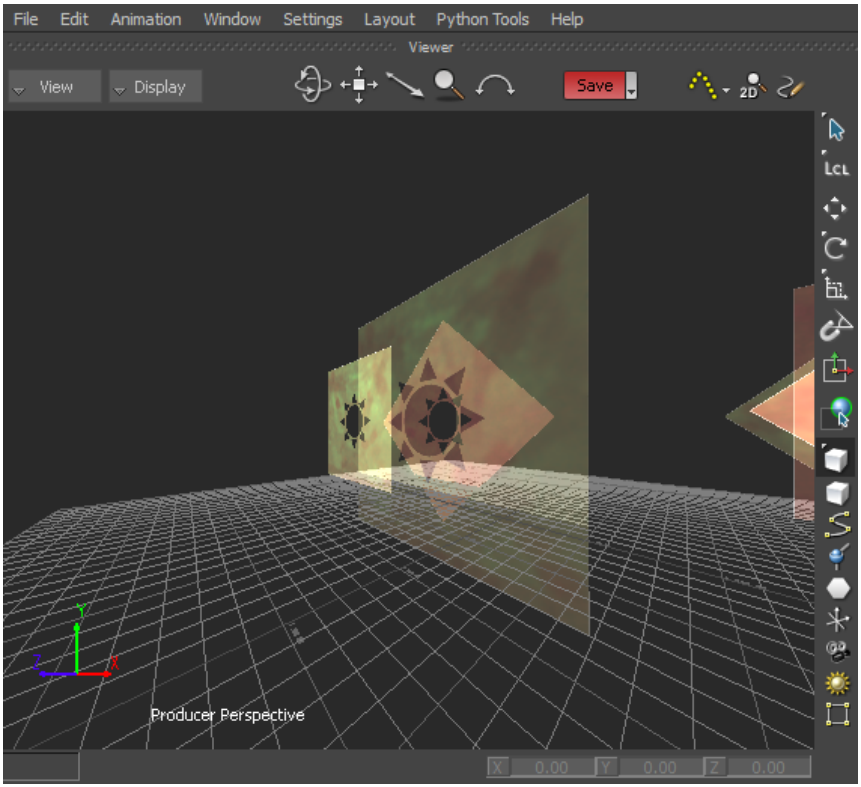
Action	Keyboard Shortcut	UI Element	State / Alternative to Keyboard Shortcut
ric elements in front of the selected geometric element.			
To hide textured geometric elements with a selection override color in front of the selected textured geometric element.	Click a geometric element and press `Shift` + `2`	None	Define the selection override color in the **SelectionOverrideColor** property fields or button in the Renderer Properties Resources.
To show only the selected textured geometric element.	Click a geometric element and press `Shift` + `3`	None	Define the selection override color in the **SelectionOverrideColor** property fields or button in the Renderer Properties Resources.
To isolate the selected textured geometric element with a selection override color and then scroll through all the geometric element with a selection override color (one by one).	Click a geometric element and press `Shift` + `3` + scroll mouse wheel	None	Define the selection override color in the **SelectionOverrideColor** property fields or button in the Renderer Properties Resources.

Selecting an occluded textured geometric element through alpha channels

If you have a dense scene with many geometric elements and you need to select a partially occluded geometric element in the background, you can select an element in the background through the alpha channels of partially transparent textured geometric elements in the foreground using the Easy Selection button () in the Viewer toolbar or its keyboard shortcut `Alt + Shift + A`, and a combination of other keyboard shortcuts to speed up the selection process.

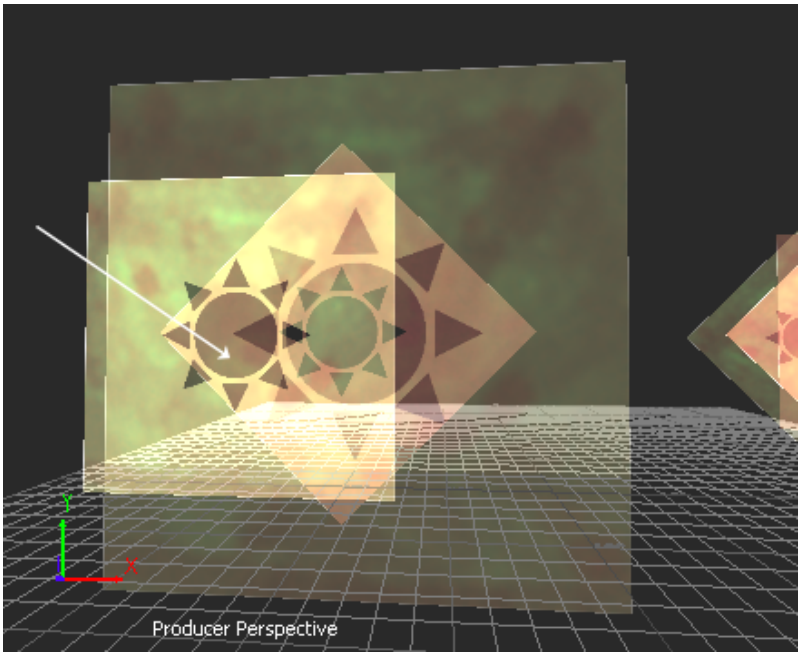
NOTE All keyboard shortcuts associated with actions within the **Viewer** window require the **Viewer** window to be in an active state.

The following image shows partially transparent textured elements, all with an alpha channel. The alpha channels are the sun-shape center of the geometric elements.

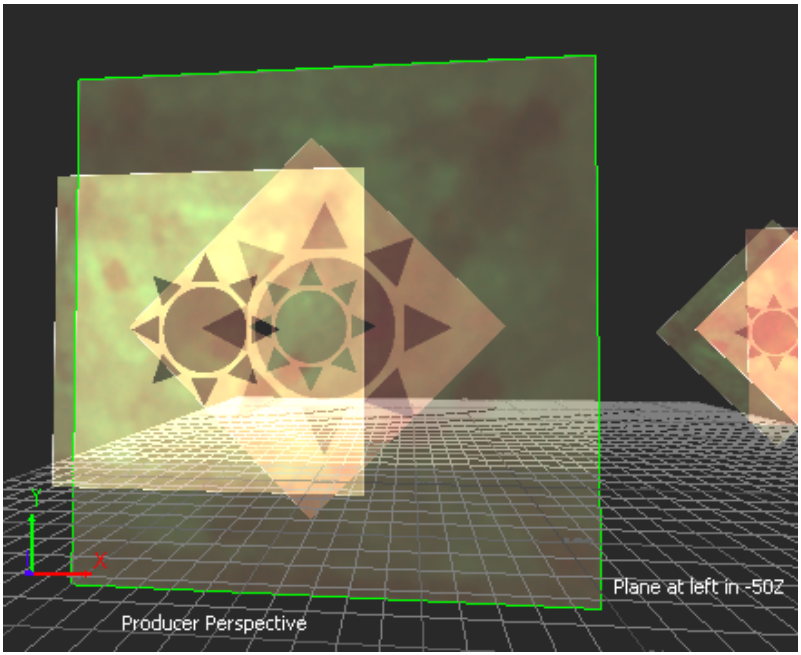


To select an occluded textured geometric element in the Viewer window through an alpha channel:

1. In the Viewer toolbar, click the Easy Selection button () or use the keyboard shortcut `Alt` + `Shift` + `A` to toggle the Easy Selection button on ().
2. In the **Viewer** window, click through the alpha channel of the textured geometric element in the foreground that occludes the geometric element behind it.

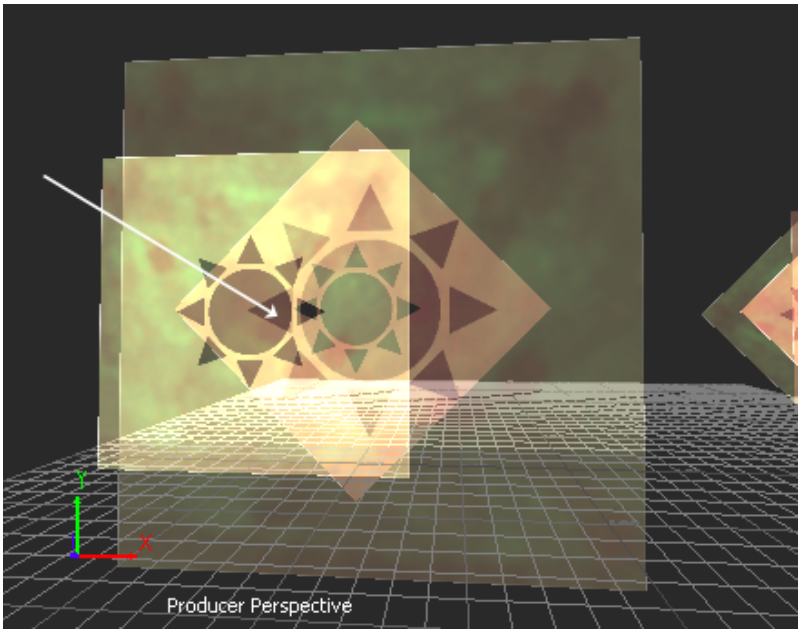


The geometric element behind the geometric element in the foreground is shown selected as its border is highlighted.

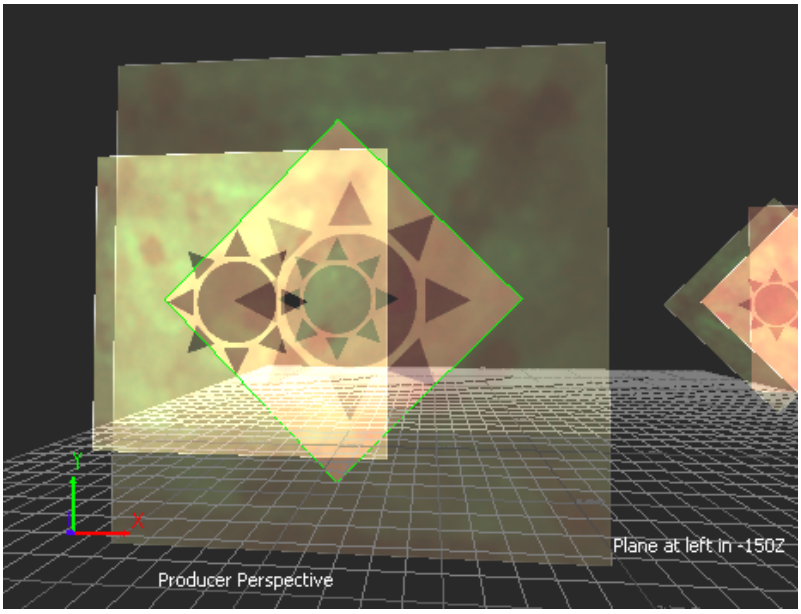


To select an occluded textured geometric element in the Viewer window through multiple alpha channels:

1. In the Viewer toolbar, click the Easy Selection button () or use the keyboard shortcut `Alt` + `Shift` + `A` to toggle the Easy Selection button on ().
2. In the **Viewer** window, click through the alpha channels of the geometric elements in the foreground that occlude the geometric element in the background.



The geometric element in the background is shown selected as its border is highlighted.



Selecting an occluded textured geometric element through alpha channels and selection override color via the API

You can select textured geometric elements through their alpha channels or through a selection override color and transparency via an external device such as a hand-held camera. This enables you to have the option to select through alpha channels and specify the camera to use.

Refer to the MotionBuilder SDK Help at: *http://www.autodesk.com/motionbuilder-sdkdoc-2013-enu*.

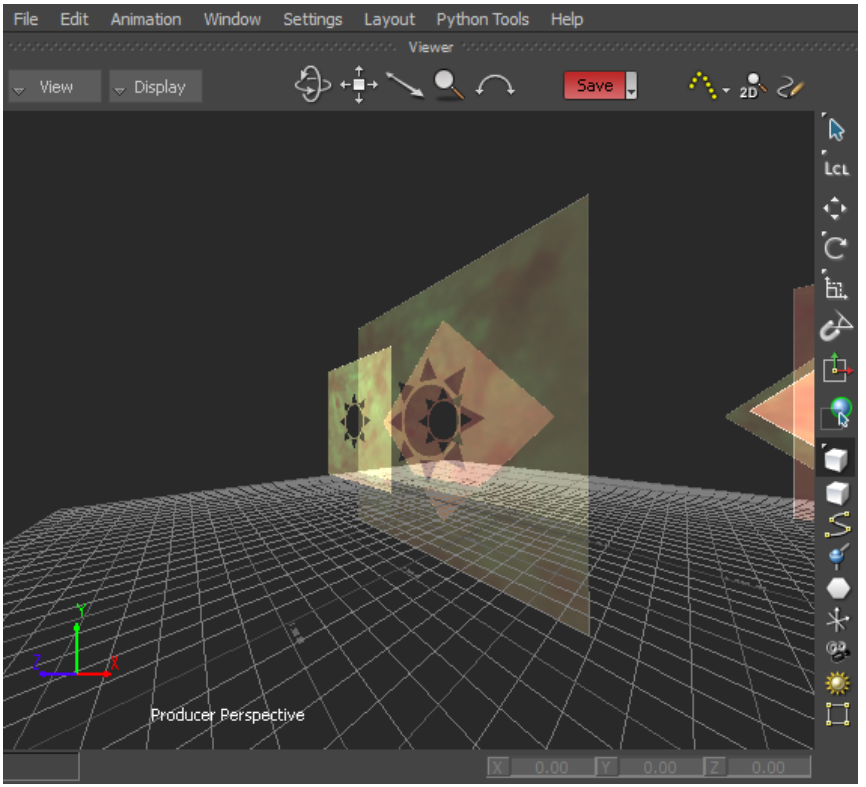
Selecting an occluded textured geometric element through partially transparent textures

Similarly to selecting occluded geometric elements through alpha channels, you can select a geometric element in the background through partially

transparent textured geometric elements in the foreground by using the Easy Selection button () in the Viewer toolbar or its keyboard shortcut (`Alt` + `Shift` + `A`), and by specifying the textures' transparency threshold.

NOTE All keyboard shortcuts associated with actions within the **Viewer** window require the **Viewer** window to be in an active state.

The following image shows partially transparent textured elements, all with an alpha channel. The alpha channels are the sun-shape center of the geometric elements.

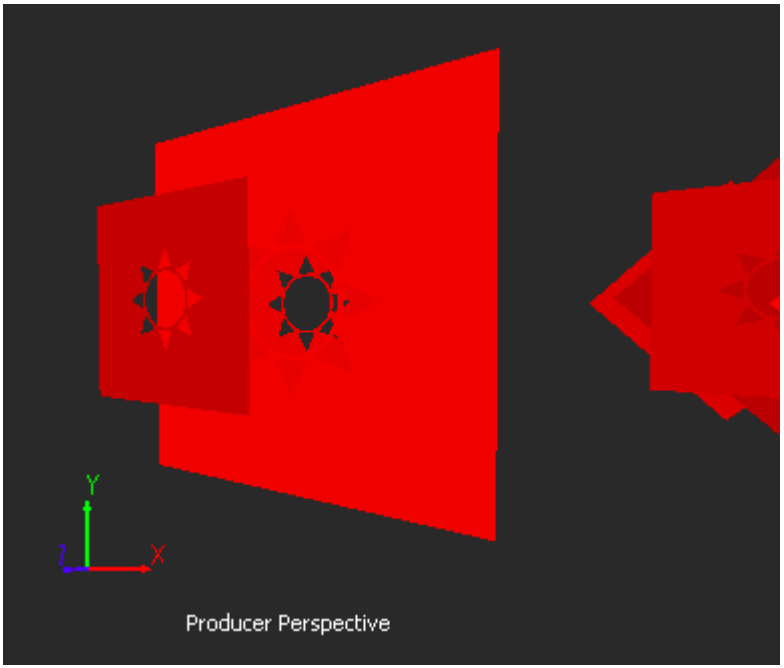


IMPORTANT To use a texture's alpha channel and transparency, the geometric element requires a shader (such as the **Lighted** shader) with its Transparency setting type set to other than **No Transparency**.

To display in the Viewer window the transparency threshold of textures via the Viewer window:

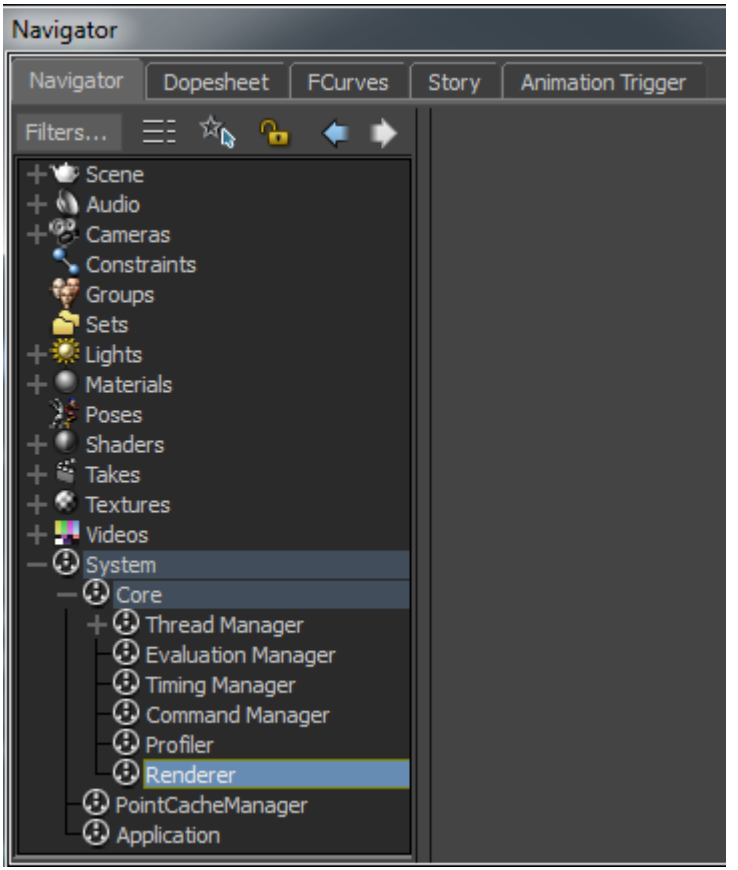
1. In the Viewer toolbar, click the Easy Selection button () or use the keyboard shortcut `Alt` + `Shift` + `A` to toggle the Easy Selection button on ().
2. Click anywhere in the **Viewer** window to make the **Viewer** window active.
3. Press `Shift` + `A`.

   The following figure shows the transparency threshold of textures for all geometric elements in the scene.

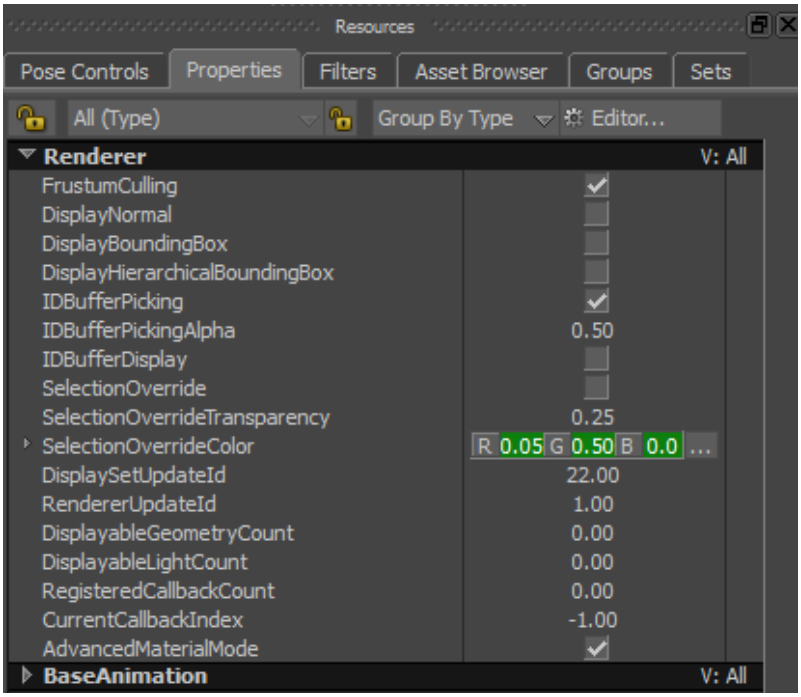


To display in the Viewer window the transparency threshold of textures via the PropertiesResources window:

1. In the **Navigator** window, expand **System**, expand **Core**, then click **Renderer**.



2 In the **Resources** window, click the **Properties** tab.
The **Renderer**'s properties are displayed.



Renderer's Property Resources

3 In the **Renderer**'s **Properties**, enable **IDBufferDisplay**.

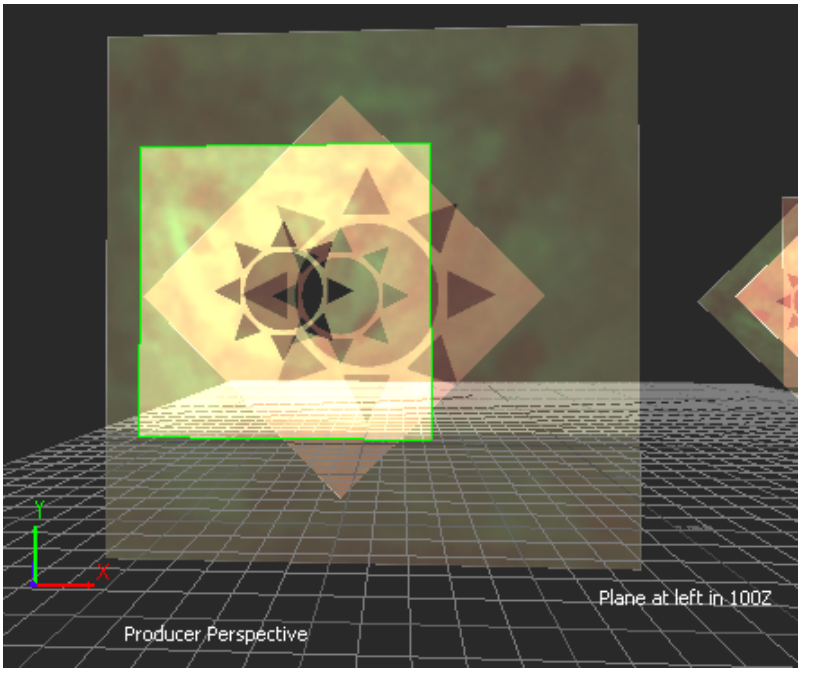
To select an occluded geometric element in the Viewer window through a geometric element's partially transparent texture:

IMPORTANT The geometric element that occludes the geometric element you want to select requires a partially transparent texture and an alpha channel.

1 In the Viewer toolbar, click the Easy Selection button () or use the keyboard shortcut `Alt` + `Shift` + `A` to toggle the Easy Selection button on ().

2 In the **Viewer** window, click a partially transparent textured geometric element.

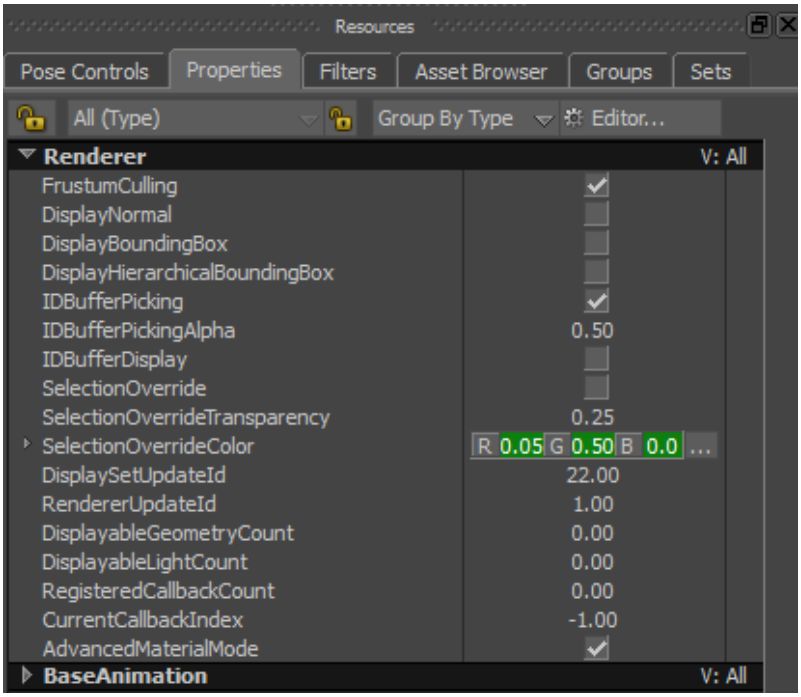
The following figure shows the foremost geometric element is selected.



Selected elements are shown with a highlighted border.

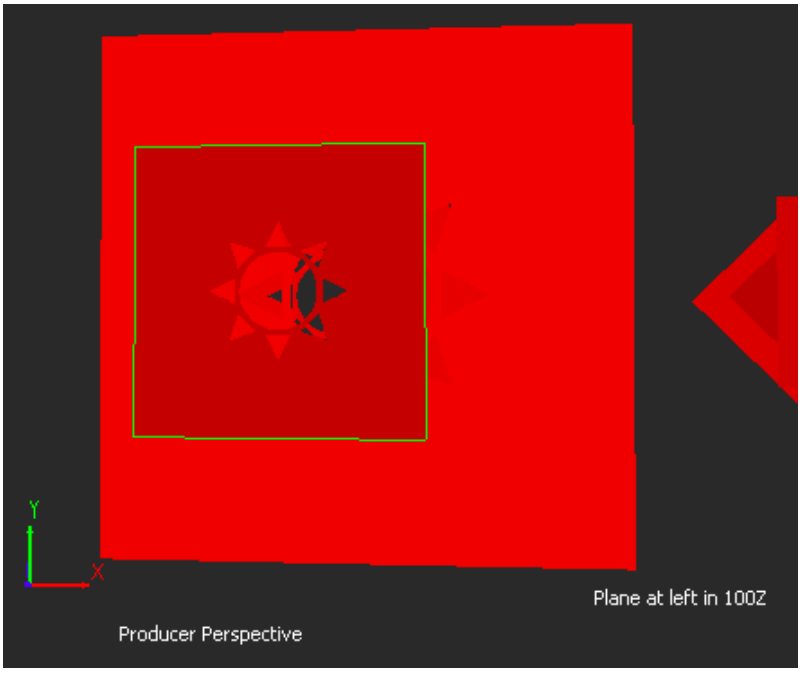
3 Press `Shift + A` to display the textures' transparency threshold (enabling the **Renderer**'s **IDBufferDisplay** property).

The textures' transparency threshold value is shown in the Renderer's **IDBufferPickingAlpha** property field. The following figure shows the textures' transparency threshold is set to 0.50.



IDBufferPickingAlpha property specifies the textures' transparency threshold

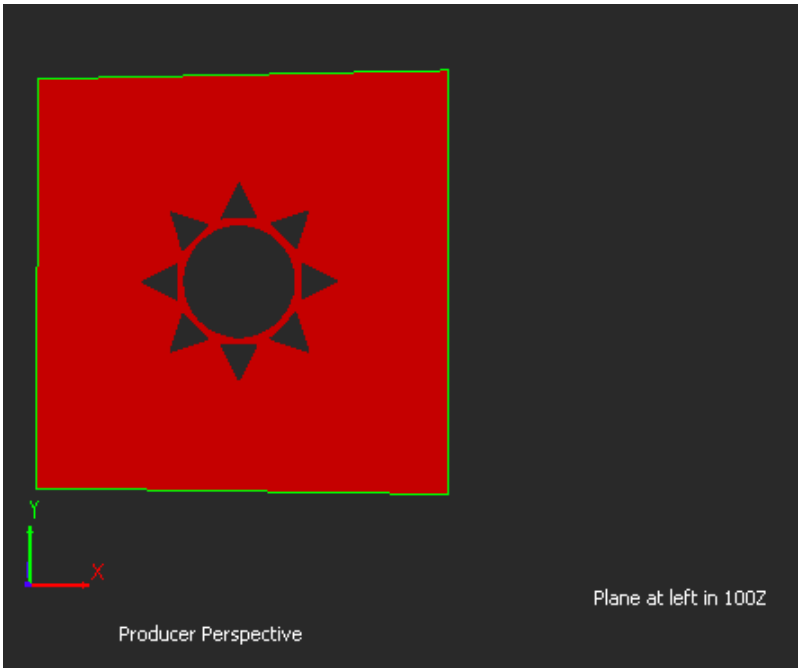
Setting the textures' transparency threshold to 0.50 means that 50% of the textures' transparency is considered when selecting occluded geometry. See the result in the following figure.



4 Press `Shift + A+` scroll the mouse wheel to change the texture's transparency threshold value.

TIP You can adjust the textures' transparency threshold value (ID buffer) via the Renderer's **IDBufferPickingAlpha** property field.

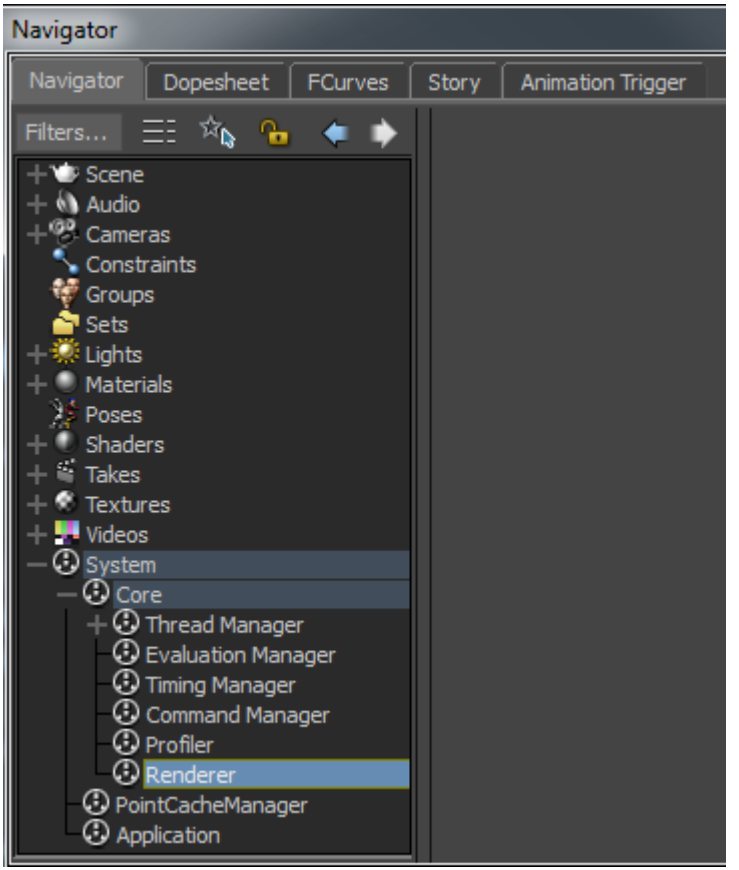
The following figure shows the textures' transparency threshold is set to 1, meaning 100% of the textures' transparency is considered when selecting occluded geometry.



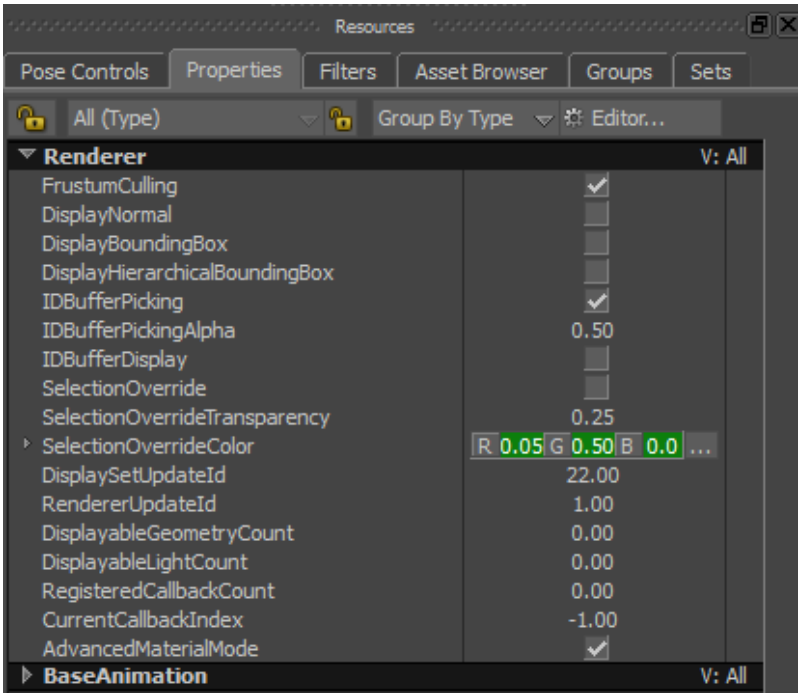
Setting the textures' transparency threshold to 1 enables you to easily select through any of the partially transparent geometry.

To access the IDBufferPickingAlpha property:

1 In the **Navigator** window, expand **System**, expand **Core**, then click **Renderer**.



2 In the **Resources** window, click the **Properties** tab.
The **Renderer**'s properties are displayed.

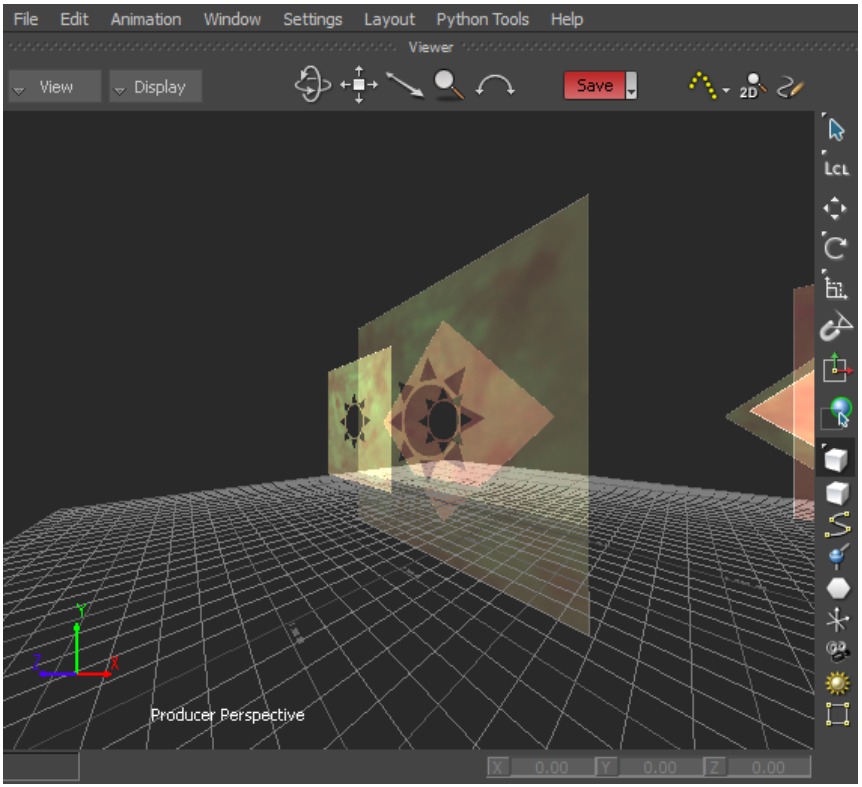


Renderer's Property Resources

Selecting an occluded textured geometric element by using a selection override color

Similarly to selecting occluded geometric elements through alpha channels, you can select a geometric element in the background through partially transparent textured geometric elements in the foreground by using the Easy Selection button () in the Viewer toolbar or its keyboard shortcut (`Alt` + `Shift` + `A`), and by specifying the texture's selection override color. Setting a selection override color uses the textures' diffuse channel for the color override.

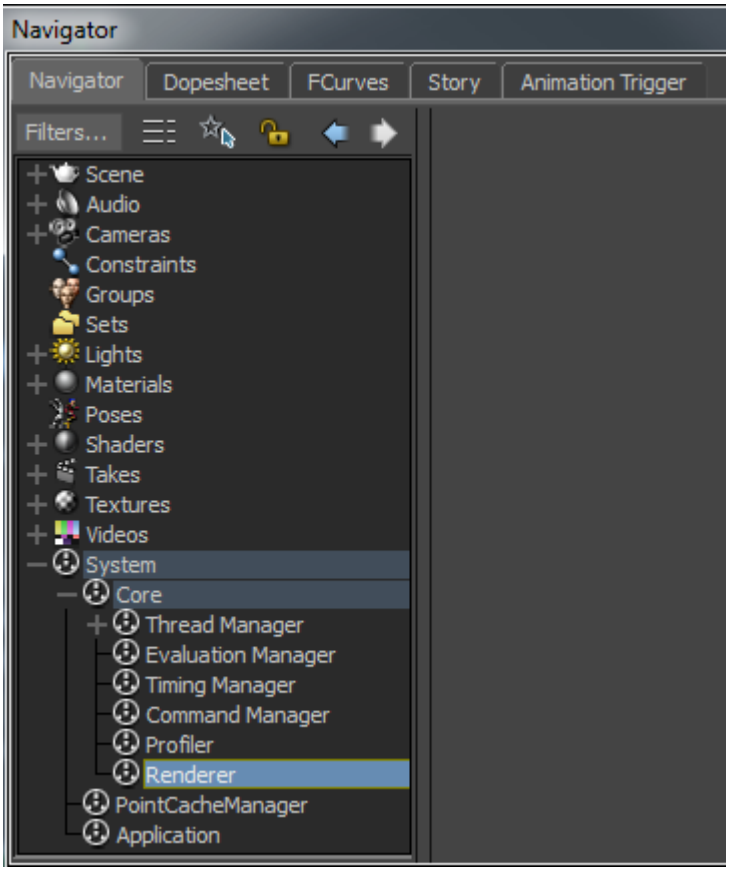
The following image shows partially transparent textured elements, all with an alpha channel. The alpha channels are the sun-shape center of the geometric elements.



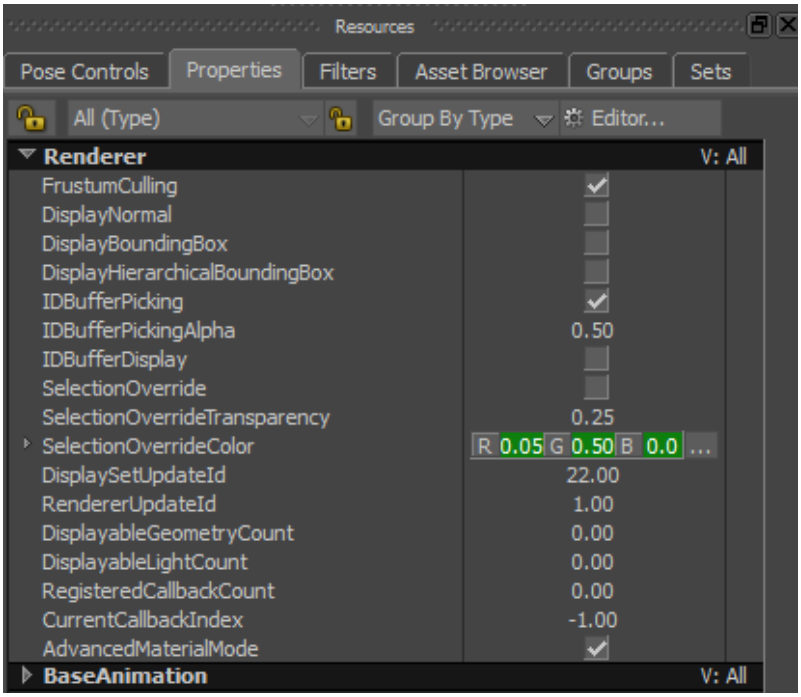
To select an occluded textured geometric element in the Viewer window by using a selection override color:

IMPORTANT To select an occluded geometric using a selection override color, the textured geometric element requires a shader (such as the **Lighted** shader) with its Transparency setting type set to other than **No Transparency**.

1. In the Viewer toolbar, click the Easy Selection button () or use the keyboard shortcut `Alt` + `Shift` + `A` to toggle the Easy Selection button on ().
2. In the **Navigator** window, expand **System**, expand **Core**, then click **Renderer**.

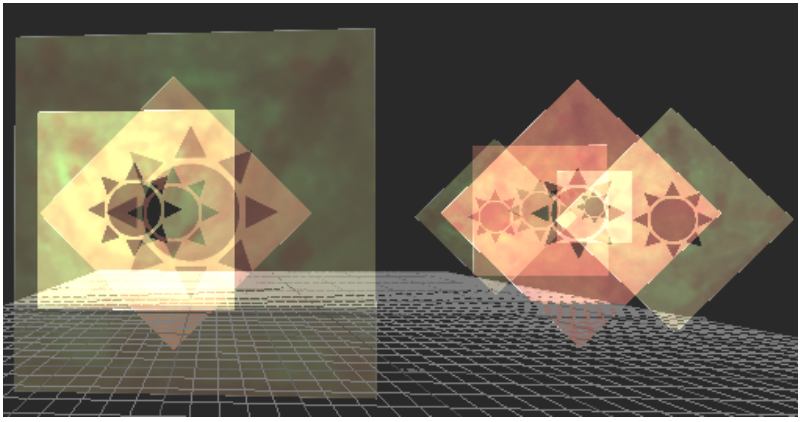


3 In the **Resources** window, click the **Properties** tab.
The **Renderer**'s properties are displayed.



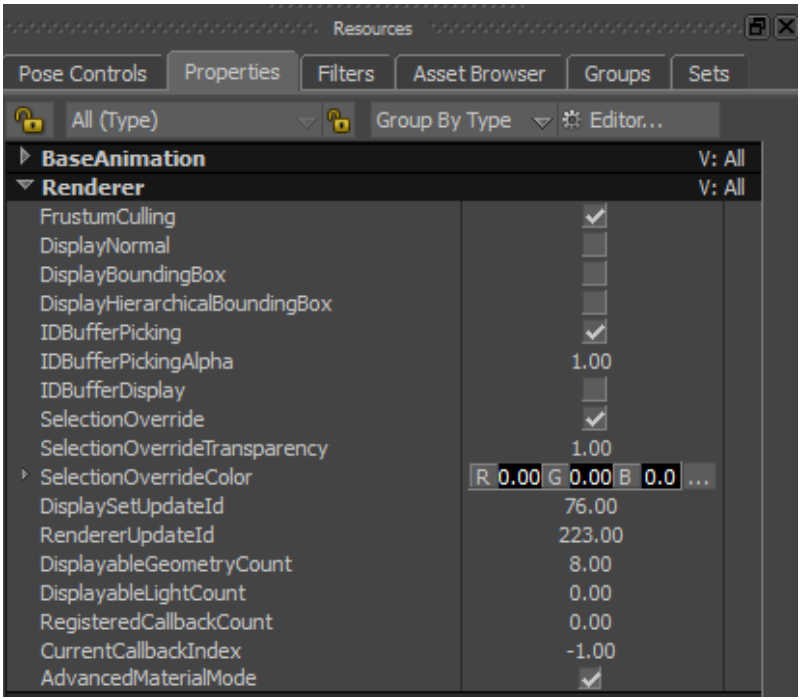
Renderer's Property Resources

4 Click in an empty area in the **Viewer** window to make it active.



5 Press `Alt` + `Shift` + `Q`.

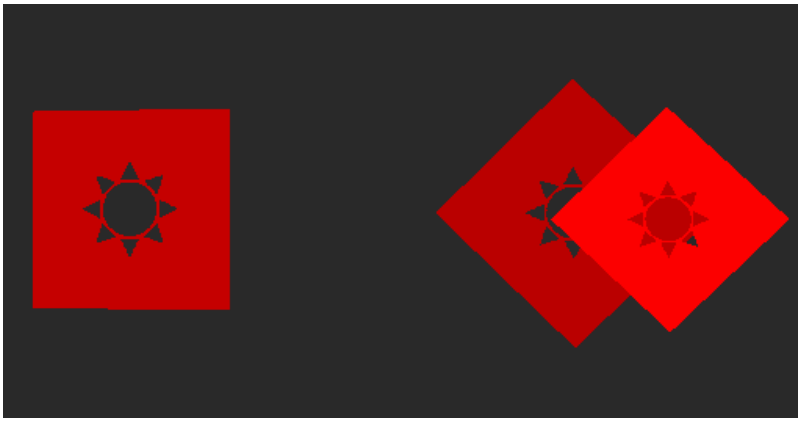
The Selection Override option is enabled. The Renderer's **SelectionOverride** property is shown enabled.



NOTE The **IDBufferPickingAlpha** value is 1.

6 (Optional) Press `Shift` + `A`.

The following figure shows the geometric elements available for selection based on the defined textures' transparency threshold (**IDBufferPickingAlpha**).



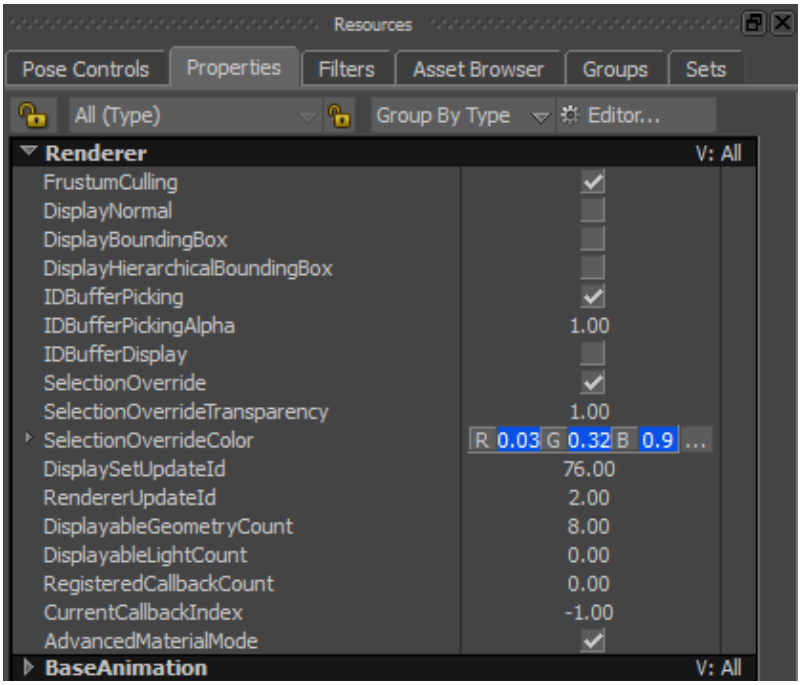
TIP Drag a selection box in the **Viewer** window to see which geometric elements can be selected based on the defined textures' transparency threshold.

7 In the **Renderer**'s properties, define the Selection Override color properties by either:

- dragging in the **SelectionOverrideColorR**, **G**, **B** fields or double-clicking the **R**, **G**, **B** fields to enter values,

- or by clicking the **SelectionOverrideColorR**, **G**, **B** button () and picking a color in the Color window.

The **SelectionOverrideColorR**, **G**, **B** fields update.

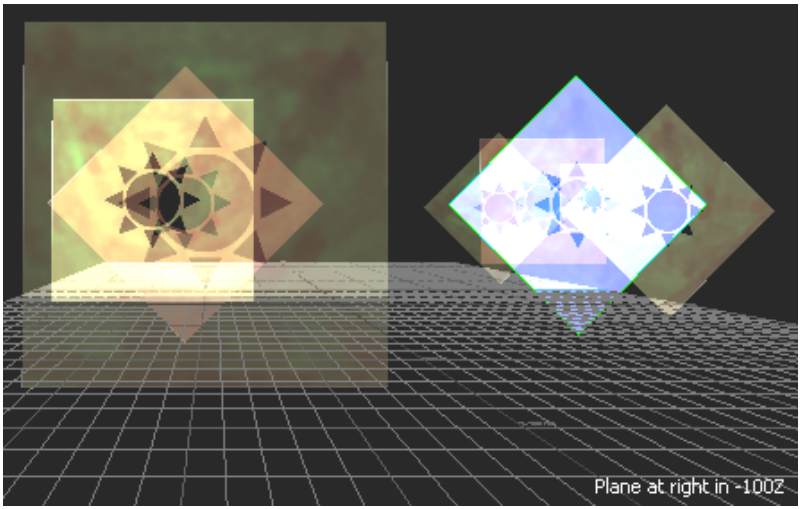


8 In the **Renderer**'s properties, drag or double-click the **SelectionOverrideTransparency** property to define the transparency of the selection override color.

9 In the **Viewer** window, click a textured geometric element.

Setting a selection override color enables you to easily see which textured geometric element is selected.

The following figure displays the selected geometry with the selection override color defined in the **Renderer**'s **SelectionOverrideColor** property.



If you are working in a dense scene containing geometric elements with various subtle transparent textures, taking advantage of the **Renderer**'s **SelectionOverrideColor** property optimizes the selection process.

To select and cycle through textured geometric elements with a selection override color:

1. In the Viewer toolbar, click the Easy Selection button () or use the keyboard shortcut `Alt` + `Shift` + `A` to toggle the Easy Selection button on ().
2. In the **Viewer** window, click a textured geometric element.
3. Press `Shift` + `1` + scroll with the mouse wheel.

   The textured geometric elements with a selection override color are selected one by one using the Z buffer.

To hide textured geometric elements with a selection override color in front of the selected textured geometric element and then cycle through the textured geometric elements (with a selection override color) in the back:

1. In the Viewer toolbar, click the Easy Selection button () or use the keyboard shortcut `Alt` + `Shift` + `A` to toggle the Easy Selection button on ().
2. In the **Viewer** window, click a textured geometric element.
3. Press `Shift` + `2` + scroll with the mouse wheel.

   The textured geometric elements in front of the selected geometric element are hidden and the geometric elements in the back are selected one by one using the Z buffer.

To hide textured geometric elements with a selection override color in front of the selected textured geometric element:

1. In the Viewer toolbar, click the Easy Selection button () or use the keyboard shortcut `Alt` + `Shift` + `A` to toggle the Easy Selection button on ().
2. In the **Viewer** window, click a textured geometric element and press `Shift` + `2`.

To show only the selected geometric element with a selection override color:

1. In the Viewer toolbar, click the Easy Selection button () or use the keyboard shortcut `Alt` + `Shift` + `A` to toggle the Easy Selection button on ().
2. In the **Viewer** window, click a textured geometric element and press `Shift` + `3`.

To isolate the selected textured geometric element with a selection override color and then scroll through the geometric element with a selection override color (one by one):

1. In the Viewer toolbar, click the Easy Selection button () or use the keyboard shortcut `Alt` + `Shift` + `A` to toggle the Easy Selection button on ().
2. In the **Viewer** window, click a textured geometric element and press `Shift` + `3` + scroll with the mouse wheel.

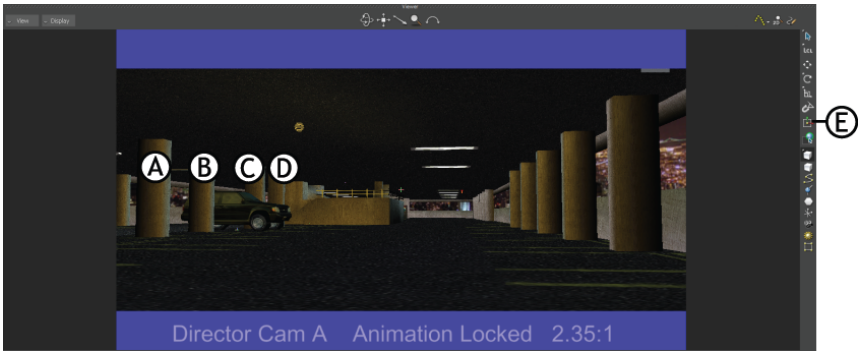
Temporary Pivot Shift

Sometimes the pivot of an object offsets, rather than being at the center point of its bounding box. This prevents you from selecting the center of the object and moving it to a different location. The **Temporary Pivot Shift** tool helps to temporarily shift the pivot of an object, from the offset position, to the center of its bounding box.

Temporarily shifting the pivot from original location

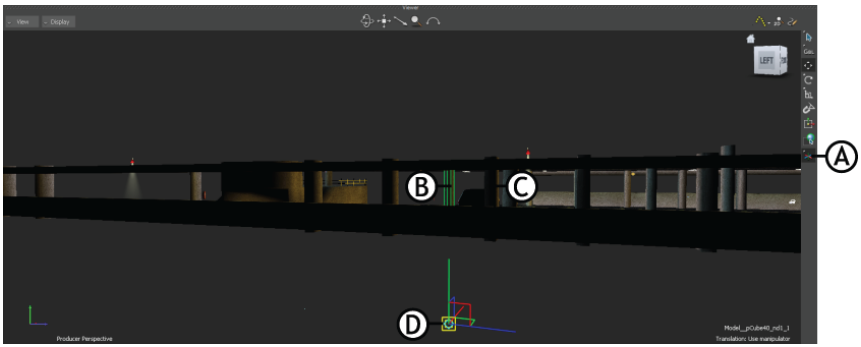
This section provides an example to explain how to move the pivot of an object from an offset position to its center, using the **Temporary Pivot Shift** tool.

The following figure displays a parking lot scene in the Viewer window. The scene displays a car, which is parked between the pillars B and C. Each pillar in the scene is an object.



Camera view of a parking lot scene in Viewer window *A, B, C, D* Pillars *E*. Temporary Pivot Shift icon

In the following figure, the pivot of the pillar B is offset at some distance from its center. The offset location of the pivot is not visible in the normal camera view. To view the actual offset position, you need to rotate the scene until you locate the pivot.



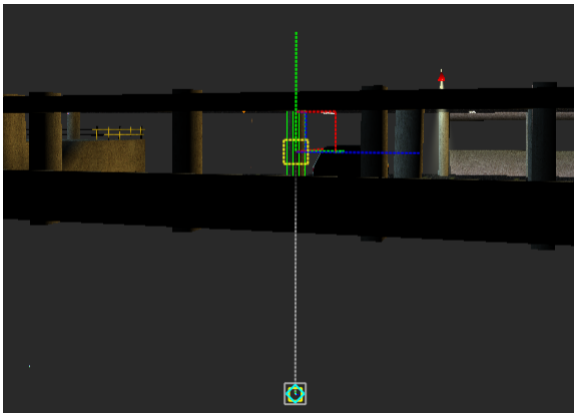
Parking lot scene rotated to locate the pivot of pillar C *A*. Pivot Mode *B, C* Pillars between which the car is parked *D*. Offset location of the pivot of pillar C

In a virtual production environment, if the director want to immediately reposition all the pillars (A, B, C, and D) on the scene, then it is time consuming to rotate the scene, locate the offset position of each pillar, and drag them to the center point of each pillar, before repositioning them.

To avoid this:

1. Select the object that you want to move.
2. From the **Viewer** window toolbar, click the **Temporary Pivot Shift** icon.

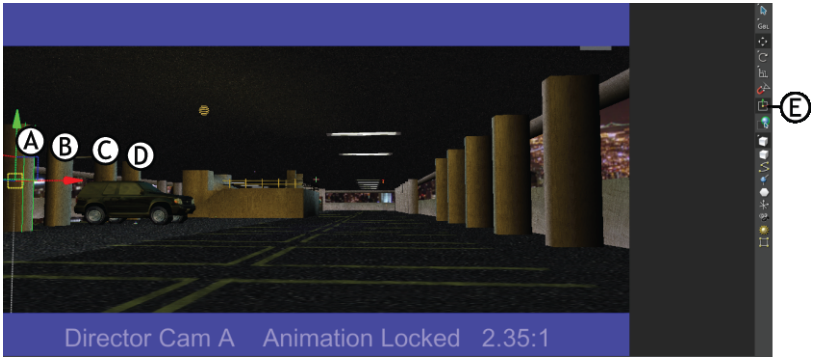
   The pivot moves from the offset position to the center of the bounding box of the object, as shown in the following figure:



Notice that the coordinates of temporary pivot and the line that connects the offset location and the temporary shift to the bounding box center appears dotted. This specifies that the shift from offset pivot location to the center of an object is only temporary.

TIP Instead of clicking the **Temporary Pivot Shift** tool from the **Viewer** toolbar, press the `Alt+Shift+W` keys to toggle between normal and temporary pivot modes.

In the temporary pivot mode, selecting any object in the scene shifts the pivot of the respective object, temporarily from its offset location to the center of the bounding box. So you can select each pillar and move to the desired location in the scene.



Parking lot scene *A, B, C, D* Pillars moved backward *E.* Temporary Pivot Shift tool active

By default, the temporary pivot appears in the translation mode (T). You can change to the rotation and scaling modes using the R and S keys, respectively.

You can manipulate the translation, rotation, and scaling of pivots using the properties listed in **Resources** window **>** **Properties** tab.

See the *Transformation Pivots properties* in the Help.

You can save a scene with the `Alt+Shift+W` keys enabled. When you reload the scene, it contains the saved settings.

See the *Temporarily shifting the pivot from original location* topic in the Help.

Advanced Audio Engine

While shooting in a virtual production environment, audio helps the actor, director, and editor to confirm that the visual scene is in sync with the story. The advanced audio engine lets you add multiple audio tracks in the **Story** window, and play them back. In a take-based approach, a take is considered as the destination for an audio file to play. Therefore, you can assign only one audio file to a take.

With the advanced audio engine, you can:

- Stretch multiple audio tracks in time
- Import 16-bit *.WAV*, *.MP3*, and *.BWF* file formats

  NOTE You need to install Apple QuickTime player to import *.MP3* files.

  The Broadcast Wave Format (BWF) is based on the Microsoft WAVE audio file format, to which the European Broadcasting Union (EBU) has added a Broadcast Audio Extension chunk. In addition to the audio data, a *BWF* file contains the metadata which is considered necessary for all broadcast applications. This audio format enables seamless exchange of audio material between different broadcast environments and between equipments based on different computer platforms.
- Export WAV files from MotionBuilder SDK.

  See the MotionBuilder SDK Help.

  NOTE You cannot export *BWF* files.
- Choose left, right, or both channels to play the audio content
- Lock audio speed when constraining the audio to a take

See the *Advanced Audio* topic in the Help.

Verifying animation and audio sync in the Story window

In a virtual production environment, you can use the **Story** window to create character animation tracks and audio tracks. You can then insert clips to the audio tracks and play the character animation and audio tracks together to check whether the visual movements in the character animation match with the audio. In the process, you can use various audio settings to achieve the desired audio quality.

See the topics *Creating character clips* and *Creating audio clips* in the Help.

TIP Before creating animation and audio tracks, insert a folder using the **Insert** option from the **Story** window contextual menu. A folder is useful to organize the tracks.

See the *Story contextual menu* topic in the Help.

Adding audio clips from Navigator window

To add audio clips from the Navigator window to the Story window:

1. Load an audio file.

   The audio file appears under the **Audio** asset in the **Navigator** window.

   In the following figure, the imported audio file is assigned to Take 001. If you import multiple audio files, then you need to assign individual Takes for each file.

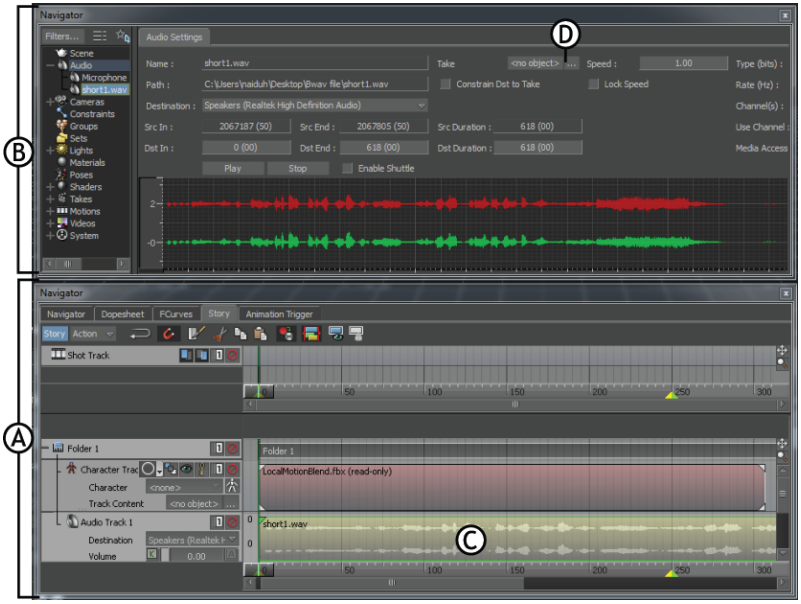
Navigator window *A*. Audio file *B*. Take to which the audio file is assigned to

2. From the **Window** menu, select **Add Navigator**.

   A second **Navigator** window appears.

3 In the first **Navigator** window, click the **Story** tab.

4 From the second **Navigator** window, click the audio file, drag, and drop it on the **Audio Track**, which you already created in the **Story** window of the first **Navigator** window.



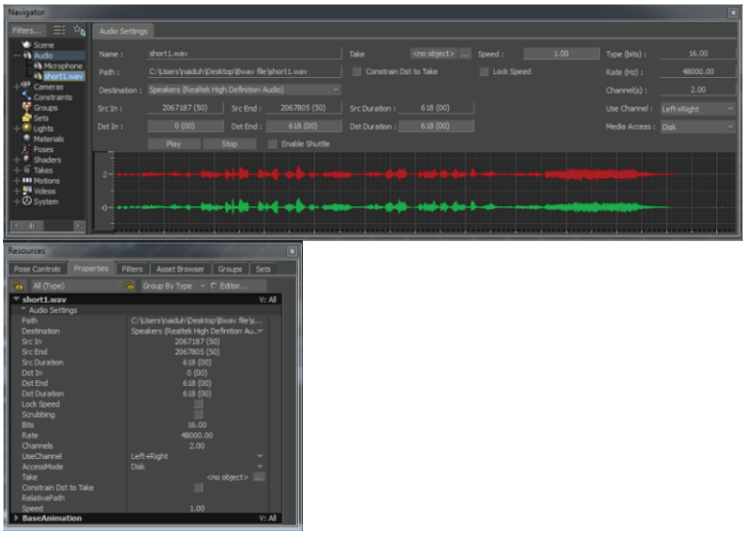
Two Navigator windows *A.* First Navigator window *B.* Second Navigator window *C.* Dragged and dropped audio clip *D.* Take name disappears after assigning the clip to the track

See the *Adding audio clips from the Navigator window* topic in the Help.

See the topic for more information.

Understanding audio settings

The audio settings help to adjust the speed of the audio, select left, right, or both channels, and so on. The audio settings appear in the **Navigator** window and in the **Resources** window **>** **Properties** tab.



From the **Audio Settings** in the **Navigator** window, click:

- **Play** — to hear audio content
- **Stop** — to end the audio

The following table explains the audio settings in the **Resources > Properties** tab.

NOTE The setting name mentioned within brackets is the corresponding name that appears in the **Audio Settings** pane of the Navigator window.

Audio Setting	Description
Path	Path from where the audio file is imported
Destination	Destination device to play the audio file. Choose the destination device from the list of all the connected audio devices.
Src In Point	The count of audio samples recorded in the source audio sequence, and the starting frame of the audio file. This information is stored as a time stamp, only in the *BWAV* header files and not in the *WAV* files.

Audio Setting	Description
Src End Point	The last frame of the source audio file.
Src Duration	The total number of frames included in the source audio file. **NOTE** The Src In Point, Src End Point, and Src Duration are the existed parameters when the source audio files was recorded. So you cannot alter the data in these fields.
Dst In	The frame from which the audio plays in the selected destination (output device such as speakers).
Dst End	The last frame of the audio file.
Dst Duration	The total duration of the audio file. **NOTE** Alter the **Dst In**, **Dst End**, and **Dst Duration** values to specify the start and end time to play the audio file.
Scrubbing (Enable Shuttle)	Enables the shuttle mode. You can shuttle the audio, back and forth, between the start and end frames in the time line. To shuttle the audio, back and forth, press J and the left mouse button simultaneously and move the mouse to the left or right on the **Timeline**. This option helps to hear the audio by increasing and decreasing the speed without manually changing the value of **Speed**.
Type (Bits)	Specifies the number of bits of information recorded for each audio sample. The depth of bit (8, 16, or 24) directly corresponds to the resolution and quality of an audio sample.
Rate (Hz)	Specifies the audio sample count per second. **NOTE** Type and Rate values are part of the header information of the audio file.
Channels	Specifies whether the source audio is a mono (1.0) or stereo (2.0) file.

Audio Setting	Description
Use Channel	The Left or Right (mono) and Left+Right (dual) channels are supported. If you select only the Right or Left channel, then the graphical representation of the unselected channel appears faded in the **Navigator** window.
Access Mode (Media Access)	Specifies from which location to pick and play the audio file. You can choose **Disk** or **Memory** as the location to pick the audio file.
Take	Specifies the current take to which the audio file is assigned to. You can change the **Take** value, if there are many audio files and want to assign each audio file to different Takes.
Constrain Dst to Take	Restricts from modifying the **Dst In** value. **NOTE** Turning on this option, automatically turns on the **Lock Speed** option.
Relative Path	The location of the audio file.
Speed	The velocity at which sound travels in a given medium under specified conditions. Increase or decrease the audio speed according to the slow or fast movements in your animation scene. Using this option, you can adjust the audio speed from 0.01 to 10. This means, you can play the audio 100 times slower or 10 times faster than the original speed (1.0).

See the topic for more information.

To get the relative path of the audio file:

1. From the **File** menu, select **Save As**.
   The **Save As** window appears.
2. Specify a name for the file, and click **Save**.
   The path where you saved the file with audio content appears in the **Relative Path** field. You can use the relative path, later, to open the file with the audio content.

Retime Tool

In the FCurves toolbar, the **Retime Tool** lets you adjust the timing of key movements in your animation to make them occur faster or slower. For animators working in a pipeline with multiple Autodesk applications, similar animation retiming tool is available in other applications including Maya, 3ds Max, and Softimage.

A common task in all stages of animation is changing the timing of a motion. Performing tiny refinements to the timing of an animation is a repetitive and time consuming task for an animator. Therefore, animators need:

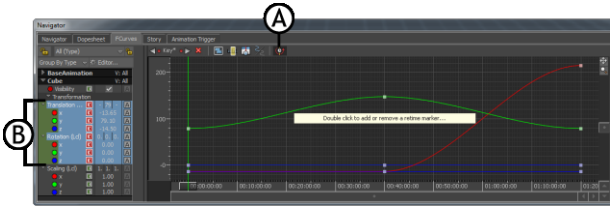
- A predictable method to manipulate key movements (slower or faster) in an animation
- High quality curves that do not require additional cleanup tasks

Retiming key movements in animation

To retime key movements in an animation, you can create retime markers in the FCurves pane, then drag them to adjust the timing of key movements.

To create retime markers:

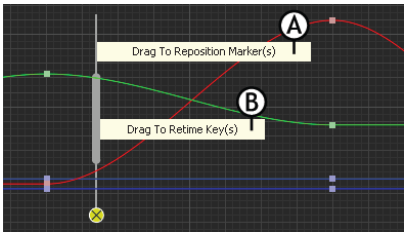
1. Select the object with animation.
2. In the FCurves editor, select the channels (T, R, or S).
3. In the FCurves toolbar, click  .
   This activates the Retime mode in the FCurves editor.



FCurves editor *A*. Retime Tool *C*. T and R channels selected

4. Double-click on the FCurves pane to add retime markers around segments of the animation curves you want to retime.

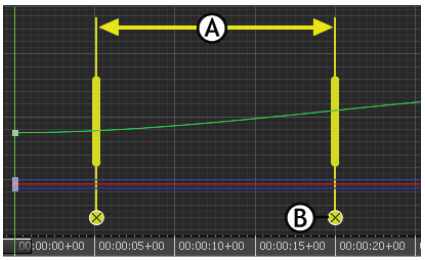
NOTE Add a single marker to reposition the marker or to ripple all animation out from a single point.



Single retime marker added *A*. Time bar (thin upper and lower part) to reposition the marker *B*. Handle (thicker middle part) to retime animation

5 Add two or more markers to retime the time span between them.

For example, in the following figure, two markers are added at frames 5 and 20 to retime animation between them.



Retime markers *A*. Solid line between markers *B*. Delete icon

When there are multiple retime markers, a solid line displays between each pair of markers. It indicates that dragging either marker affects any keys between the first marker and the next. Dragging two retime markers further apart slows the motion between them, and dragging them closer together speeds it up.

To delete a retime marker, click the **Delete** icon or double-click anywhere on the marker.

When you drag the marker, the timing of the animated object in the Timeline of **Transport Controls** window and in the scene loaded in the **Viewer** window is changed.

TIP To exit the retime mode, click  .

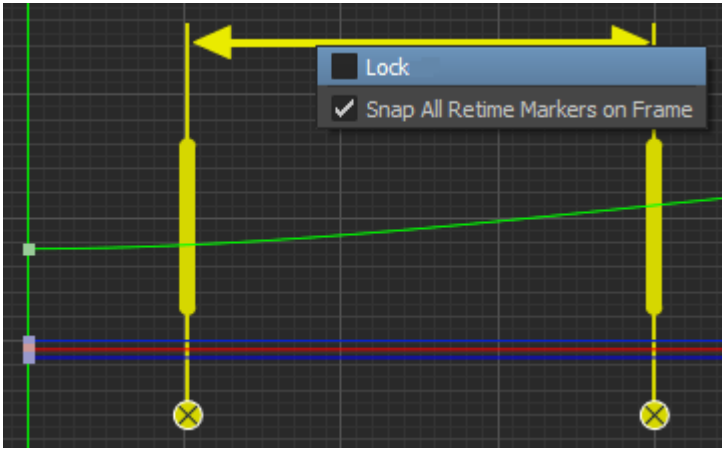
TIP In the retime mode, press Shift+mouse drag to move the FCurves grid, Ctrl+mouse scroll to zoom in and zoom out the view, and hold Shift and select multiple retime markers.

Locking time span between two markers

You can lock the time span between two markers to move the segment in time, without scaling or adjusting the shape of the curves within.

To lock the time span between two markers:

1. Right-click the solid line that appears between two markers.
2. From the contextual menu, select **Lock**.



Activating the **Lock** option disables the adjustment of FCurves within a segment as you drag the retime markers.

Locking a segment of animation is useful when you want to retime multiple keys together, without adjusting the shape of the curves. Once the segment is locked, drag the markers to shift the entire segment to a new location in time.

TIP To unlock a segment, right-click on the solid line and turn off the **Lock** option.

Snapping markers on the nearest frame

When you drag a marker, you can choose to snap it on the nearest frame or to maintain the last position of your movement. By default, all markers are snapped on the nearest frame to each marker.

To disable snapping of markers to the nearest frame:

1. Right-click the solid line that appears between two markers.
2. From the contextual menu, deselect **Snap All Retime Markers on Frame**.

   If you disable snapping, then the marker appears on the same frame where you created.

Inserting a key on a Retime marker

You can insert a key on all selected channels currently displaying under the retime marker.

To insert a key on a marker:

1. Right-click anywhere on the marker.
2. Select **Insert Key**.

   NOTE In the retime mode, you cannot edit any keys or FCurves.

   TIP In the retime mode, press Ctrl+Z to undo your last 10 actions.

See the *Retime Tool* topic in the Help.

Using Video Out Window

You can invoke a non-interactive copy of the pane zero window. This copy is useful to watch the current scene by placing the copy of pane zero window on a secondary monitor and continue with other tasks in MotionBuilder.

To invoke a copy of the pane zero window:

1. From the **Navigator** window > **Videos** folder, double-click **Video Output 1**.

The video output settings appear on the right pane.

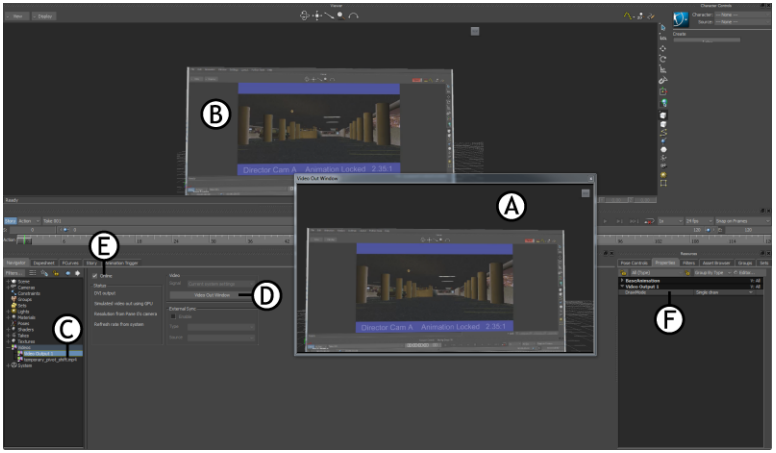
2 Click the **Video Out Window** button.

The **Video Out Window** appears with a blank screen, since it is in the inactive mode.

NOTE Alternatively, invoke the **Video Out Window** from the **Window** menu **>Video Out**.

3 Turn on the **Online** checkbox to activate the **Video Out Window**.

The **Video Out Window** displays exactly what is being displayed in the **Viewer**.

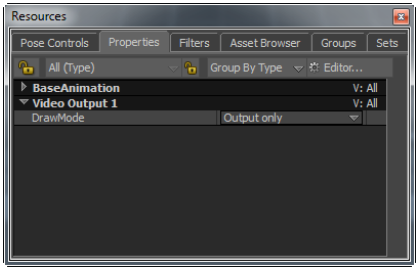


MotionBuilder interface *A.* Video playing in the copy of pane zero window *B.* Video playing in the Viewer *C.* Video Output 1 *D.* Video Out Window button *E.* Online checkbox *F.* DrawMode property

By default, the **Video** and **External Sync** settings are disabled. These settings are enabled, only if you use an Nvidia SDI Output card in MotionBuilder.

IMPORTANT Using the **Video Out Window** may impact the scene frame rate. Moreover, loading huge video files in the **Video Out Window** could impact MotionBuilder performance.

TIP To minimize the impact on frame rate, select **Output only** from the **Resources** window > **Properties** tab > **Video Output 1** > **DrawMode** property drop-down list.

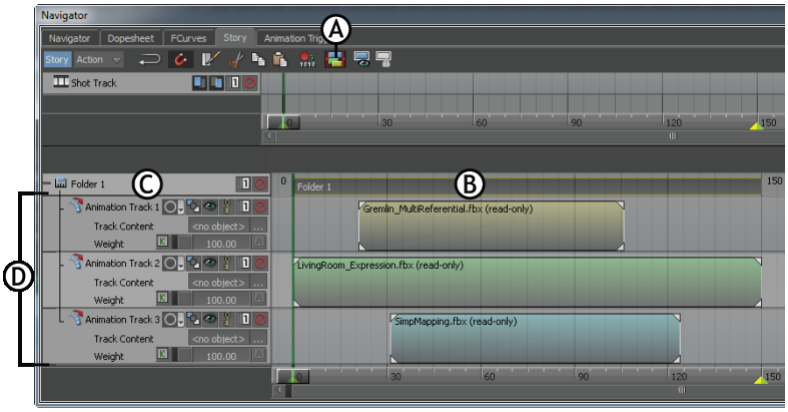


See the *Using Video Out Window* topic in the Help.

Summary Clip in Story Window

In the **Story** window, you can insert multiple tracks and add audio, animation, or video clips to each track. You can insert a folder and group multiple tracks within it. If there are many clips within a folder, then it is time consuming to select and move each clip along the timeline. To avoid this, the **Summary Clips On/Off** window in the **Story** toolbar allows you to display a summary clip, as part of the folder track. By moving the summary clip, you can move all the clips in a folder.

To display the summary clip, click the **Summary Clips On/Off** icon from the **Story** toolbar. The summary clip appears at the top of all clips in the folder.



Story window *A*. Summary Clips On/Off icon *B*. Summary clip *C*. Folder *D*. Tracks and clips within the folder

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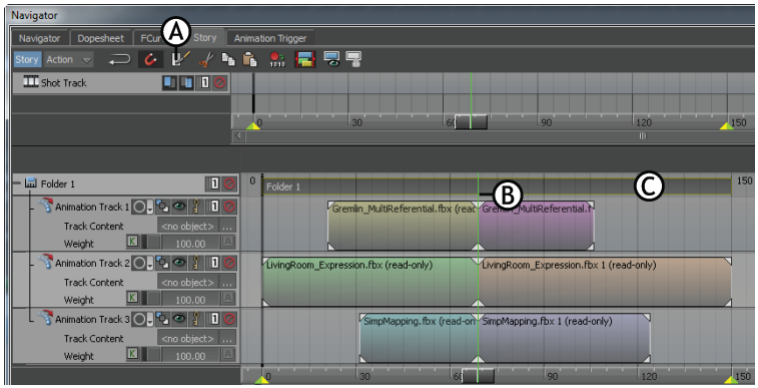
NOTE The length of the default summary clip is equal to the timeline of the longest clip in the folder.

Using the summary clip, you can:

- Drag all clips in a folder along the timeline.
- Scale the summary clip in time. When you scale the summary clip, all the clips within the folder also scale accordingly in time. To scale the summary clip, click the **Loop/Scale Clips** icon () in the **Story** toolbar to turn on the scale mode ().

  NOTE Currently, you can only scale all clips and cannot loop them.

- Razor or cut up one or all clips, which lie along the current transport control time, within the folder. To do this, select the summary clip and move the timeline to the position where you want to razor the clip(s). Click the **Razor** icon from the **Story** toolbar.

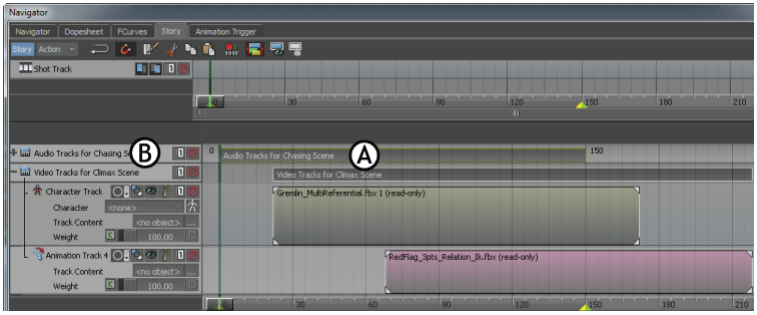


Story window *A*. Razor icon *B*. Position of timeline where the clips are razored *C*. Summary clip is not razored

NOTE The **Razor** tool cuts only the clips within a folder. It does not affect the summary clip.

TIP Press `Ctrl+Z` to undo the actions performed in the **Story** window.

The name of summary clip is same as the name of the folder track. Right-click on the folder track or the summary clip, and select **Rename** from the contextual menu to rename both the folder track and summary clip. The name of the summary clip is helpful to know the summary of a folder, when you minimize the folder.



Story window *A*. Names of summary clip and folder are same *B*. Folder is minimized

If you delete the summary clip, then the folder and the clips within it are deleted. To delete the summary clip, right-click on it and select **Delete** from the contextual menu.

See the *Adding a Summary clip for tracks* topic in the Help.

Selective Display of Tracks in Story Window

Consider the following scene that contains many characters. In the Story window, notice that each character in the scene is represented by an animation track and all tracks have similar names. If you want to manipulate the timing of a character, then it is difficult to find the animation track for that particular character in the **Story** window.

Viewer window and Story window *A*. Play ground scene with many characters *B*. Animation tracks with similar names *C*. Filter by selection tool

Filtering by selection

The **Filtering by selection** () tool displays only the animation tracks that belong to the objects that you select in a scene.

To display tracks that belong to only the selected objects:

1. From the scene, select the object(s).

   For example, in the following figure, an animation character is selected.
2. From the **Story** toolbar, click the **Filter by selection** icon.

Viewer window and Story window *A*. Selected character *B*. Animation track for the selected character *C*. Filtering by selection icon *D*. Message to inform that only the track for the selected object is displayed

According to your needs, manipulate the timing of the selected character.

NOTE When the **Filtering by selection** tool is active, the background color of the **Story** window appears blue.

Lock filtering by selection

If you want to perform additional tasks on the scene, such as inserting an object, it is important to lock the view in the **Story** window. To achieve this, click the **Lock filtering by selection** () tool.

NOTE The **Lock filtering by selection** icon is enabled only if the **Filtering by selection** icon is active.

Viewer window and Story window *A.* Lock filtering by selection icon is active *B.* Current position of all characters are unchanged *C.* Position of the track for the already selected character is unchanged in the Story timeline *D.* Object is added to the scene *E.* Story window displaying the locked status

To unlock the characters and manipulate their timing, click the **Filtering by selection** icon.

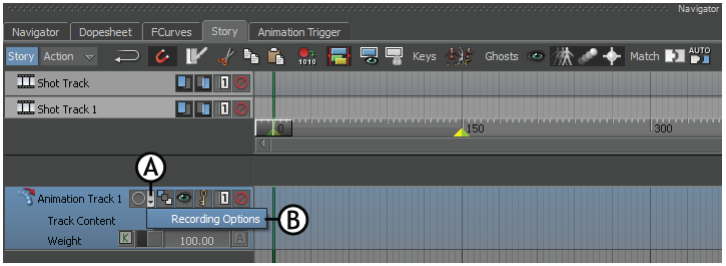
NOTE When the **Lock filtering by selection** tool is active, the **Story** window background color appears yellow.

See the *Displaying only the selected tracks* topic in the Help.

Track Recording Options in Story Window

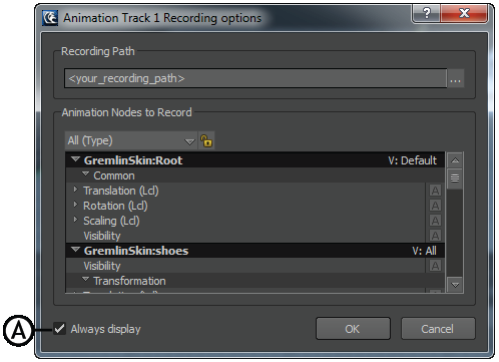
The Story Tracks include a Track **Recording options** button ( ) with a **Recording Options** menu ( ).

Click the **Record Options** menu ( ) to display the **Animation Track Recording options** dialog.



Story window *A*. Record Options menu *B*. Recording Options menu

When you click the **Recording options** button ( ) in the Story window's **Animation Track**, **Character Track**, or **Camera Animation Track**, the **Track Recording options** window for that specific track displays. In the Track Recording options window, the **Always display** checkbox is turned on by default. If you turn this checkbox off, then in your next session, you cannot invoke the **Animation Track Recording options** window by clicking the **Recording options** button.



Animation Track Recording options window *A*. Always display checkbox turned on by default

Unlike the Track Recording options dialog, the Properties window includes all the Track recording options.

See the *Recording Story tracks to memory or disk* topic in the Help.

Recording Story tracks to memory or disk

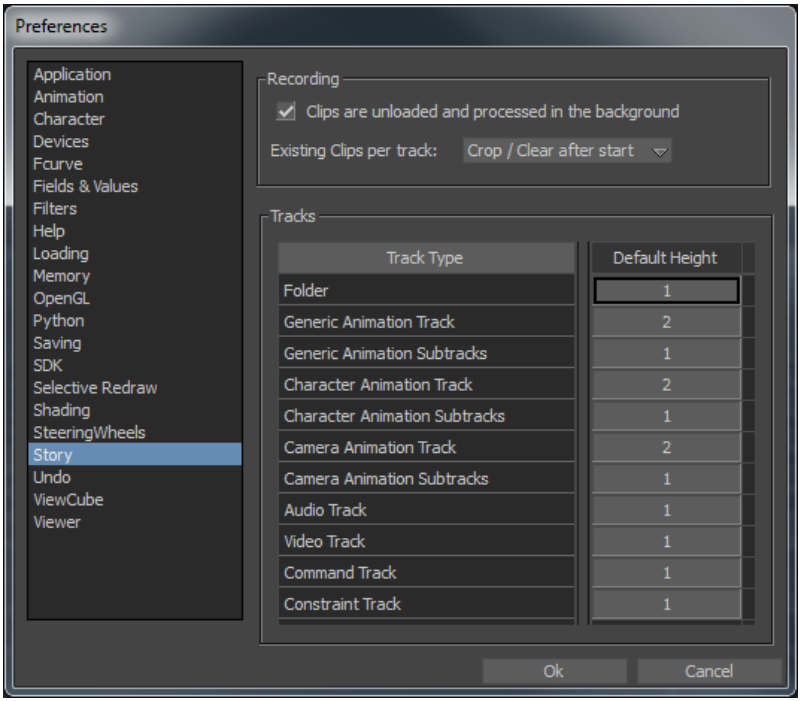
MotionBuilder enables you to view a live scene, record source data to memory, and record source data to disk. The ability to record to disk becomes crucial when dealing with very large scene files that can easily outgrow a system's memory limit. Instead of storing the data into the memory buffer, you can store the data in real time to disk and also choose to record discrete Animation track, Character track, and Camera track clip files to disk.

Although the default recording of tracks is set to memory, the advantages of recording to disk outweigh by far the recording to memory, especially if you have large scene files and deal with motion capture data.

Before you start recording, make sure the Story recording, clips, and Track preference settings are set to your needs.

To access the Story preference settings:

1. In the menu bar, select Settings > Preferences.
2. In the Preferences window, click the Story preference option.
   The Story preference settings display.



Story preferences

When you record data, you need to specify in the Story window:

- the track(s) you want to record,
- the track Recording options, and
- whether you want to record to memory or to disk.

Recording Story Tracks via API

You can set a track's ability to record boolean value to true. You can enter a value for the track or Story's Record to path, although the path must exist.

You can enter the clip naming convention using standard string formatting: Python : Track.ClipNameConvention = %s_%s %(Track.Name, Track.ClipNumber)

You can receive a callback after a clip is created.

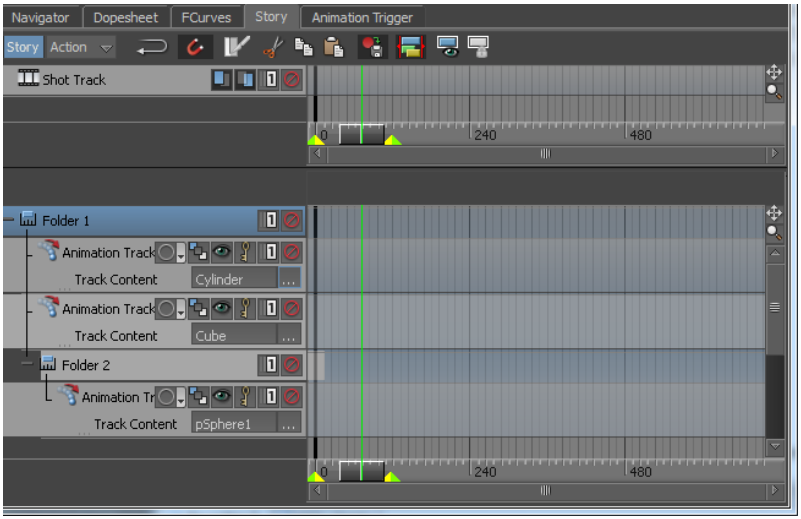
Refer to the *MotionBuilder SDK Help* at: *http://www.autodesk.com/motionbuilder-sdkdoc-2013-enu*.

Story Folder and Story Track recording paths

Before you begin recording, you need to set the recording path for your Story Folders and Tracks. The recording path needs to be defined for each track you want to record with the exception of tracks within a Folder. For example, you can set a path for a Folder in the Story window and have the Tracks within that Folder point to the same path. You can also set a path for a Folder in the Story window and another path for the Tracks within that Folder. This applies also to nested Folders and Tracks. Complete lower-level paths overwrite higher-level paths, while a hierarchy of incomplete paths is assembled to form a complete path. This enables you to specify only the subfolder in the track, while the folder contains the base path..

To set a recording path for a Story Folder:

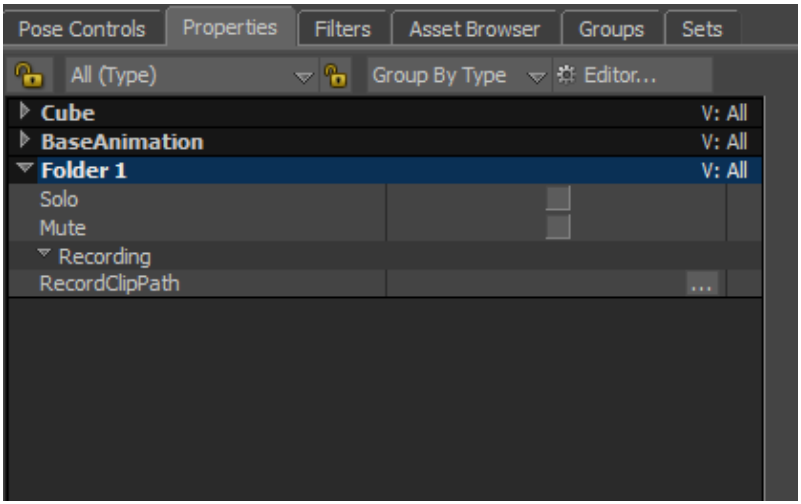
1 In the Story window, double-click a **Folder** to display its properties in the Resources window.



Story Folder shown selected

The Story Folders, unlike the Story Tracks, do not have a **Recording options** ( ) and **Recording Options** menu ( ) that enable you to define the recording path.

2 In the Resources window, in the Properties, expand the selected Folder to display its contents.

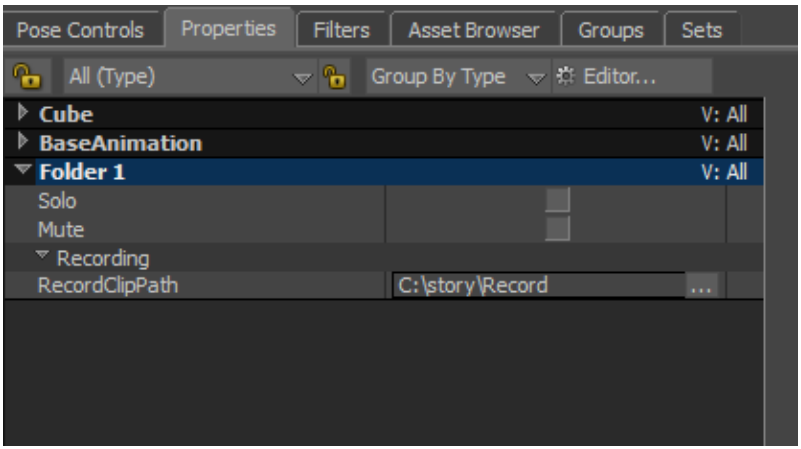


The recording paths for all Story Folders are set via the Property Resources window.

3 Click ... .

4 In the Open Directory window choose a path for recording and then click OK.

The recording path is set and is now shown in the **RecordClipPath** field.

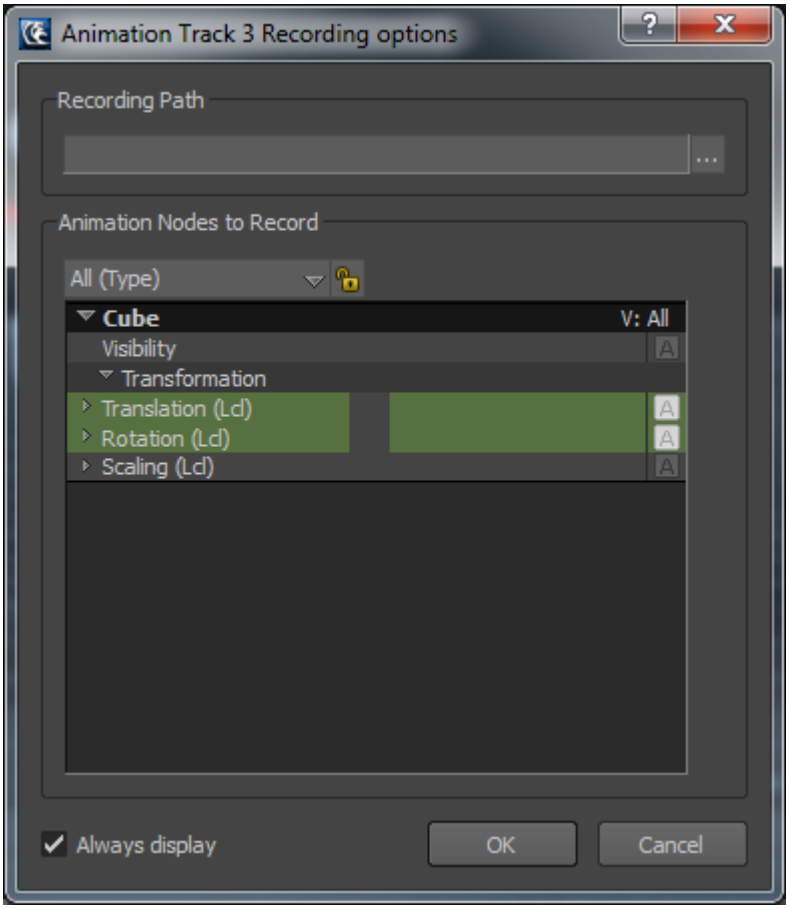


To set a recording path for a Story Track:

NOTE You can set a Track's recording path via the Property Resources window (as you would for the Story Folders) or via the Story Track's **Recording options** () or **Recording Options** menu () in the Story window.

1. In the Story window, click the Story Track you want to record.
2. In the Story window, click the Story Track's **Recording options** (), or **Recording Options** menu () followed by the Recording options menu 

.
The selected Track's Recording options window displays.



The properties shown in the Track's Recording option dialog are the properties that can be animated and therefore recorded.

The default activated ( ) recording properties shown in the preceding figure are the Translation and Rotation properties

3 Activate the properties you wish to record.

4 Click ... .

5 In the Open Directory window choose a path for recording and then click OK.

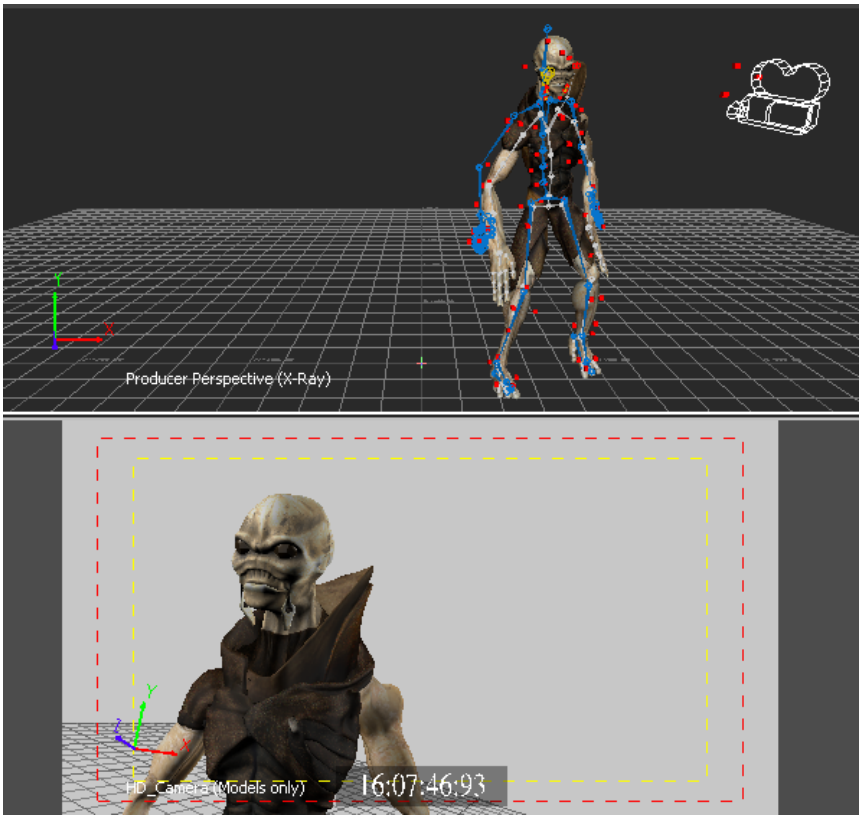
TIP You can also set the recording path by entering the path in the Recording Path field and clicking OK.

Recording data to disk

Recording to disk enables you to (a) record many takes without stopping to free up memory, (b) record in real time sessions, (c) efficiently aggregate animation via mocap sources, and (d) open the recorded scene and continue working on it as opposed to rebuilding the scene from scratch.

The data you want to capture may be what you see when you look through a Director's camera (although sometimes, the Director doesn't want to shoot cameras at the time the actors are recorded—he's just collecting animation assets for later use).

For example, if you have a scene with motion capture data that shows a Character driven by motion capture markers and a skeleton and marker data driving a constrained camera (as shown in the top Viewer pane in the following figure), you can record the motion capture data, however, what you really want to record is the end result—the data recorded to the camera and the data recorded to the retargeted character. In the following figure, the bottom Viewer pane displays what you see through a Director's camera.



When you record data to disk, you need to specify:

- where you want the data to be recorded

  BEST PRACTICE Define the same track recording path for all your tracks.

- the token naming convention (**ClipNameConvention**)

  The default naming convention is:

  ```
  <Name>_<StartDate>_<StartTime>
  ```

Each take requires a unique name. You can customize tokens. You can add the track name, the timecode, the start time, the end time, the take name, and static text. The purpose of defining tokens for your recording tracks is to optimize recording file management.

You can use the following keys to define the naming convention for your clips:

- <Name> The current track Name property
- <TakeName> The system's current take name
- <StartTCValue> the TimeCode value using the timebase of the Transport Controls rate
- <StartFrameValue> the frame value according to the Transport Controls
- <StartDate> the current day, YYYY-MM-DD as per international ISO 8601 standards
- <StartTime> the current time, HHMMSS as per international ISO 8601 standards

You can also enter any alpha numeric string value (no special characters). If you do not enter an iteration value to keep the clip name unique, new clips overwrite current clips.

To record a Story Track to disk:

1. In the Story Controls, click the Record to memory/disk option if the record option is set to memory (). If the Record to memory/disk option is set to Record to disk (), proceed to the next step.

   NOTE The default Record to memory/disk option is set to memory ().

2. In the Story Controls, select the Track you want to record.
3. Set the path for the Track recording either via the Story window or the Property Resources window.

   Refer to the procedure To set a recording path for a Story Track (page 104) and to the procedure To set a recording path for a Story Folder (page 102).
4. In the Story window, click the selected Track's **Recording options** button ().

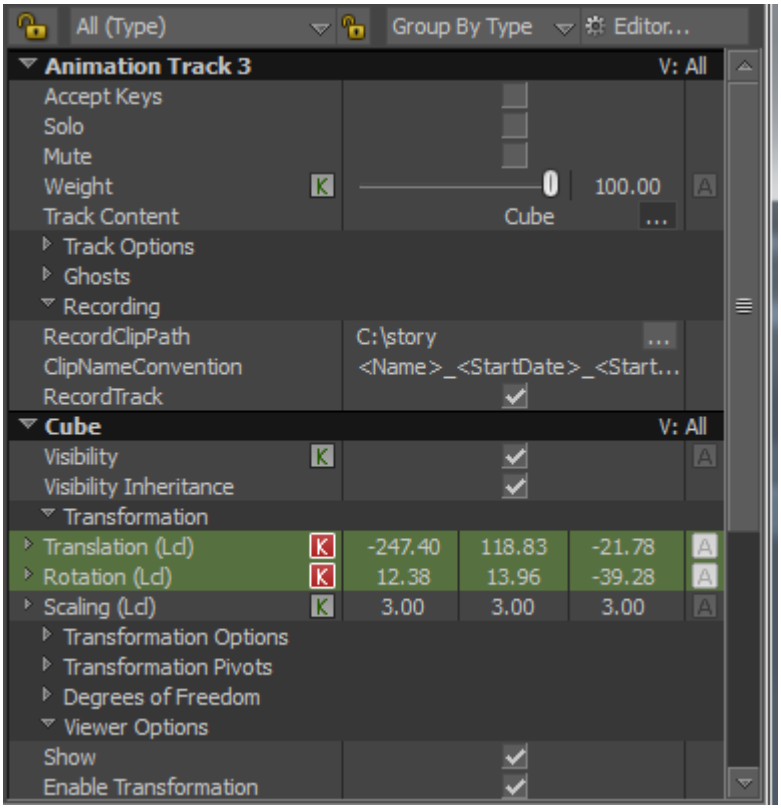
The contour of the selected Track's **Recording options** button () changes from grey to green () once the recording path is set.

The Track's Recording options dialog displays the recording path and any other changes you made to the track recording options.

5 In the Track Recording options dialog, click OK.

6 (Optional) To verify the Track's recording path, in the Property Resources window, expand the Track and expand its Recording properties to view its contents.

The **RecordClipPath** field displays the Track's recording path.



NOTE You can set Record via the Property Resources by enabling **RecordToTrack** Recording property.

7 In the Transport Controls, click Record ().

The Transport Controls Record button turns red (), showing it is in a record state and the Record Mode button () in the Story window turns green ().

8 In the Transport Controls, click Play () to start recording.

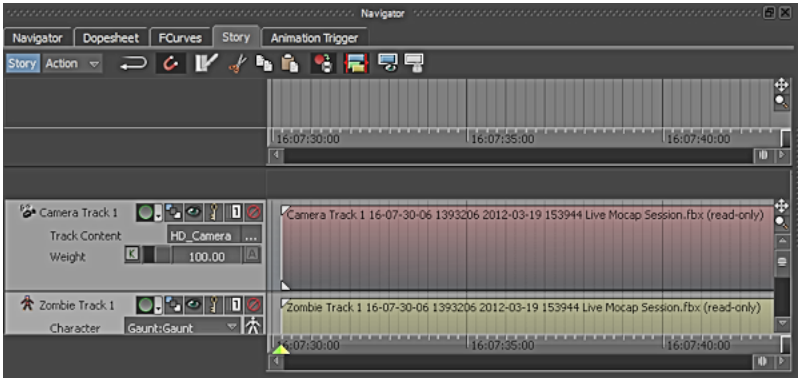
In the Story window, the Record Mode button is red (), indicating data is being recorded.

When you record to disk, an *.fbx* file template containing the Track's contents (such as bones) is created. When the recording is finished, the *.fbx* file template and the recorded track's animation are merged in an *.fbx* file.

NOTE The *.fbx* file templates are created as MotionBuilder cannot record directly to FBX.

In the motion capture example used, even though you are not hooked live to a motion capture system you are recording a live constraint. There is no actual data on the retargeting character or camera. MotionBuilder is writing this data on disk as it is being recorded.

The Story Tracks now represent the recorded data. The recorded data is inserted in the 3D record Editorial timeline. If you manipulate the objects, the animation is recorded.



Story tracks representing the recorded data

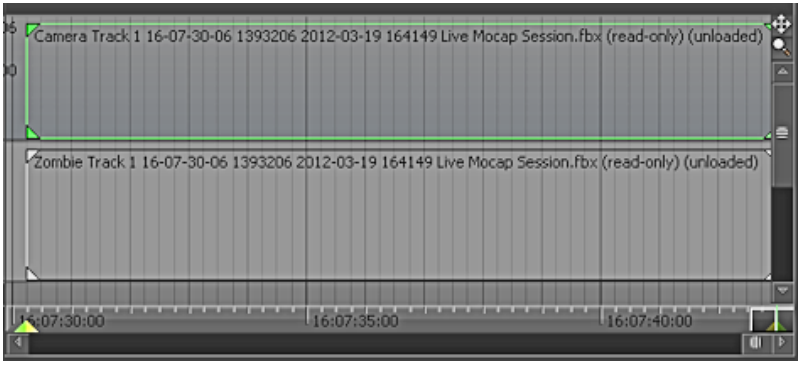
The Tracks display the token naming convention you defined.

```
<Name> <StartTCValue> <StartFrameValue> <StartDate>
<StartTime> <TakeName>
```

9 In the Transport Controls, click Stop ( ).

NOTE You can stop, and resume your recording as often as you need to.

The Tracks in the Story window are now gray, meaning they are just a representation of the tracks recorded to disk. The Tracks are in fact unloaded.



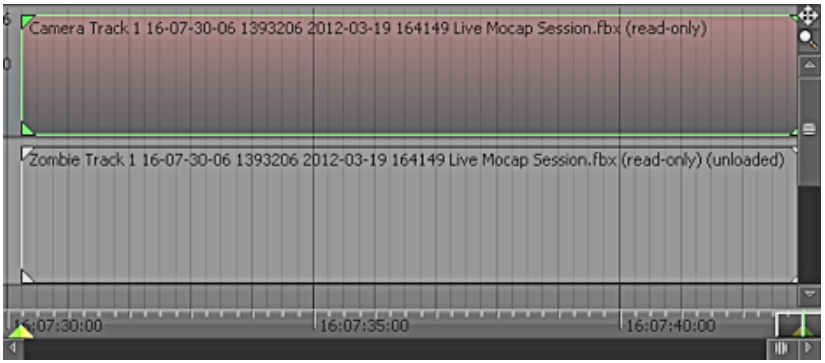
If you prefer to have the recorded Tracks loaded as opposed to unloaded after the recording, you need to change the Story recording preferences.

To reload into the Story window the Story Track recorded to disk:

- In the Story window, right-click the Story Track you want to reload and from the contextual menu, select Load/Unload > Load Clips.

The following figure shows one Story Track was selected to be reloaded.

The recorded Story Track is loaded into the Story window, enabling you to edit the track. The Story Track is no longer gray, meaning it is loaded.



NOTE Remember you can set recording preferences to have clips unloaded or loaded after the recording finishes. Setting the clips to loaded once the recording finishes enables you to use the clips as soon as they are loaded. Setting the clips to unloaded while recording enables you to record one clip after another without affecting recording performance.

See the *Story preferences* topic in the MotionBuilder Help.

To record a Track over the current clip:

1. In the Story window, set the start time for the new clip.
2. In the Transport Controls, click Record ( ).

   The new clip overwrites the current clip but not necessarily from the beginning to the end. The new clip overwrites the portion of the current clip whose end time equals the start time of the new clip. The original clip's data is still there. Only the representation of the original clip is changed.

Recording data to memory

If you have small scene files, if you want to see the results of the recording immediately, or if you do not need to concern yourself with memory, you can opt to record to memory or to disk but loaded back into memory.

The procedure for recording Story Tracks to memory is similar to the procedure for recording Story Tracks to disk. Instead of selecting the Record to disk () option, you select the Record to memory option ().

To record a Track over the current clip:

1. In the Story window, set the start time for the new clip.
2. In the Transport Controls, click Record ().
   The new clip overwrites the current clip but not necessarily from the beginning g to the end. The new clip overwrites the portion of the current clip whose end time equals the start time of the new clip.

This procedure is also valid also for Story Tracks recorded to disk.

To record Story Tracks to memory:

1. In the Story window, select the Track you wish to record.

Customizing Image Sequence Frame Rate in Video Settings

When you import an image sequence in MotionBuilder, by default, it uses the system frame rate (selected in the Transport Controls window) to play an image sequence. If you change the frame rate in **Transport Controls**, then the new frame rate takes effect for sequencing images as well.

In this release, the **Use system frame rate** option is available as a checkbox, which is on by default. This option allows you to:

- Choose other frame rates from the drop-down list
- Enter your own frame rate
- Use the same frame rate that you set in the **Transport Controls** window

---

NOTE The **Use system frame rate** option is active, only if you select the **Image sequence** option. If you do not select this option, then the **Use system frame rate** option is disabled and refers the frame rate in **Transport Controls**.

All the frame rates in the **Transport Controls** are also available in the **TimeMode** drop-down list.

To enter the frame rate at which you want to play the images in sequence:

1. Choose **Custom** from the **TimeMode** drop-down list.

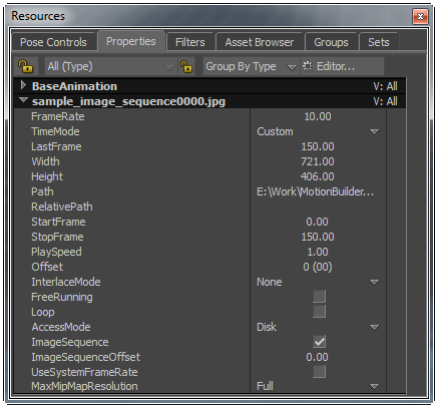
   The **Custom Frame Rate** dialog box appears.

2. Enter a frame rate of your choice in the **Insert new frame rate** text box.

Transport Controls window and Video Settings tab *A*. Image sequence checkbox *B*. Custom frame rate (10 fps) *C*. Frame rate in Transport Controls window

TIP Press the left or right mouse button and drag on this text box to decrease or increase the frame rate.

TIP You can also choose **Custom** from the **Resources** window > **Properties** tab > **TimeMode** drop-down list, and then enter a frame rate in the **FrameRate** text box.



See the *Customizing Frame Rate for playing images in sequence* topic in the Help.

Roll Bone Enhancements

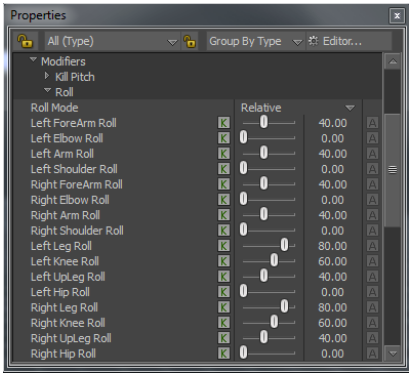
In the previous releases of MotionBuilder, the user had limited control on the behavior of Roll bones when rotating a limb of a character. This was a usability issue with the HumanIK implementation in both Maya and MotionBuilder. Moreover, the terminology used to refer properties and the manner in which they were exposed caused confusion to the user.

The new HIK 4.5 Character Solver is now implemented in both Maya and MotionBuilder. This Solver contains all the required Roll bone properties to solve this usability issue. Now the properties are easy to use and allow a user to decide which bone will be influenced to what degree, for a given limb. For example, Forearm Roll will be influenced to 40% and Elbow at 0%.

The property names are also changed to be consistent in Maya and MotionBuilder. The old Roll bone property names and their corresponding new names are listed in the following table:

Old Roll bone property name	New Roll bone property name
LeftForeArmRollEx	Left Forearm Roll
Left ForeArm Roll	Left Elbow Roll
LeftArmRollEx	Left Arm Roll
Left Arm Roll	Left Shoulder Roll
RightForeArmRollEx	Right Forearm Roll
RightForeArm Roll	Right Elbow Roll
RightArmRollEx	Right Arm Roll
Right Arm Roll	Right Shoulder Roll
LeftLegRollEx	Left Leg Roll
Left Leg Roll	Left Knee Roll

Old Roll bone property name	New Roll bone property name
LeftUpLegRollEx	Left UpLeg Roll
Left UpLeg Roll	Left Hip Roll
RightLegRollEx	Right Leg Roll
Right Leg Roll	Right Knee Roll
RightUpLegRollEx	Right UpLeg Roll
Right UpLeg Roll	Right Hip Roll



NOTE The new values do not include roll influence on the Elbows and Shoulder, by default.

New Roll bone properties and their values

The new values do not include roll influence on the Elbows and Shoulder, by default.

For the property values, the value of a Roll bone (Left Forearm Roll) cannot be higher than the corresponding <parent> Roll value (Left Elbow Roll). You cannot extract more on the Roll bone than on the corresponding Elbow, only less. The same applies to the shoulder and Leg Roll values.

When Roll bones do not exist or not defined, the corresponding Roll bone property will be disabled (non-editable), and the remaining Roll properties

will be applied to the corresponding parent (Elbow, Shoulder, UpLeg, and Knee).

The Roll amount is defined by the **Roll Extraction Mode**. The two extraction modes are:

- **Relative** — takes care of HIK-generated Roll amounts
- **Absolute** — takes care of both user generated and HIK-generated Roll amounts

See the *Modifiers* topic in the Help.

Additional Changes

2

The following topics describe additional changes to this release of the MotionBuilder software product.

Sharing Help Topics

This release of the MotionBuilder Help includes a Share  UI button at the top right of the topic page enabling you to send a link to the Help topic via your default e-mail application.

To share a Help topic:

1. In the Help, go to the topic page you want to share.
2. At the top right of the topic page, click  .

   Your default e-mail application launches with an e-mail that includes the topic subject and a link to the topic in the body of the e-mail.

Resolution-Independent Editing Layout

Unlike the Scripting layout, Preview layout, and custom layout, the Editing layout remains consistent regardless of your screen's resolution. thus providing a uniform editing layout experience on all systems.

See the *Layouts* topic in the Help.

Profiling Center Window

From the **Evaluation** > **Parallel Evaluation** drop-down list, the:

- **Parallel Simple** option is removed
- **Parallel Advanced** option is renamed as **Parallel**

The Reset to Default button is removed, and the following three buttons are added to provide more control on user settings:

- Save User Settings
- Reset User Settings
- Restore Default Settings

See the *Profiling Center window* topic in the Help.

FCurves Window

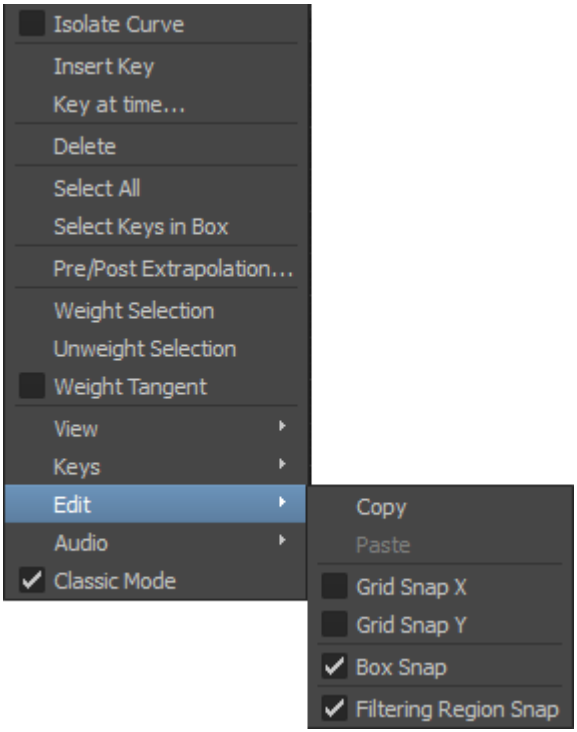
The FCurves toolbar is added with the new Retime Tool () icon. See the *Retime Tool* topic in the Help.

The names of the following menus in the FCurves contextual menu are changed from:

- Display to View
- Snap to Edit
- Extrapolation to Pre/Post Extrapolation

Moreover,

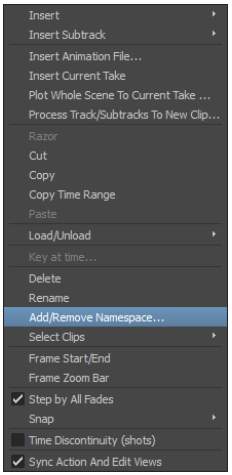
- the Cut, Copy, and Paste options are removed from the main menu.
- two more sub-options, Copy and Paste, are added to the Edit menu.



See the *FCurves contextual menu* topic in the Help.

Namespace Support for Story Tracks

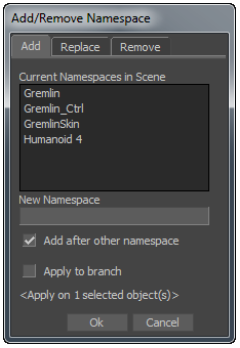
In this release, you can add namespaces of object names to their corresponding story tracks. To make this possible, the **Add/Remove Namespace** option is added to the **Story** tool contextual menu. Clicking this contextual menu option, displays the **Add/Remove Namespace** dialog box with all the namespaces added to the scene objects.



To add namespaces to story tracks:

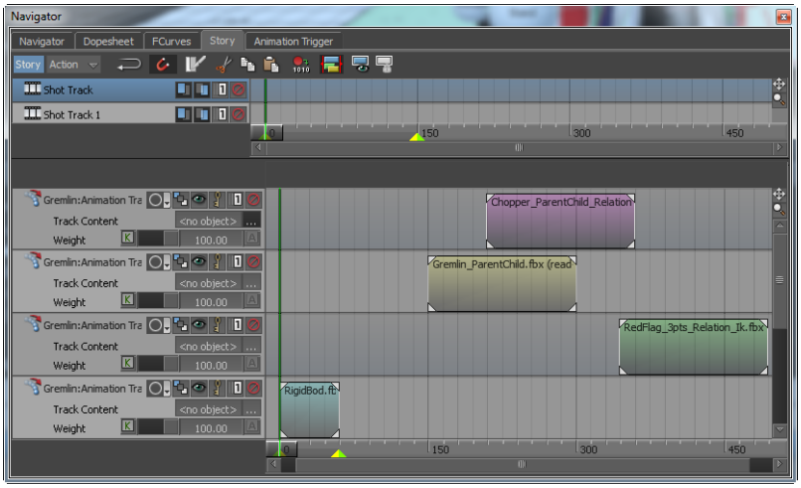
1 From the **Story** tool, select one or more story tracks, right-click on them, and select the **Add/Remove Namespace** contextual menu option.

The **Add/Remove Namespace** dialog box appears. By default, the **Add** tab displays all the namespaces that are added to the object names.



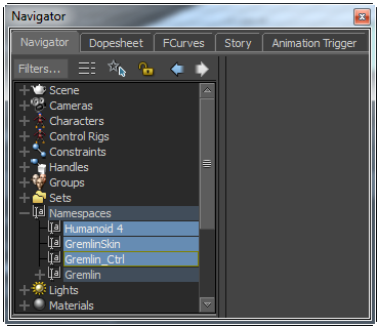
2 From the **Current Namespaces in Scene** list box, select a namespace and click **Ok**.

The namespace is prepended to the names of the selected story tracks.



TIP Press **Ctrl+Z** to undo any namespace operation that you perform on objects in the **Navigator** window and story tracks in the **Story** tool.

Notice that all the namespaces in objects are displayed in the **Navigator > Namespaces** folder.



For replacing namespaces with another namespace and removing namespaces from story tracks, follow the procedures in the *Namespace* topic in the Help.

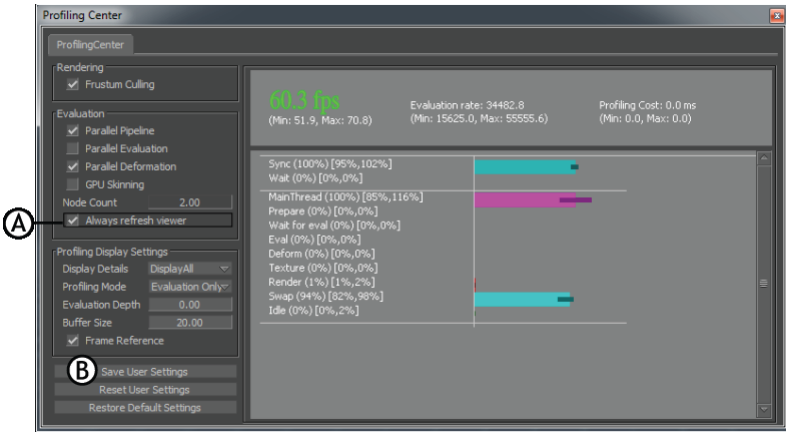
Refreshing the Viewer Window

Consider that you are viewing an animation scene in the **Viewer**. When you open another application, for example Windows Explorer, it opens up on top of the **Viewer**. Now the Windows Explorer is the active window and the

Viewer window is inactive. This stops playing the animation scene in the **Viewer**, keeping it in an idle state. You need to bring back the focus on the **Viewer** to make it active and resume the play.

In the virtual production environment, it is important that the **Viewer** gets automatically refreshed when working with different applications. To achieve this, turn on the **Always refresh viewer** checkbox in the **Profiling Center** window. Turning on this checkbox keeps the **Viewer** window in an always active state for that particular session only.

To turn on the **Always refresh viewer** checkbox permanently, click the **Save User Settings** button in the **Profiling Center**. This saves the setting to the MotionBuilder configuration.



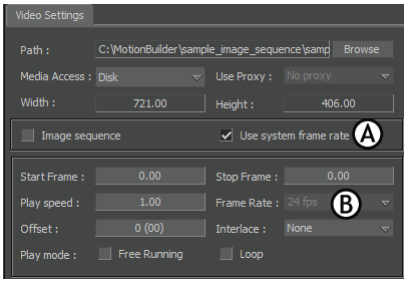
Profiling Center *A*. Always refresh viewer checkbox *B*. Save User Settings button

See the *Profiling Center window* topic in the Help.

Video Settings

In the Video Settings window, the **FPS static** text box that displays system frame rate is changed to **Frame Rate** drop-down list.

The **Use system frame rate** option is added. This option enables you to choose a different frame rate, which is independent of what is set in the Transport Controls window.



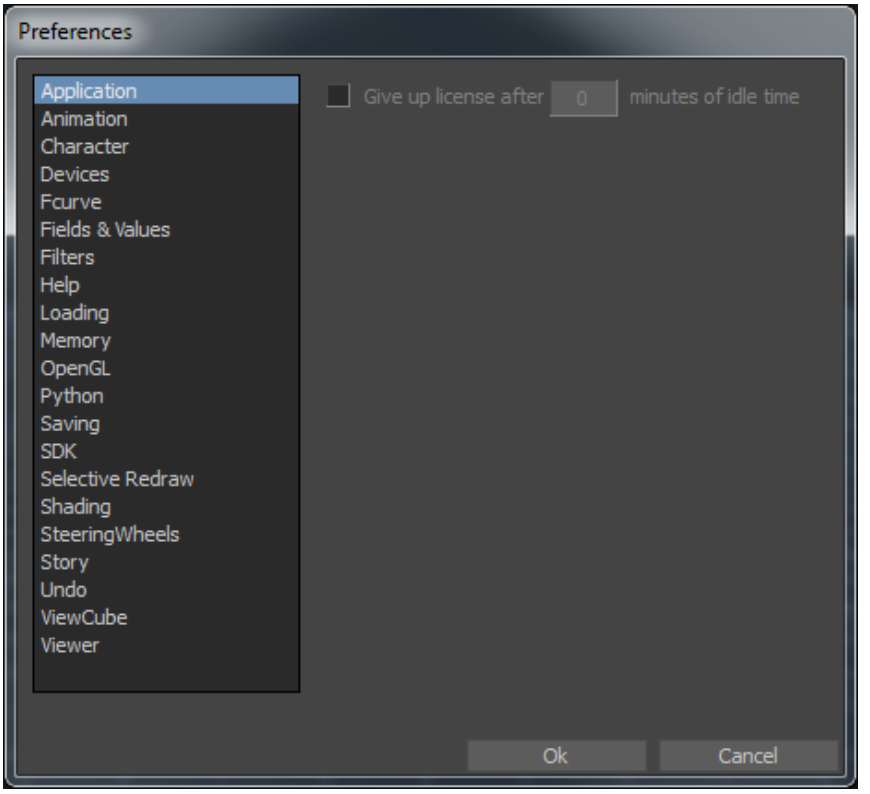
A. **User system frame rate check box** ***B.*** **Frame Rate drop-down list**

See the *Video settings* topic in the Help.

Setting Network License Timeout

The License Timeout option enables you to define the duration a MotionBuilder session can be idle before the network license is reclaimed by the license server. You set the license timeout in the MotionBuilder Application preference settings.

If you choose to set a time for the license timeout, the license is reclaimed by the license server if MotionBuilder is idle on the computer for more than the timed out period you define in the MotionBuilder Application preference settings.



Application preference settings for license timeout

See the *Application preferences* topic in the Help.

Python and OR SDK Sample Files

This release includes new Python and SDK sample files.

The following lists the new Python and SDK sample files shipped with the software product.

Python Sample Files

- HUD.py
- TimecodeKeying.py
- ImageSequenceFrameRateChange.py
- SetPropertyStaticIfPossibleOption.py

- CreateProfilingEventsLog.py
- MultiPatchGeometry.py
- AudioRendering.py
- NamespaceOperationsOnTrack.py

OR SDK Sample Files

- ORDeviceTimeCode
- ormaterial_template
- ordevice_syncreference

FBX SDK Support

This release supports Autodesk FBX SDK version 2013 to align with other Autodesk software products.

Broadcast Wave Format (BWF) File Support

This release supports the audio Broadcast Wave Format (BWF), a format for audio data files in broadcasting.

DDS File Format Support

This release extends the support of DDS (DirectDraw Surface) (binary) file format used for storing compressed textures to the GPU to DDS BC4, DDS BC5, DDS ATI1, and DDS ATI2 files.

MotionBuilder now supports the ability to import DDS BC4, DDS BC5, DDS ATI1, and DDS ATI2 files at full resolution.

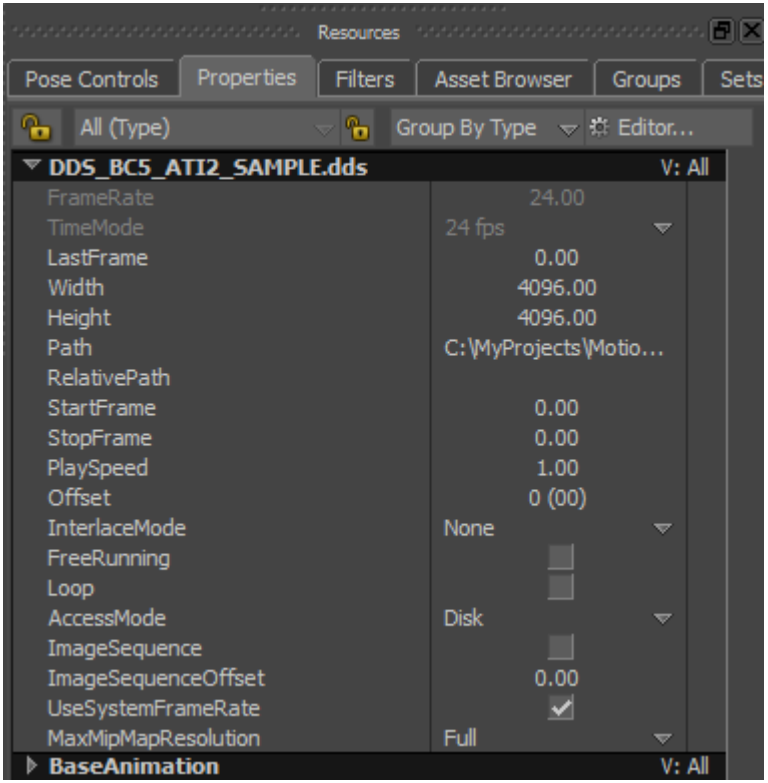
You can load a *.dds* file as a texture to a material. See "Adding a texture to a material" in the MotionBuilder Help. You can use a *.dds* file as a background or foreground texture.

You can also load a *.dds* file via File > Import Video and use it as a video file. The following properties are now supported for the DDS file format:

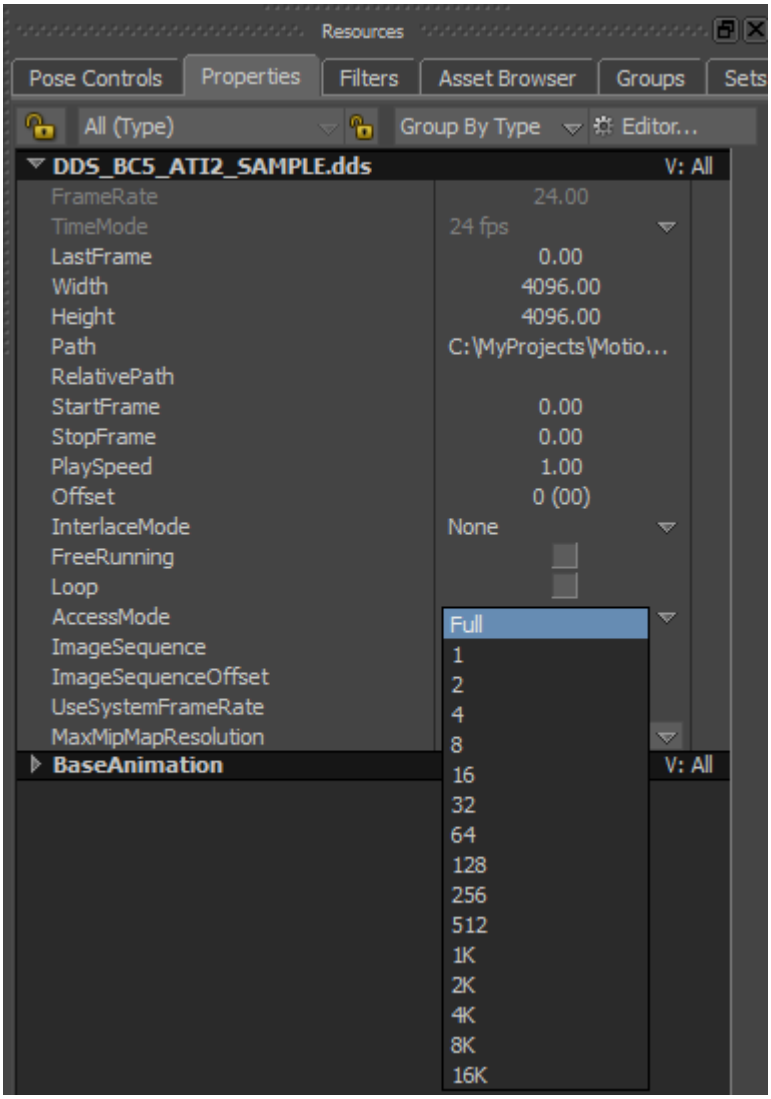
- **ImageSequence**
- **ImageSequenceOffset**

- **UseSystemFrameRate**
- **MaxMipMapResolution**

These properties are accessible via the Property Resources.



The maximum predefined resolution are: Full, 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1K, 2K, 4K, 8K, and 16K.


Resources
Pose Controls
Properties
Filters
Asset Browser
Groups
Sets
All (Type)
Group By Type
Editor...
DDS_BC5_ATI2_SAMPLE.dds
V: All
FrameRate
24.00
TimeMode
24 fps
LastFrame
0.00
Width
4096.00
Height
4096.00
Path
C:\MyProjects\Motio...
RelativePath
StartFrame
0.00
StopFrame
0.00
PlaySpeed
1.00
Offset
0 (00)
InterlaceMode
None
FreeRunning
Loop
AccessMode
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CgFX Support

This release supports an updated version of the CgFX library.

MotionBuilder now supports version 3 of the CgFX library, enabling you to take advantage of the latest CgFX shader technology.

Unsupported Audio File Formats

Some audio file formats supported in the MotionBuilder 2012 release are not supported in this release.

The following audio file formats are not supported in this release:

- .mp2
- .mpeg
- .mpg
- .mpg4
- .sd2
- .ulw
- .vwf

For a list of supported file formats as audio assets, see the *Loading audio files* topic in the Help.

Enhancements in Timecode

In this release, the Timecode frame rate precision error is fixed, more frame rates are added, and the hours unit is displayed as two digits.

Timecode precision

In the previous release, the playback frame rates such as 23.976, 29.97, 72, and so on were not precise over longer periods of time. The precision error in these frame rates are fixed in this release. The new precision and rates can be stored in FBX.

The new frame rates 48, 59.94, 60, 72, 96, and 1000 are added in all the Time Format menus in MotionBuilder.

For a list of Timecode frame rates, see the *Transport Controls contextual menu* topic in the Help.

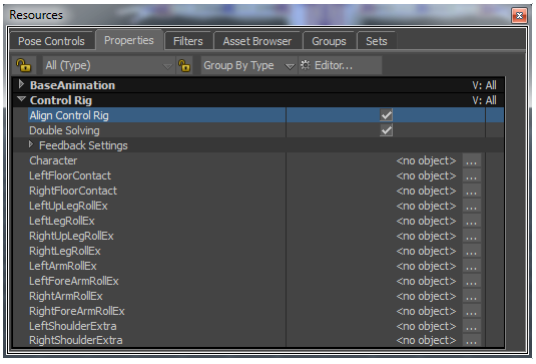
Timecode hour display

The Timecode hours is now displayed as two digits as per industry standard. For example, 00:01:15.

Align Control Rig property

The Rig Align property in the previous release is replaced by the new Align Control Rig property.

The Rig Align property has been replaced with the Align Control Rig property in the Control Rig properties for a character. This change is to provide only one property to solve the Control Rig alignment using the HIK 2013 Solver.



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