# Table of Contents

**iClone 7 User Manual**

- Main Menu - File .................................................................................................................. 34
- Main Menu - Edit .................................................................................................................... 35
- Main Menu - Create .............................................................................................................. 36
- Main Menu - Modify .............................................................................................................. 37
- Main Menu - Animation ........................................................................................................ 39
- Main Menu - Render ............................................................................................................. 40
- Main Menu - View ................................................................................................................ 41
- Main Menu - Window .......................................................................................................... 42
- Main Menu - Plugins ......................................................................................................... 43
- Main Menu - Help .............................................................................................................. 44

**Knowing the Environment – Docking Areas**

- Dockable Areas .................................................................................................................. 53
- Benefits of Docking Panels ............................................................................................... 54
- Project Toolbar ................................................................................................................... 55
- General Toolbar .................................................................................................................. 56
- Aligning Objects ................................................................................................................ 56
  - Aligning Objects .............................................................................................................. 57
  - Uniform Spacing Objects ................................................................................................. 58
- Aligning 3D Entity to Target Object .................................................................................. 58
- Using "Align to" Feature ..................................................................................................... 59
- Aligning 3D Entity to Center of Another Object ............................................................... 60
- Global Illumination (GI) Toolbar (New for V7.0) ............................................................... 61
- Camera Toolbar .................................................................................................................. 62
- Physics Toolbar ................................................................................................................... 63
- Timeline Panel .................................................................................................................... 64
  - Timeline Operation - Basic ............................................................................................. 65
  - Basic Timeline Operation ............................................................................................... 66
  - Timeline Operation - Advanced ...................................................................................... 67
  - Advanced Timeline Operation ....................................................................................... 68
- Modify Panel ....................................................................................................................... 69
  - Setting Parameter Value ................................................................................................. 70
    - Dragging Sliders ............................................................................................................. 71
    - Clicking Arrow Buttons ............................................................................................... 72
    - Typing into Numeric Fields ......................................................................................... 73
    - Utilizing Transform Tools ........................................................................................... 74
- Content Manager ............................................................................................................... 75
- Scene Manager ................................................................................................................... 76
- Project Settings Panel ....................................................................................................... 77
  - Color Management Section ............................................................................................. 78
  - Mode ............................................................................................................................... 79
  - PBR Environment Setup ................................................................................................. 80
  - Time Unit Section .......................................................................................................... 81
- Total Frames ....................................................................................................................... 82
- Play Mode ........................................................................................................................... 83
- Time Mode .......................................................................................................................... 84
- Time Unit ............................................................................................................................ 85
Display Section ................................................................. 82
Dummy Object (Ctrl + D) ....................................................... 82
Aux Light ........................................................................ 82
Visual Settings Section (New for v7.0) .................................. 83
Voxel Mode ....................................................................... 83
Broad Color Gamut .............................................................. 83
Light Flickering Restraint .................................................... 83
Global Sound Settings Section ............................................. 84
Voice Volume ...................................................................... 84
Music Volume ..................................................................... 84
Global Physics Settings Section ........................................... 85
Simulation ......................................................................... 85
Rigid Body ......................................................................... 85
Soft Cloth .......................................................................... 85
Gravity ............................................................................... 85
World Scale ......................................................................... 85
2D Background Section ........................................................ 86
  Background Color .............................................................. 86
  Activate Image .................................................................. 86
  Using Video as 2D Background .......................................... 86
External Image Path ............................................................... 86
Info Section ......................................................................... 87
Length ................................................................................ 87
Scene Totals ......................................................................... 87
External Files ......................................................................... 87
Visual Settings Panel .......................................................... 88
Render Panel ......................................................................... 89
Preference Panel .................................................................... 90
Control Section ..................................................................... 91
Snap to Grid ......................................................................... 91
Snap to Model ....................................................................... 91
Transform Gizmo ..................................................................... 91
Auto-play Motion Clip After Apply ........................................ 91
Timeline Audio Scrubbing .................................................... 91
Confine Face Puppet Area to 3D Viewport ............................. 91
Quick Thumbnail Generation ................................................ 92
Zoom to Mouse Position ........................................................ 92
Angle Snap .......................................................................... 92
Compression ......................................................................... 92
Grid Section ......................................................................... 93
Show Grid ............................................................................ 93
Grid Color ............................................................................. 93
Grid Spacing ......................................................................... 93
Grid Size ................................................................................ 93
Display Section ..................................................................... 94
Info ....................................................................................... 94
World Axis ............................................................................ 94
Message Panel ...................................................................... 94
External Texture Section (New for V7.2) ................................. 95
External Texture ...................................................................... 95
Real-time Render Options Section (New for V7.1) ..................... 96
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAA (for Real-time Rendering only)</td>
<td>96</td>
</tr>
<tr>
<td>Mipmap</td>
<td>96</td>
</tr>
<tr>
<td>Tessellation Shadow</td>
<td>97</td>
</tr>
<tr>
<td>Viewport GI</td>
<td>97</td>
</tr>
<tr>
<td>Depth of Field</td>
<td>98</td>
</tr>
<tr>
<td>Anisotropic Filtering and Mipmap</td>
<td>98</td>
</tr>
<tr>
<td>Max Texture Size</td>
<td>98</td>
</tr>
<tr>
<td>LOD (Level of Detail)</td>
<td>98</td>
</tr>
<tr>
<td>System Section</td>
<td>99</td>
</tr>
<tr>
<td>Undo Times</td>
<td>99</td>
</tr>
<tr>
<td>Temp Folder</td>
<td>99</td>
</tr>
<tr>
<td>Texture Editor</td>
<td>99</td>
</tr>
<tr>
<td>Interface Section</td>
<td>100</td>
</tr>
<tr>
<td>Icon and Font Size</td>
<td>100</td>
</tr>
<tr>
<td>Color Theme</td>
<td>100</td>
</tr>
<tr>
<td>Default Key Tangent Section</td>
<td>101</td>
</tr>
<tr>
<td>Setting Default Key Tangent</td>
<td>101</td>
</tr>
<tr>
<td>Displaying Key Tangent Type in Curve Editor</td>
<td>101</td>
</tr>
</tbody>
</table>

### 3D Real-time Viewer (Preview Window)

- Render Quality of 3D Viewer (Preview Window) .................................................. 102
- Real-time Render Options .................................................................................. 103
- Drag-and-Drop to Preview Window ...................................................................... 104
  - Drag and Drop ................................................................................................. 104
    - Drag and Drop Media to Space ...................................................................... 104
    - Drag and Drop Media to Object ...................................................................... 104
    - Drag and Drop With Ctrl Pressed .................................................................. 105
    - Drag and Drop from Content Manager to Folder ............................................ 105
    - Drag and Drop Media with Right Mouse Button ............................................ 106
- Drag and Drop Mesh Objects ................................................................................ 106
- Variations of Accessories .................................................................................. 106
- Drag and Drop Non-Mesh Objects and Media ...................................................... 106
- Material ............................................................................................................. 107
- Image and Video .................................................................................................. 107
- Audio ................................................................................................................... 107
- Supported Asset Files ....................................................................................... 107
- Gizmo of Objects in Preview Window .................................................................. 108
  - Rotate ............................................................................................................. 108
  - Transform ...................................................................................................... 108
  - Scale ............................................................................................................... 108
- Play Bar ............................................................................................................... 109
- Operating with Camera and Transform Tools ...................................................... 110
- Picking and the Right-click Menu ..................................................................... 111
  - Picking ............................................................................................................ 111
  - Right-click Menu ............................................................................................ 111
  - Application Key .............................................................................................. 111

### System Requirements

- I. General ............................................................................................................ 112
- II. For Real-time GI Editing in iClone 7 .............................................................. 112
- III. iClone Real-time GI vs. Graphics Cards ....................................................... 112

### Video Memory Usage

- Accessing HUD (Heads Up Display) for “FPS” and “Used Video Memory” .......... 114
<table>
<thead>
<tr>
<th>Visual Enhancements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance Notes</td>
</tr>
<tr>
<td>Features Slowing Down System</td>
</tr>
<tr>
<td>For Loading Files</td>
</tr>
<tr>
<td>Reallusion Substance Files</td>
</tr>
<tr>
<td>Loading Project Files Failed</td>
</tr>
<tr>
<td>Crashing when Loading</td>
</tr>
<tr>
<td>IBL Loading HDRI</td>
</tr>
<tr>
<td>For Authoring with iClone</td>
</tr>
<tr>
<td>Realtime Smooth</td>
</tr>
<tr>
<td>GI Related</td>
</tr>
<tr>
<td>Timeline On</td>
</tr>
<tr>
<td>Substance Related</td>
</tr>
<tr>
<td>Object Related</td>
</tr>
<tr>
<td>For Real-time Rendering or Playback</td>
</tr>
<tr>
<td>GI Related</td>
</tr>
<tr>
<td>Substance Related</td>
</tr>
<tr>
<td>TAA Related</td>
</tr>
<tr>
<td>Tessellation Related</td>
</tr>
<tr>
<td>Sky Blur</td>
</tr>
<tr>
<td>Material and Texture Related</td>
</tr>
<tr>
<td>Lights and Shadows Related</td>
</tr>
<tr>
<td>For Saving Files</td>
</tr>
<tr>
<td>Saving Contents</td>
</tr>
<tr>
<td>For Final Rendering</td>
</tr>
<tr>
<td>Render Quality with Large Size Export</td>
</tr>
<tr>
<td>Shadow Related</td>
</tr>
<tr>
<td>GI Related</td>
</tr>
<tr>
<td>Opacity Related</td>
</tr>
<tr>
<td>AO Related</td>
</tr>
<tr>
<td>Sharing Projects and Props with External Files</td>
</tr>
<tr>
<td>Turn on the External Files Mode for Drag-and-drop Feature</td>
</tr>
<tr>
<td>Sharing Projects with External Files</td>
</tr>
<tr>
<td>Sharing Props with External Files</td>
</tr>
<tr>
<td>Selecting Entities</td>
</tr>
<tr>
<td>Selecting on Preview Window</td>
</tr>
<tr>
<td>Selecting Single Objects</td>
</tr>
<tr>
<td>Selecting Multiple Objects</td>
</tr>
<tr>
<td>Selecting with the Scene Manager</td>
</tr>
<tr>
<td>Selecting Single Objects</td>
</tr>
<tr>
<td>Selecting Multiple Objects</td>
</tr>
<tr>
<td>Using the Search Feature</td>
</tr>
<tr>
<td>Removing Animations and Preserving Project States</td>
</tr>
<tr>
<td>Removing AllAnimations</td>
</tr>
<tr>
<td>World or Local Axis</td>
</tr>
<tr>
<td>Pivot Orientation</td>
</tr>
<tr>
<td>Transform Tools in World and Local Mode</td>
</tr>
<tr>
<td>About G6 and CC Character</td>
</tr>
<tr>
<td>Editing Body Proportion for CC Characters</td>
</tr>
<tr>
<td>Editing Body Proportion for CC Characters</td>
</tr>
<tr>
<td>Scaling CC Characters in iClone (New for v7.1)</td>
</tr>
<tr>
<td>Section</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Layering Clothing</td>
</tr>
<tr>
<td>Applying Cloth Template</td>
</tr>
<tr>
<td>Clothing Character with Templates</td>
</tr>
<tr>
<td>Getting Content Pack</td>
</tr>
<tr>
<td>How to Show or Hide Inner Meshes</td>
</tr>
<tr>
<td>Hiding Inner Meshes</td>
</tr>
<tr>
<td>Masking Penetrating Meshes</td>
</tr>
<tr>
<td>Getting UV Reference Map for Modifying Mask Texture</td>
</tr>
<tr>
<td>Filtering Off Mesh with Mask Image</td>
</tr>
<tr>
<td>Conforming Clothing</td>
</tr>
<tr>
<td>Solving Penetrating Meshes Issue</td>
</tr>
<tr>
<td>Making Clothes Smoother</td>
</tr>
<tr>
<td>Saving Current Cloth Status as Default</td>
</tr>
<tr>
<td>RLHead</td>
</tr>
<tr>
<td>Loading Heads from Library</td>
</tr>
<tr>
<td>Finding and Loading the Content Files for Realistic Human</td>
</tr>
<tr>
<td>Creating RLHead from CrazyTalk</td>
</tr>
<tr>
<td>Importing RLHead to iClone CC Characters</td>
</tr>
<tr>
<td>Importing Options</td>
</tr>
<tr>
<td>Import Head Morph - Different Head Shapes, Same Original Texture</td>
</tr>
<tr>
<td>Import Texture - Same Head Shape, Different Textures</td>
</tr>
<tr>
<td>Verifying Head Appearance between iClone and CrazyTalk</td>
</tr>
<tr>
<td>Settings for CrazyTalk 8</td>
</tr>
<tr>
<td>Settings for iClone</td>
</tr>
<tr>
<td>Environmental Settings</td>
</tr>
<tr>
<td>Texture Settings</td>
</tr>
<tr>
<td>Verifying Characters</td>
</tr>
<tr>
<td>How to Change the Proportion of Each Sub Node of an Actor</td>
</tr>
<tr>
<td>Adjust Proportion</td>
</tr>
<tr>
<td>Adjust Finger</td>
</tr>
<tr>
<td>CloneCloth - Creating Your Own Fashion Designs and Collections</td>
</tr>
<tr>
<td>Modify CloneCloth (G3 and G2 Actors Only)</td>
</tr>
<tr>
<td>Modify Shoes (G3 and G2 Actors)</td>
</tr>
<tr>
<td>CloneCloth Tutorial</td>
</tr>
<tr>
<td>Gloves and Shoes</td>
</tr>
<tr>
<td>Gloves</td>
</tr>
<tr>
<td>Shoes</td>
</tr>
<tr>
<td>Actor - Look At</td>
</tr>
<tr>
<td>Look At</td>
</tr>
<tr>
<td>Look At the Camera</td>
</tr>
<tr>
<td>Weight and Convergence</td>
</tr>
<tr>
<td>Persona</td>
</tr>
<tr>
<td>What is Persona</td>
</tr>
<tr>
<td>Using Persona from Library</td>
</tr>
<tr>
<td>Export and Import Persona</td>
</tr>
<tr>
<td>CloneBone</td>
</tr>
<tr>
<td>Benefits</td>
</tr>
<tr>
<td>Creating CloneBone Actors</td>
</tr>
<tr>
<td>Adjusting Body Parts of CloneBone Actors</td>
</tr>
<tr>
<td>Adjusting after Attaching</td>
</tr>
<tr>
<td>Adjusting Along the Body Proportion</td>
</tr>
<tr>
<td>Section</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Motion Editing for CloneBone Actors</td>
</tr>
<tr>
<td>G5 Heads with Better Lip-sync</td>
</tr>
<tr>
<td>Accessing New G5 Characters</td>
</tr>
<tr>
<td>Creating a head</td>
</tr>
<tr>
<td>Creating A Face</td>
</tr>
<tr>
<td>Loading the Facial Image</td>
</tr>
<tr>
<td>Photo Enhancement</td>
</tr>
<tr>
<td>Importing Photo Image</td>
</tr>
<tr>
<td>Defining the Facial Angle</td>
</tr>
<tr>
<td>Adjusting the Facial Boundary</td>
</tr>
<tr>
<td>Adjusting the Angle and Orientation of the Face</td>
</tr>
<tr>
<td>Adjusting Feature Points and Contours</td>
</tr>
<tr>
<td>Synchronizing Skin Color of Head and Body</td>
</tr>
<tr>
<td>Adjusting Facial Features</td>
</tr>
<tr>
<td>Basic Adjustments</td>
</tr>
<tr>
<td>Detailing Overall Facial Features</td>
</tr>
<tr>
<td>Full Head Morph</td>
</tr>
<tr>
<td>Using Custom Head Morph Template</td>
</tr>
<tr>
<td>Multi-Full Head Morph Effects</td>
</tr>
<tr>
<td>Randomizing Facial Features</td>
</tr>
<tr>
<td>Detailing Overall Facial Features</td>
</tr>
<tr>
<td>Using the MixMoves Panel</td>
</tr>
<tr>
<td>Using the Motion Puppet Panel</td>
</tr>
<tr>
<td>Getting Familiar with Motion Puppet in Preview Mode</td>
</tr>
<tr>
<td>Getting Ready to Start Recording</td>
</tr>
<tr>
<td>Masking Puppet Motion</td>
</tr>
<tr>
<td>Checking out the Result in Timeline</td>
</tr>
<tr>
<td>Introducing the Motion Puppet Panel</td>
</tr>
<tr>
<td>Slider Control and Mouse Control</td>
</tr>
<tr>
<td>Slider Control Mode</td>
</tr>
<tr>
<td>Exaggeration and Speed</td>
</tr>
<tr>
<td>Sliders in the Preset Tab</td>
</tr>
<tr>
<td>Mouse Control Mode</td>
</tr>
<tr>
<td>Matching Walking Loop to the Transformation Distance</td>
</tr>
<tr>
<td>Masking Puppeteering and Multi-Layer Recording</td>
</tr>
<tr>
<td>Masking Puppeteering</td>
</tr>
<tr>
<td>Multi-Layer Recording</td>
</tr>
<tr>
<td>Defining Custom Motions with the Parameter Sliders</td>
</tr>
<tr>
<td>Defining Custom Motions</td>
</tr>
<tr>
<td>Saving and Loading Body Puppet Profiles</td>
</tr>
<tr>
<td>What is saved in a Body Puppet Profile?</td>
</tr>
<tr>
<td>Puppeteering Principles for Body Puppet Panel</td>
</tr>
<tr>
<td>Offset Sliders</td>
</tr>
<tr>
<td>Youth to Elderly</td>
</tr>
<tr>
<td>Man to Woman</td>
</tr>
<tr>
<td>Woman to Man</td>
</tr>
<tr>
<td>Motion Elasticity Sliders - Body Parts</td>
</tr>
<tr>
<td>Happy to Depressed</td>
</tr>
<tr>
<td>Motion Elasticity Sliders - Entire Body</td>
</tr>
<tr>
<td>Using the Direct Puppet Panel</td>
</tr>
<tr>
<td>Direct Puppet - Basic Concept</td>
</tr>
<tr>
<td>Section</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Introducing the Direct Puppet Panel</td>
</tr>
<tr>
<td>Locking Bones</td>
</tr>
<tr>
<td>Lock Move</td>
</tr>
<tr>
<td>Lock Rotate</td>
</tr>
<tr>
<td>Realistic Shoulder</td>
</tr>
<tr>
<td>Direct Puppeteering - Move</td>
</tr>
<tr>
<td>Screen-based Movement</td>
</tr>
<tr>
<td>Horizontal Movement and Vertical Movement</td>
</tr>
<tr>
<td>Direct Puppeteering - Rotate</td>
</tr>
<tr>
<td>Screen-based Rotation</td>
</tr>
<tr>
<td>Primary Rotation</td>
</tr>
<tr>
<td>Secondary Rotation</td>
</tr>
<tr>
<td>Multi-Layer Recording</td>
</tr>
<tr>
<td>Puppeteering with an Existing Motion or Pose</td>
</tr>
<tr>
<td>Preparing Motion or Start Pose for a Character</td>
</tr>
<tr>
<td>Motion</td>
</tr>
<tr>
<td>Start Pose</td>
</tr>
<tr>
<td>Puppeteering with a Motion or a Pose</td>
</tr>
<tr>
<td>Puppet to Timeline Clip - How It Works</td>
</tr>
<tr>
<td>Puppeteering to Create a New Motion Clip without Existing Motions in Place</td>
</tr>
<tr>
<td>Overlapping Puppet Motion to an Existing Motion Clip</td>
</tr>
<tr>
<td>Start from the Same Frame</td>
</tr>
<tr>
<td>Start from the Middle of the Previous Clip</td>
</tr>
<tr>
<td>Introducing the Edit Motion Layer Panel (New for V7.1)</td>
</tr>
<tr>
<td>Producing a Custom Pose or a Key-frame Motion</td>
</tr>
<tr>
<td>Producing a Custom Pose</td>
</tr>
<tr>
<td>Producing a Key-frame Motion</td>
</tr>
<tr>
<td>Layering Motion Keys to Existing Motions</td>
</tr>
<tr>
<td>Making an Absolute Motion Layer Key</td>
</tr>
<tr>
<td>Making a Relative Motion Layer Key</td>
</tr>
<tr>
<td>Setting Default Keys and Resetting Motion Layer Keys</td>
</tr>
<tr>
<td>What is the Default Pose in iClone?</td>
</tr>
<tr>
<td>Setting Default Keys (Reset Pose Key)</td>
</tr>
<tr>
<td>Resetting Motion Layer Keys</td>
</tr>
<tr>
<td>Creating Custom Default Pose</td>
</tr>
<tr>
<td>Fixing G3 Motions for G5 Character</td>
</tr>
<tr>
<td>Using Edit Motion Layer Panel to Fine-tune G3 Motions</td>
</tr>
<tr>
<td>Fixing with the Edit Motion Layer Panel</td>
</tr>
<tr>
<td>Locking Bones</td>
</tr>
<tr>
<td>Lock Move</td>
</tr>
<tr>
<td>Lock Rotate</td>
</tr>
<tr>
<td>Realistic Shoulder</td>
</tr>
<tr>
<td>Animating Hand Gestures</td>
</tr>
<tr>
<td>Fine Tuning the Actor with IK, FK</td>
</tr>
<tr>
<td>What is IK/FK</td>
</tr>
<tr>
<td>What is IK</td>
</tr>
<tr>
<td>What is FK</td>
</tr>
<tr>
<td>How to Use IK</td>
</tr>
<tr>
<td>How to Use FK (New for V7.1)</td>
</tr>
<tr>
<td>Section</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>IK, FK for Actors or Extend Bones</td>
</tr>
<tr>
<td>Launching Panels</td>
</tr>
<tr>
<td>FK Method</td>
</tr>
<tr>
<td>IK Method</td>
</tr>
<tr>
<td>Using the Reach Target Panel</td>
</tr>
<tr>
<td>Setting Reach Target Keys</td>
</tr>
<tr>
<td>Transition Keys</td>
</tr>
<tr>
<td>Introducing the Reach Target Panel</td>
</tr>
<tr>
<td>Character Contacting with Targets</td>
</tr>
<tr>
<td>Reach Mode - Reach Object</td>
</tr>
<tr>
<td>Reach Mode - Rotation</td>
</tr>
<tr>
<td>Keeping Original Poses or Motions</td>
</tr>
<tr>
<td>Using Embedded Reach Effectors</td>
</tr>
<tr>
<td>Creating Body Motions with Effectors (New for v7.1)</td>
</tr>
<tr>
<td>Fixing Motions with Effectors (New for v7.1)</td>
</tr>
<tr>
<td>Creating Body Motions</td>
</tr>
<tr>
<td>Fixing Motions</td>
</tr>
<tr>
<td>Baking Reach Keys to Pose (New for v7.1)</td>
</tr>
<tr>
<td>Issue</td>
</tr>
<tr>
<td>Baking Reach Keys to Pose</td>
</tr>
<tr>
<td>The Basic Workflow from the Kinect Depth Camera to iClone</td>
</tr>
<tr>
<td>A. Get the Depth Camera Ready</td>
</tr>
<tr>
<td>B. Receiving Data from the Device Mocap Plug-ins</td>
</tr>
<tr>
<td>Using the Mocap Device Plug-ins with Mirror Mode</td>
</tr>
<tr>
<td>Installing Mocap Device and Corresponding Plug-in</td>
</tr>
<tr>
<td>Installing the Mocap Device - Microsoft’s Kinect for Xbox 360 &amp; Microsoft’s Kinect for Windows</td>
</tr>
<tr>
<td>Installing Mocap Device Plug-in - for Xbox 360 and for Windows</td>
</tr>
<tr>
<td>System Requirements for Mocap Device Plug-in</td>
</tr>
<tr>
<td>Installing the Mocap Device Plug-in</td>
</tr>
<tr>
<td>Installing the Mocap Device and Corresponding Plug-in</td>
</tr>
<tr>
<td>Installing the Mocap Device - Microsoft’s Kinect for Xbox One</td>
</tr>
<tr>
<td>Installing the Mocap Device Plug-in - Xbox One</td>
</tr>
<tr>
<td>System Requirements for Mocap Device Plug-in - Xbox One</td>
</tr>
<tr>
<td>Installing the Mocap Device Plug-in - Xbox One</td>
</tr>
<tr>
<td>Using Mocap Device Plug-in</td>
</tr>
<tr>
<td>Optimizing the Screen View when Working with iClone</td>
</tr>
<tr>
<td>Using Body Command Feature to Preview or Record</td>
</tr>
<tr>
<td>Using Near Mode</td>
</tr>
<tr>
<td>Capturing Head Rotation</td>
</tr>
<tr>
<td>Leveling the Virtual Floor Direction</td>
</tr>
<tr>
<td>Using the Mocap Device Plug-in - Xbox One</td>
</tr>
<tr>
<td>Quick Switch Actors during Capturing</td>
</tr>
<tr>
<td>Optimizing the Screen View when working with iClone</td>
</tr>
<tr>
<td>Using Body Command Feature to Preview and Record</td>
</tr>
<tr>
<td>Using Near Mode</td>
</tr>
<tr>
<td>Capturing Head Rotation</td>
</tr>
<tr>
<td>Leveling the Virtual Floor Direction</td>
</tr>
<tr>
<td>Multi-layer Capturing</td>
</tr>
<tr>
<td>The Best Way for Capturing Upper Body Motions</td>
</tr>
<tr>
<td>Capturing with the Default Pose</td>
</tr>
<tr>
<td>Capturing with a Custom Pose</td>
</tr>
</tbody>
</table>
Speed ................................................................. 337
Sample .................................................................... 338
Flatten .................................................................... 338
Facial Expression Tracks ............................................ 339
Viseme Track .......................................................... 339
Expression Track ...................................................... 339
Facial Layer Track ................................................... 339
Using Facial Mocap Plug-in (New for V7.0) .................. 340
Reducing Jumpy Mouth Movements as a Character Talks ................................................................. 341
Generating Visemes .................................................. 341
Reducing Lip Keys ..................................................... 342
Smoothing Mouth Movements ....................................... 343
Generating Visemes .................................................. 343
Smoothing Mouth Movements ....................................... 344
Smoothing Parts ....................................................... 345
Stylizing Mouth Movements .......................................... 346
Generating Visemes .................................................. 346
Stylizing Entire Mouth Movements ................................. 346
Stylizing Parts of Mouth Movements .............................. 347
User Interface Introduction for Morph Animation and Features (New for V7.0) ................................. 348
Morph Contents (New for V7.0) .................................... 349
Morph Animation Timeline (New for V7.0) ..................... 350
Creating Custom Morph Sliders with Morph Creator (New for V7.0) ........................................ 352
The User Interface Introduction for Morph Creator (New for V7.0) ........................................ 353
  The Main Menu for Morph Creator (New for V7.0) ......................................................... 354
    File ..................................................................... 354
    Edit ................................................................... 354
    View .................................................................. 355
    Window ................................................................ 355
    Help .................................................................. 356
  The Tool Bars for Morph Creator (New for V7.0) ................................................................. 358
    Project Tool Bar .................................................. 358
    General Tool Bar ................................................ 358
    Modify Tool Bar .................................................. 358
    Camera Tool Bar .................................................. 358
  The Scene Manager for Morph Creator (New for V7.0) ......................................................... 359
  The Morph Editor for Morph Creator (New for V7.0) .......................................................... 361
Importing Contents to Morph Creator (New for V7.0) ................................................................. 362
Creating Morph Sliders (New for V7.0) ............................... 363
Exporting Base Meshes as OBJ File ................................. 363
Creating Morph Sliders from iAvatar ................................. 363
Creating Morph Sliders from Objects with Morph Targets .......................................................... 364
Creating Morph Sliders from Custom Assets ......................... 364
Importing Morph Target .................................................. 367
Baking Morph Sliders .................................................... 367
Editing Morph Sliders (New for V7.0) ............................... 370
Replacing Morph Target Meshes .................................... 370
Deleting Morph Sliders .................................................. 370
Sending and Updating Morph Data (New for V7.0) .......................... 371
Sending Morph Data to iClone ........................................ 371
Updating Morph Data for Specific Mesh .............................. 371
Updating Morphs and Link Sliders .................................................. 372
Spring Effects .................................................................................. 373
Where to Apply Spring Effect ........................................................... 374
  Standard Actors (how) .................................................................. 374
  Non-standard Actors (how) ......................................................... 374
  Non-human Actors (how) ........................................................... 374
Props (how) ..................................................................................... 374
Spring Settings .................................................................................. 375
Turning Spring Effects On/Off .......................................................... 376
  Turning Spring Effects On/Off ...................................................... 376
  Manually Animating Bones with Spring Effects Off ...................... 377
Adjusting Spring Settings for Bones with SPX Files (New for 6.1) ....... 379
Physics Concepts ............................................................................. 381
Physics Objects ............................................................................... 381
Physics Characters .......................................................................... 381
Rigid body ....................................................................................... 381
Soft Cloth ....................................................................................... 382
  Optimization for Physics Simulation ........................................... 382
Dual Physics Engines ........................................................................ 383
  The Comparison of Bullet and PhysX Engines ......................... 383
Switching Physics Engines ............................................................... 384
Simulating Physics Animations for iClone 5 Projects ....................... 384
Simulating Physics Animations for iClone 6 Projects ....................... 385
Physics Settings for Characters ........................................................ 386
  How Does It Work? ...................................................................... 386
  Setting the Collision Shapes for Characters .............................. 386
  Introducing the Character Collision Shape Editor Panel ............. 388
  Setting Collision Shapes for Characters .................................... 389
Adjusting Existing Collision Shapes .................................................. 389
Adding Collision Shapes for Better Simulation ................................ 391
Basic Transforming ........................................................................ 391
Adding More Collision Shapes ........................................................ 392
Adding Collision Shapes for Extend Bones ..................................... 393
Soft Cloth for Characters ............................................................... 395
Editing the Soft Cloth Objects ........................................................ 395
The Rigid Body Simulation .............................................................. 398
  Rigid Body and Regular Props .................................................... 399
Baking Animation Clips from Physics Simulations ......................... 400
Using Rigid Body from the Library ................................................ 402
Using the Infinite Plane .................................................................... 402
Using the Props in the Rigid Body Category ..................................... 403
  The States of Rigid Body ............................................................ 404
Dynamic ......................................................................................... 404
Static ............................................................................................. 405
Kinematic ....................................................................................... 405
Frozen ............................................................................................ 406
Setting States Keys .......................................................................... 407
  From Static to Dynamic ............................................................. 408
  From Dynamic to Static ............................................................. 409
  From Kinematic to Dynamic ..................................................... 410
  From Dynamic to Kinematic ..................................................... 411
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link/Unlink and State Keys</td>
<td>412</td>
</tr>
<tr>
<td>Throwing a Dynamic Rigid Body with Linkage Feature</td>
<td>412</td>
</tr>
<tr>
<td>The Properties of a Rigid Body</td>
<td>413</td>
</tr>
<tr>
<td>Mass</td>
<td>413</td>
</tr>
<tr>
<td>Rigid body to rigid body</td>
<td>413</td>
</tr>
<tr>
<td>Rigid Body to Soft Cloth</td>
<td>414</td>
</tr>
<tr>
<td>Friction</td>
<td>414</td>
</tr>
<tr>
<td>Damping</td>
<td>414</td>
</tr>
<tr>
<td>Elasticity</td>
<td>415</td>
</tr>
<tr>
<td>The Bounding of Rigid Body</td>
<td>416</td>
</tr>
<tr>
<td>Bounding and Collision</td>
<td>416</td>
</tr>
<tr>
<td>Collision Margin</td>
<td>417</td>
</tr>
<tr>
<td>Convex Hull and Self Mesh</td>
<td>418</td>
</tr>
<tr>
<td>Convex Hull</td>
<td>418</td>
</tr>
<tr>
<td>Self Mesh</td>
<td>418</td>
</tr>
<tr>
<td>Mass Pivot and Rigid Body</td>
<td>419</td>
</tr>
<tr>
<td>The Rotation of a Rigid Body</td>
<td>419</td>
</tr>
<tr>
<td>Mass Pivot and Rolling</td>
<td>419</td>
</tr>
<tr>
<td>Relocating Mass Pivot - Creating a Balancing Toy</td>
<td>420</td>
</tr>
<tr>
<td>Creating Initial Motion</td>
<td>420</td>
</tr>
<tr>
<td>Creating Initial Motion - Direction</td>
<td>422</td>
</tr>
<tr>
<td>Creating Initial Motion - Rotation</td>
<td>423</td>
</tr>
<tr>
<td>The Basic Workflow of Using Constraint</td>
<td>425</td>
</tr>
<tr>
<td>Setting Constraint to a Physics Object</td>
<td>425</td>
</tr>
<tr>
<td>Setting Connection Relationship</td>
<td>428</td>
</tr>
<tr>
<td>Pick a Target or Connect to World</td>
<td>428</td>
</tr>
<tr>
<td>Connect to a Moving Target</td>
<td>428</td>
</tr>
<tr>
<td>Connect to World - Stay in Original Position</td>
<td>429</td>
</tr>
<tr>
<td>Collision between Constrained and Target Objects</td>
<td>429</td>
</tr>
<tr>
<td>Breaking Connection Relationship</td>
<td>430</td>
</tr>
<tr>
<td>Setting Constraint Limits</td>
<td>430</td>
</tr>
<tr>
<td>Move</td>
<td>431</td>
</tr>
<tr>
<td>Rotation</td>
<td>431</td>
</tr>
<tr>
<td>Producing Initial Force by Setting Constraint Limits</td>
<td>435</td>
</tr>
<tr>
<td>Move</td>
<td>435</td>
</tr>
<tr>
<td>Saving Constrained Objects</td>
<td>437</td>
</tr>
<tr>
<td>Hinge</td>
<td>439</td>
</tr>
<tr>
<td><strong>Creating Motor with Hinge</strong></td>
<td>441</td>
</tr>
<tr>
<td>Slider</td>
<td>443</td>
</tr>
<tr>
<td>Point to Point</td>
<td>445</td>
</tr>
<tr>
<td><strong>Enlarge the Rotation Range with Point to Point Constraint</strong></td>
<td>447</td>
</tr>
<tr>
<td>Cone Twist</td>
<td>449</td>
</tr>
<tr>
<td>Spring</td>
<td>451</td>
</tr>
<tr>
<td>Move</td>
<td>451</td>
</tr>
<tr>
<td>Setting Spring Property</td>
<td>453</td>
</tr>
<tr>
<td>Rotate</td>
<td>454</td>
</tr>
<tr>
<td><strong>The Combination of Moving And Rotating Spring Effect</strong></td>
<td>456</td>
</tr>
<tr>
<td>Duplicating Rigid Bodies with Constraints</td>
<td>458</td>
</tr>
<tr>
<td>Duplicating Constrained Rigid Body</td>
<td>458</td>
</tr>
<tr>
<td>Setting the Physics Structure</td>
<td>458</td>
</tr>
<tr>
<td>Duplicating the Constraint and Target</td>
<td>459</td>
</tr>
</tbody>
</table>
Duplicating Constraint and Target ........................................................................................................ 460
Setting the Physics Structure .................................................................................................................. 460
Duplicating the Constraint and Target .................................................................................................... 461
Duplicating the Entire Structure ............................................................................................................... 463
Building a Physics Structure .................................................................................................................... 463
Duplicating Physics Structure ................................................................................................................. 464
Serial and Multiple Constraints .............................................................................................................. 466
One to One - Serial Connection ............................................................................................................... 466
Many to One ............................................................................................................................................ 466
One to Many ........................................................................................................................................... 466
Creating a Series-Connected Chain ......................................................................................................... 467
Individual Constrained Objects with Single Target ................................................................................. 470
Using Bolts (Intermediate Dummies) with Multiple Constraints .............................................................. 472
Directly Combining Objects - Using Constraints as Joints ..................................................................... 472
Using Bolts (Intermediate Dummies) with Multiple Constraints .............................................................. 473
Relationships of Rigid Body, Constraint and Target ................................................................................ 475
Identifying by Colors ............................................................................................................................... 475
Constraint ................................................................................................................................................ 475
Constraint and Rigid Body ....................................................................................................................... 475
Identifying by Constraint Manager ......................................................................................................... 476
Constraint and Constraint Manager ......................................................................................................... 476
Rigid Body and Constraint Manager ....................................................................................................... 477
The Soft Cloth Simulation ......................................................................................................................... 479
Using Soft Cloth Props from the Library .................................................................................................. 482
Using Cloth with Various Details .............................................................................................................. 482
Using Hanging Cloths .............................................................................................................................. 483
Structure of Pinned Cloths ......................................................................................................................... 483
Attaching Cloth to another Object ........................................................................................................... 484
Remove Dummies .................................................................................................................................... 485
Setting Keys to Cloth Dummies ................................................................................................................ 486
Setting Softcloth Weight with a Weight Map .......................................................................................... 487
The Basic Concept of Using Weight Maps .............................................................................................. 487
Loading Weight Map ............................................................................................................................... 489
Editing Weight Map ................................................................................................................................. 493
Basic Editing ............................................................................................................................................ 493
Advanced Editing .................................................................................................................................... 494
Displaying Desired Material for Applying Weight Map (New for 6.2) ..................................................... 497
Preparing Object with Soft Cloth Settings ............................................................................................. 497
Filtering out Unnecessary Material via 3DXchange ................................................................................. 497
Solver Frequency ....................................................................................................................................... 500
Drag .......................................................................................................................................................... 501
Stretch, Elasticity and Tether Limit ........................................................................................................... 502
Stretch ....................................................................................................................................................... 502
Stretch and Object Meshes ....................................................................................................................... 502
Elasticity .................................................................................................................................................... 503
Tether Limit .............................................................................................................................................. 503
Bending ..................................................................................................................................................... 504
Inertia ......................................................................................................................................................... 505
Collision Margin ....................................................................................................................................... 506
Soft vs. Rigid Collision & Self Collision ................................................................................................. 506
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collision Margin</td>
<td>507</td>
</tr>
<tr>
<td>Wind Settings for Soft Cloth</td>
<td>508</td>
</tr>
<tr>
<td>Force</td>
<td>508</td>
</tr>
<tr>
<td>Wind</td>
<td>509</td>
</tr>
<tr>
<td>Gust Frequency</td>
<td>509</td>
</tr>
<tr>
<td>Strength</td>
<td>510</td>
</tr>
<tr>
<td>Global Physics Settings</td>
<td>511</td>
</tr>
<tr>
<td>Simulation Section</td>
<td>512</td>
</tr>
<tr>
<td>Rigid Body Global Settings</td>
<td>512</td>
</tr>
<tr>
<td>Soft Cloth Global Settings</td>
<td>512</td>
</tr>
<tr>
<td>Setting Simulating Environments</td>
<td>513</td>
</tr>
<tr>
<td>Actor - Look At</td>
<td>514</td>
</tr>
<tr>
<td>Look At</td>
<td>514</td>
</tr>
<tr>
<td>Look At the Camera</td>
<td>514</td>
</tr>
<tr>
<td>Weight and Convergence</td>
<td>514</td>
</tr>
<tr>
<td>Camera - Look At</td>
<td>515</td>
</tr>
<tr>
<td>Spotlight - Look At</td>
<td>516</td>
</tr>
<tr>
<td>Utilizing Path</td>
<td>517</td>
</tr>
<tr>
<td>Creating New Path</td>
<td>518</td>
</tr>
<tr>
<td>Creating Paths on the Grid</td>
<td>518</td>
</tr>
<tr>
<td>Drawing on Terrain</td>
<td>518</td>
</tr>
<tr>
<td>Drawing in the Sky</td>
<td>519</td>
</tr>
<tr>
<td>Converting Animation Keys to Path</td>
<td>520</td>
</tr>
<tr>
<td>Projecting to Terrain</td>
<td>521</td>
</tr>
<tr>
<td>Projecting to Terrain</td>
<td>521</td>
</tr>
<tr>
<td>Tangent Type</td>
<td>521</td>
</tr>
<tr>
<td>Editing Path</td>
<td>522</td>
</tr>
<tr>
<td>Prop Picking Path</td>
<td>523</td>
</tr>
<tr>
<td>Character Picking Path</td>
<td>524</td>
</tr>
<tr>
<td>Character</td>
<td>524</td>
</tr>
<tr>
<td>Setting Position Keys on Path</td>
<td>525</td>
</tr>
<tr>
<td>Position Value</td>
<td>525</td>
</tr>
<tr>
<td>Infinite Loop</td>
<td>525</td>
</tr>
<tr>
<td>Position Keys and Timeline</td>
<td>526</td>
</tr>
<tr>
<td>Release Constraint</td>
<td>526</td>
</tr>
<tr>
<td>Transition Keys</td>
<td>527</td>
</tr>
<tr>
<td>Adjusting Speed Variation on Path</td>
<td>528</td>
</tr>
<tr>
<td>Drag/Pull Position Keys</td>
<td>528</td>
</tr>
<tr>
<td>Transition Curve between Position Keys</td>
<td>528</td>
</tr>
<tr>
<td>Layering Path Transition Keys to Transformation (New for 6.03)</td>
<td>529</td>
</tr>
<tr>
<td>Path Transition Start Key</td>
<td>529</td>
</tr>
<tr>
<td>Transition Stop Key to Release Key</td>
<td>531</td>
</tr>
<tr>
<td>Following Control Points</td>
<td>532</td>
</tr>
<tr>
<td>Control Points Direction</td>
<td>532</td>
</tr>
<tr>
<td>Turning Control Points</td>
<td>532</td>
</tr>
<tr>
<td>Jumping from Path to Path</td>
<td>533</td>
</tr>
<tr>
<td>Keying Path to Path</td>
<td>534</td>
</tr>
<tr>
<td>Camera on Path and Look At Target</td>
<td>535</td>
</tr>
<tr>
<td>Camera on Path</td>
<td>535</td>
</tr>
<tr>
<td>Look At Target</td>
<td>535</td>
</tr>
<tr>
<td>Link and Attach</td>
<td>536</td>
</tr>
</tbody>
</table>
Transformation for 3D Blocks ........................................ 671
Transforming Blocks .................................................. 572
Reset Transform Data ................................................. 673
Attach Blocks as Groups ............................................. 674
Duplicating Blocks .................................................... 575
Applying Materials .................................................... 576
Pivot of Prop ................................................................ 577
What is Pivot ............................................................... 577
How does the pivot affect Transform Data ...................... 677
Set the pivot location .................................................. 577
Using Quick Set ......................................................... 578
Setting Pivot Anywhere ............................................... 579
World or Local Axis ..................................................... 680
Pivot Orientation ......................................................... 580
Transform Tools in World and Local Mode ..................... 581
Rotating Props Continuously (New for v7.1) ..................... 682
Using Rotating Tool ..................................................... 682
Rotating with Rotate XYZ Fields .................................... 683
"Look At" Feature for Prop ............................................ 684
Setting Look At for Prop .............................................. 684
Basics Steps ................................................................. 684
Look At the True Pivot .................................................. 686
Setting look At Limitations ......................................... 687
Lock Axis ................................................................ 587
Create Cannon by Setting Limit ..................................... 688
Duplicating Props ....................................................... 589
Duplicating Props with Ctrl Key .................................... 689
Using the Multi-Duplicate Panel ................................. 689
Collaborating with Object-Moving ............................... 689
Collaborating with Object-Rotating ............................. 691
Producing a Prop Array by Multi-Duplicate .................. 691
Using Spatial Offset ..................................................... 593
Controlling the "Look At", "Reach" and "Path" of Character, Camera, and Props ............................................ 694
Dummy as a Looked Target .......................................... 695
Offsetting the Line of Vision of Camera ......................... 696
Dummy as the Reaching Target ..................................... 697
Using Follow Path Feature with Dummy ....................... 698
Prop Puppeteering ...................................................... 699
Simple Mode ................................................................ 699
Move ........................................................................ 699
Rotate ....................................................................... 699
Scale ....................................................................... 700
Advanced Mode .......................................................... 700
Using the Profile ......................................................... 702
Manually Adjusting the Profile Settings ............................ 703
Sensitivity ................................................................. 703
World or Local ............................................................ 703
Creating Animation Helper ......................................... 704
Collect Clip ................................................................ 704
Prop Animation with Helper ........................................ 705
Basic Rules ................................................................ 705
<table>
<thead>
<tr>
<th>Benefits</th>
<th>736</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limitations</td>
<td>735</td>
</tr>
<tr>
<td>Height Map Terrain</td>
<td>736</td>
</tr>
<tr>
<td>The Benefits of Height Map Terrain</td>
<td>736</td>
</tr>
<tr>
<td>Details of Height Map Terrain</td>
<td>738</td>
</tr>
<tr>
<td>Replacing Textures to Change Landscape</td>
<td>739</td>
</tr>
<tr>
<td>Changing Texture of Height Map Terrain</td>
<td>740</td>
</tr>
<tr>
<td>Replacing Material with Material Presets</td>
<td>744</td>
</tr>
<tr>
<td>Creating Custom Height Map Mask</td>
<td>748</td>
</tr>
<tr>
<td>The Basic Concept of Detailmap</td>
<td>748</td>
</tr>
<tr>
<td>Creating a Material Mask in Earth Sculptor</td>
<td>749</td>
</tr>
<tr>
<td>Obtaining Height Map and Material Mask Images for iClone</td>
<td>751</td>
</tr>
<tr>
<td>Finding Required Images in Earth Sculptor</td>
<td>751</td>
</tr>
<tr>
<td>Loading Height Map and Mask Images in iClone</td>
<td>752</td>
</tr>
<tr>
<td>Re-arranging Materials</td>
<td>753</td>
</tr>
<tr>
<td>Tiling Cliffs on Height Map Terrain</td>
<td>755</td>
</tr>
<tr>
<td>Tiling Texture on Cliffs</td>
<td>756</td>
</tr>
<tr>
<td>Adding More Details to Terrain Material</td>
<td>757</td>
</tr>
<tr>
<td>Using Detail Channel</td>
<td>757</td>
</tr>
<tr>
<td>Physics Settings for Height Map Terrain</td>
<td>759</td>
</tr>
<tr>
<td>Snap To or Follow Terrain</td>
<td>761</td>
</tr>
<tr>
<td>Off</td>
<td>761</td>
</tr>
<tr>
<td>Snap to Terrain</td>
<td>761</td>
</tr>
<tr>
<td>Follow Terrain</td>
<td>761</td>
</tr>
<tr>
<td>Create Your Own Terrain</td>
<td>762</td>
</tr>
<tr>
<td>Convert Props to Terrain</td>
<td>762</td>
</tr>
<tr>
<td>How to Add a Terrain</td>
<td>762</td>
</tr>
<tr>
<td>Turn Bounding Mesh On or Off</td>
<td>763</td>
</tr>
<tr>
<td>The Difference between On and Off</td>
<td>763</td>
</tr>
<tr>
<td>Why Turn Bounding Mesh On?</td>
<td>763</td>
</tr>
<tr>
<td>Customize a Terrain with Collision Detection</td>
<td>764</td>
</tr>
<tr>
<td>Customize a Terrain with Collision Detection</td>
<td>764</td>
</tr>
<tr>
<td>Water</td>
<td>765</td>
</tr>
<tr>
<td>Basic Water Parameters - Color</td>
<td>766</td>
</tr>
<tr>
<td>Change the Color</td>
<td>766</td>
</tr>
<tr>
<td>Basic Water Parameters - Wave</td>
<td>767</td>
</tr>
<tr>
<td>Change the Wave</td>
<td>767</td>
</tr>
<tr>
<td>Size and Strength</td>
<td>767</td>
</tr>
<tr>
<td>3 Types of Water</td>
<td>768</td>
</tr>
<tr>
<td>Video Diffuse and Video Normal</td>
<td>769</td>
</tr>
<tr>
<td>Video Diffuse - Quick Mode</td>
<td>769</td>
</tr>
<tr>
<td>Video Normal - High Real-time Rendering Mode</td>
<td>769</td>
</tr>
<tr>
<td>Water Edge Softness</td>
<td>770</td>
</tr>
<tr>
<td>Advanced Water Parameters - Underwater Fog</td>
<td>771</td>
</tr>
<tr>
<td>Advanced Water Parameters - Reflection</td>
<td>772</td>
</tr>
<tr>
<td>Reflection above the Water Surface</td>
<td>772</td>
</tr>
<tr>
<td>Reflection under the Water Surface</td>
<td>772</td>
</tr>
<tr>
<td>Advanced Water Parameters - Refraction</td>
<td>773</td>
</tr>
<tr>
<td>The Above Water Clarity</td>
<td>773</td>
</tr>
<tr>
<td>Refraction above the Water Surface</td>
<td>773</td>
</tr>
<tr>
<td>Refraction under the Water Surface</td>
<td>773</td>
</tr>
</tbody>
</table>
# Lighting

The Comparison of Lights ........................................................................................................ 779
Increasing Light Contrast with Multiplier .................................................................................. 780
Producing Lighting at Noon with the Multiplier ........................................................................ 780
Multiplier, Spotlight and Point Light ......................................................................................... 781
Ambient Light ............................................................................................................................. 782
Manipulating the Directional Light ............................................................................................. 783
  Change the Angle of Directional Lights .................................................................................... 783

## Spotlight

Intensity, Beam and Falloff ........................................................................................................... 785
Intensity ....................................................................................................................................... 785
Beam ............................................................................................................................................ 786
Falloff .......................................................................................................................................... 786
Link for a Spotlight .................................................................................................................... 787
Spotlight - Look At ..................................................................................................................... 788

## Point Light

Range and Decay of Point Lights ............................................................................................... 790
Range and Decay of Point Lights ............................................................................................... 790
Utilizing Point Lights ................................................................................................................ 791
Utilizing Point Lights ................................................................................................................ 791
Using Aux Light Mode (New for v7.0) ...................................................................................... 792
Using Light Tool ......................................................................................................................... 793
  Using the Light Tool ................................................................................................................ 793
  Controlling Lights with Single Menu ...................................................................................... 795
    Controlling Custom Lights with Single Control Menu ......................................................... 795
    Controlling Light Tool with Single Control Menu ............................................................... 796
Saving Attached Lights ............................................................................................................ 797
Saving Attached Lights ............................................................................................................ 797

## Shadow

Shadow Option ............................................................................................................................. 800
  Resolution ............................................................................................................................... 800
  Shadow Opacity ..................................................................................................................... 801
  Soft Shadow ........................................................................................................................... 801
  Shadow Bias Adjustment ........................................................................................................ 801
  Shadow Range ....................................................................................................................... 801
  Focus Near Area (Directional Light Only) .............................................................................. 802
Darkening Shadows (New for V7.0) ............................................................................................ 803
Shadow Catcher in Default Project (New for V7.0) .................................................................... 805
Casting Shadow on Invisible Mesh Plane (New for V7.0) ........................................................ 806

## Shadows and Transparent Props

  Shadow Threshold and Shadows ............................................................................................... 808
  Alpha Threshold and Shadows ............................................................................................... 808
  Alpha Threshold ...................................................................................................................... 809

Increasing Real-time Speed and Performances ......................................................................... 809
Fixing Undesired Edge Lines from Objects ................................................................................ 810
Correcting Character's Hair for Toon Shader, and NPR Post Effect ........................................... 810
Using Shadow Casters (New for V7.0) ...................................................................................... 811
Workflows for Exporting Camera (New for v7.0) ........................................ 852
Basic Concepts for Exporting Camera(s) from iClone ........................................ 852
Exporting Camera(s) from iClone ................................................................. 853
Preparations in 3D Tools for Importing iClone Camera(s) ............................... 854
  For Maya .................................................................. 854
  For 3ds Max ................................................................. 854
Workflows for Importing Camera (New for v7.0) ........................................... 856
Importing Camera(s) into iClone via FBX ......................................................... 856
Examples (New for V7.0) .............................................................................. 857
iClone Camera Exported to Maya and 3ds Max (3 environments in layered comparison) 857
Maya Camera Exported for iClone ................................................................. 857

Clipping Planes of the Camera ........................................................................ 858
  Rule of Clipping planes ............................................................................ 858
  Setting the Near Clipping Plane Value ....................................................... 858
  Setting the Far Clipping Plane Value ......................................................... 858
The Concept of DOF (New for v7.1) ................................................................. 859
The Concept of DOF (New for v7.1) ................................................................. 860
The Introduction for DOF Related User Interface (New for v7.1) ...................... 862
  Modify Panel ....................................................................................... 862
  Preference Panel .................................................................................. 863
Setting Focus Distance (New for v7.1) ........................................................... 864
  Picking the Target ................................................................................. 864
Picking between multiple objects ..................................................................... 864
Picking Certain Surface Point of One Large Object ......................................... 865
  Manually Setting Focus Distance ............................................................. 865
  About Perfect Focus Range (New for v7.1) ............................................... 866
Enhancing Spatial Impression with Blur Effect (New for v7.1) ......................... 868
  Setting Blur Strength ............................................................................. 868
Adjusting Blur Transition Regions (New for v7.1) ........................................... 870
  Setting Length of Transition Regions ....................................................... 870
Using Bokeh Effects (New for v7.1) ................................................................ 872
  Using Bokeh Effect ............................................................................... 872
Creating DOF Animation (New for v7.1) ........................................................ 874
Fixing Visual Defects of Out-of-focus Objects (New for v7.1) ......................... 875
Fixing Sharp Edges for Objects in Blur Region .............................................. 875
Fixing Blurriness behind Semi-transparent Object ........................................... 877
Known Issues for DOF (New for v7.1) ............................................................. 879
  Highlight Flickering in View Port ........................................................... 879
  TAA and DOF ...................................................................................... 879
  Interference Between Near and Far Blur Regions .................................... 880
  DOF and Edges of Object in Near Blur Region ......................................... 880
  Blur Edge Sample Scale Influence Transition Region Effects ..................... 881
  Semi-Transparent Object Layering Issue .................................................. 881
Camera - Look At ........................................................................................... 882
Physically Based Rendering - PBR (New for v7.0) .......................................... 883
  The Introduction of PBR Related User Interface (New for v7.0) ............... 885
  Modify Panel ....................................................................................... 885
  Project Setting Panel ............................................................................ 886
Turning on PBR Color Space for the Entire Project (New for v7.0) ................... 887
Switching Color Space ................................................................................... 887
PBR Environment Setup ................................................................................... 888
Setting PBR Materials (New for v7.0) ................................................................. 890
  By Material .............................................................................................................. 890
  By Object ............................................................................................................... 890
  By Selection .......................................................................................................... 890
  By Project .............................................................................................................. 890
Using PBR Shader (New for v7.0) ....................................................................... 891
  PBR Shader ......................................................................................................... 891
  Adjusting or Replacing PBR Textures .............................................................. 892
Turning on Image Base Lighting for PBR (New for v7.0) .................................. 893
Baking IBL (New for V7.0) .................................................................................. 894
  Basic Concept ...................................................................................................... 894
  Center Point for Baking IBL ................................................................................ 894
  Applications for Baking Indoor Environments .................................................. 895
  Original IBL vs Baked IBL Detailed Comparison ........................................... 896
  Maintaining Baked IBL Light Source ............................................................... 896
  Important Notes for PBR Specular ................................................................. 898
  Advices and Tips for Using PBR (New for v7.0) ........................................... 899
  Dealing with Mipmapping .................................................................................. 899
  Dealing with Anti-aliasing .................................................................................. 900
What is Global Illumination (New for V7.0) ....................................................... 901
Minimum hardware requirements for Global Illumination (GI) ....................... 901
What are the benefits of Global Illumination (GI)? ........................................... 901
What elements in iClone project can take part in the GI (emit light photons) ... 902
User Interface Introduction for GI (New for V7.0) ........................................... 903
  Global Illumination Section .............................................................................. 903
  Diffuse Section ................................................................................................... 904
  Specular Section ............................................................................................... 905
Basic GI Operating Process (New for V7.0) ...................................................... 906
GI Ambient Light Settings (New for V7.0) .......................................................... 907
  Ambient Light Color ......................................................................................... 907
  Ambient Strength .............................................................................................. 907
Resetting Methods for GI Settings (New for V7.0) ........................................... 908
  Resetting All GI Settings ................................................................................. 908
  Resetting Individual GI Settings ...................................................................... 908
Elements Contributing Lights for GI (New for V7.0) ........................................ 909
  IBL for GI (New for V7.0) .................................................................................. 910
  Glow Texture for GI (New for V7.0) ................................................................. 911
  Voxelize Thickness ............................................................................................. 912
  Self Illumination for GI (New for V7.0) .............................................................. 913
  Image Based Material ......................................................................................... 914
  Video Based Material ......................................................................................... 914
  Particle for GI (New for V7.0) .......................................................................... 915
  GI Animation (New for V7.0) .......................................................................... 916
  GI Animation Comparison ............................................................................... 916
  Observe from Top View .................................................................................... 916
  Observe Voxel Size and Deployment and Descriptions through Top View ... 917
  GI and Timeline ................................................................................................. 918
Transparent Materials for GI (New for V7.0) ....................................................... 919
  Transparent Materials for GI ............................................................................. 919
  Comparison for Material Alpha Threshold, GI Alpha Threshold, and Translucent GI 920
Two Types of Dummy for GI (New for V7.0) ......................................................... 921
Adjusting LUT Image (New for v7.0) .......................................................... 957
Using Adjust Color Panel ........................................................................ 957
Superimposing LUT Effects (New for V7.0) ........................................... 959
LUT Animation (New for V7.0) ................................................................. 960
AO Effect (New for V7.0) ........................................................................ 961
The User Interface: Introduction of AO (New for V7.0) ...................... 962
Using AO Effect (New for V7.0) ............................................................... 963
The Concept of DOF (New for v7.1) ......................................................... 964
The Concept of DOF (New for v7.1) ......................................................... 965
The Introduction for DOF Related User Interface (New for v7.1) ........... 967
Modify Panel ............................................................................................. 967
Preference Panel ..................................................................................... 968
Setting Focus Distance (New for V7.1) .................................................. 969
Picking the Target .................................................................................... 969
Picking between multiple objects ............................................................ 969
Picking Certain Surface Point of One Large Object .............................. 970
Manually Setting Focus Distance ............................................................. 970
About Perfect Focus Range (New for v7.1) ............................................ 971
Enhancing Spatial Impression with Blur Effect (New for v7.1) .......... 973
Setting Blur Strength .............................................................................. 973
Adjusting Blur Transition Regions (New for v7.1) ................................. 975
Setting Length of Transition Regions ..................................................... 975
Using Bokeh Effects (New for v7.1) ....................................................... 977
Using Bokeh Effect ................................................................................ 977
Creating DOF Animation (New for v7.1) .............................................. 979
Fixing Visual Defects of Out-of-focus Objects (New for v7.1) ............. 980
Fixing Sharp Edges for Objects in Blur Region ..................................... 980
Fixing Blurriness behind Semi-transparent Object .................................. 982
Known Issues for DOF (New for v7.1) ................................................... 984
Highlight Flickering in View Port ............................................................ 984
TAA and DOF ......................................................................................... 984
Interference Between Near and Far Blur Regions ................................... 985
DOF and Edges of Object in Near Blur Region ....................................... 985
Blur Edge Sample Scale Influence Transition Region Effects ............ 986
Semi-Transparent Object Layering Issue ............................................... 986
Using Effects ......................................................................................... 987
Applying Effects from the Effect Library .............................................. 987
Modifying Current Effects ..................................................................... 988
Mix-using Effects .................................................................................. 989
Setting Keys for Effect .......................................................................... 990
Particles ................................................................................................. 991
Structure of Particle System ................................................................. 992
Generating Particles ............................................................................. 993
Adjusting Particles ............................................................................... 994
Adjusting Emitters ............................................................................... 998
Moving, Rotating Emitters ................................................................. 1001
Using Transform Data ......................................................................... 1001
Moving along a Path ............................................................................ 1001
Utilizing HDR Effect ............................................................................ 1002
Global HDR Effect ............................................................................... 1002
Fine-tuning with Tone Map .................................................................. 1003
Tip for the Opacity Keys .......................................................... 1033
Retrieving Material Settings .................................................................. 1034
Parameters Stored in a Material Template ........................................ 1034
Retrieving and Modifying Materials with Material Picker ...................... 1035
Shortcut to Modify Actors’ Skin Texture ............................................. 1036
Editing Multiple Materials ................................................................. 1038
  What Settings Can be Involved? ....................................................... 1038
  Editing Multiple Materials ............................................................. 1040
Loading and Saving Materials ............................................................ 1041
  Loading Material ........................................................................... 1041
  Saving Material ............................................................................. 1043
Saving as Material Template ............................................................. 1043
What is included in a Material Template? ............................................ 1044
External Texture and Material Sharing ................................................ 1045
External Texture .............................................................................. 1045
Material Sharing .............................................................................. 1046
Material Sync-Editing ....................................................................... 1047
Material Keys and Material Key Frame Animation ............................... 1048
Saving Material Template VS. Material Keys ...................................... 1048
Material keys and the Settings ............................................................ 1048
Saving Keys to Material Template .................................................... 1049
Real-time Render Options Section (New for V7.1) ............................... 1051
Mipmap ......................................................................................... 1051
Tessellation Shadow ....................................................................... 1052
Viewport GI .................................................................................. 1052
Depth of Field .................................................................................. 1053
Anisotropic Filtering and Mipmap ...................................................... 1053
Max Texture Size ............................................................................ 1053
LOD (Level of Detail) ....................................................................... 1053
UV Reference .................................................................................. 1054
Relationship between UV Reference Map and Diffuse Map .................. 1054
Resolution of UV-reference based Texture Map ................................. 1054
Texture Channel UV Offset and Tiling .............................................. 1055
Mapping Issues from Google SketchUp and 3D Warehouse ............... 1055
Custom UV Offset and Tiling .............................................................. 1055
How to fix the grainy texture tiling issue ........................................... 1056
Adjusting individual Texture Channels .............................................. 1057
Texture Channel UV Offset and Tiling .............................................. 1058
Mapping Issues from Google SketchUp and 3D Warehouse ............... 1058
Custom UV Offset and Tiling .............................................................. 1058
How to fix the grainy texture tiling issue ........................................... 1059
Adjusting individual Texture Channels .............................................. 1060
Synchronizing Texture UV Changes to All Channels ........................... 1061
Lock Ratio ...................................................................................... 1061
Effect All Channels ........................................................................ 1061
Replacing and Regenerating Model UV .......................................... 1062
Generating UV Reference ............................................................... 1062
Replacing / Regenerating UV Reference .......................................... 1062
Replacing and Regenerating Model UV .......................................... 1063
Generating UV Reference ............................................................... 1063
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replacing / Regenerating UV Reference</td>
<td>1063</td>
</tr>
<tr>
<td>Mapping Method for Multi-Material Object</td>
<td>1064</td>
</tr>
<tr>
<td>Single Model, Single Image as Texture</td>
<td>1064</td>
</tr>
<tr>
<td>Single Model, Multi Images as Textures</td>
<td>1064</td>
</tr>
<tr>
<td>Compounded Model, Multi Images as Textures</td>
<td>1064</td>
</tr>
<tr>
<td>What is Substance</td>
<td>1065</td>
</tr>
<tr>
<td>iClone Substance Libraries</td>
<td>1066</td>
</tr>
<tr>
<td>About Substance 3D Blocks</td>
<td>1067</td>
</tr>
<tr>
<td>iClone Substance Materials on 3D Blocks</td>
<td>1069</td>
</tr>
<tr>
<td>Benefits of Using Substance 3D Blocks</td>
<td>1069</td>
</tr>
<tr>
<td>Using Substance 3D Blocks</td>
<td>1070</td>
</tr>
<tr>
<td>Layers of iClone Substance Material and Related Parameters</td>
<td>1070</td>
</tr>
<tr>
<td>Basic Usage for Substance Props</td>
<td>1071</td>
</tr>
<tr>
<td>Advanced Usage for Substance Props</td>
<td>1072</td>
</tr>
<tr>
<td>Changing Texture of Layer</td>
<td>1072</td>
</tr>
<tr>
<td>Substance Material Templates</td>
<td>1074</td>
</tr>
<tr>
<td>Baking Textures</td>
<td>1076</td>
</tr>
<tr>
<td>iClone Substance Materials on 3D Blocks</td>
<td>1078</td>
</tr>
<tr>
<td>Benefits of Using Substance 3D Blocks</td>
<td>1078</td>
</tr>
<tr>
<td>Baking Substance Texture to Eight Channels</td>
<td>1079</td>
</tr>
<tr>
<td>Tessellation for Objects</td>
<td>1080</td>
</tr>
<tr>
<td>The Benefit of Tessellation</td>
<td>1080</td>
</tr>
<tr>
<td>Basic Tessellation in iClone - Real-time Smooth</td>
<td>1081</td>
</tr>
<tr>
<td>Tessellation and Displacement for Objects</td>
<td>1082</td>
</tr>
<tr>
<td>Using Grayscale Images for Displacement</td>
<td>1083</td>
</tr>
<tr>
<td>Using Grayscale Images for Displacement</td>
<td>1083</td>
</tr>
<tr>
<td>Animating Displacement Effect by UV Adjustments</td>
<td>1086</td>
</tr>
<tr>
<td>Using Vector Displacement Maps</td>
<td>1088</td>
</tr>
<tr>
<td>Video</td>
<td>1091</td>
</tr>
<tr>
<td>Applying Videos into Texture Channels</td>
<td>1092</td>
</tr>
<tr>
<td>Formats</td>
<td>1092</td>
</tr>
<tr>
<td>Applying Methods</td>
<td>1092</td>
</tr>
<tr>
<td>Utilizing popVideo</td>
<td>1094</td>
</tr>
<tr>
<td>Apply popVideo</td>
<td>1094</td>
</tr>
<tr>
<td>User Interface for Exporting FBX (New for V7.0)</td>
<td>1095</td>
</tr>
<tr>
<td>Exporting FBX from iClone (New for v7.0)</td>
<td>1096</td>
</tr>
<tr>
<td>What is Panorama Videos</td>
<td>1097</td>
</tr>
<tr>
<td>The Theory of Panorama Videos</td>
<td>1098</td>
</tr>
<tr>
<td>The User Interface Introduction of Exporting Panorama Videos</td>
<td>1099</td>
</tr>
<tr>
<td>Viewing Panorama Videos</td>
<td>1100</td>
</tr>
<tr>
<td>With Hardware Devices</td>
<td>1100</td>
</tr>
<tr>
<td>On Platforms</td>
<td>1100</td>
</tr>
<tr>
<td>The Notices</td>
<td>1101</td>
</tr>
<tr>
<td>The Changes of Camera View</td>
<td>1101</td>
</tr>
<tr>
<td>Limitations</td>
<td>1102</td>
</tr>
<tr>
<td>What is Alembic</td>
<td>1104</td>
</tr>
<tr>
<td>What Does It Do?</td>
<td>1104</td>
</tr>
<tr>
<td>Benefits Using Alembic</td>
<td>1104</td>
</tr>
<tr>
<td>The Main Concept of Using Alembic</td>
<td>1105</td>
</tr>
<tr>
<td>Step 1: Exporting ABC file</td>
<td>1105</td>
</tr>
</tbody>
</table>
Designed for ease of use and integrating the latest real-time technologies, iClone 7 unifies the world of 3D Animation in an all-in-one production tool that blends character creation, animation, scene design and story direction into a real-time engine with artistic visual quality for unparalleled production speed and rendering power. The iClone Animation Pipeline seamlessly connects industry-standard 3D applications and game-engines for games, film & virtual production. iClone is ideal for indie filmmakers or pro studio crews with tools designed for writers, directors, animators or anyone to turn their vision into a reality.

Note: The trademarks, registered trademarks, product names and/or logos used or referred to within this document and/or any other Reallusion products are owned by their respective owners.
Main Menu - File

The **File** menu on the main menu bar contains all the commands that are relevant to operating files.

<table>
<thead>
<tr>
<th>File</th>
<th>Ctrl+H</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Project</td>
<td>Ctrl+N</td>
</tr>
<tr>
<td>Open Project</td>
<td>Ctrl+O</td>
</tr>
<tr>
<td>Save Project</td>
<td>Ctrl+S</td>
</tr>
<tr>
<td>Save Project As...</td>
<td>Ctrl+Shift+S</td>
</tr>
</tbody>
</table>

- **Import...** (Ctrl + I) To import certain assets with supported file format. The supported formats for import are:
  - Audio (*mp3, *.wav)
  - Avatar (*iAvatar)
  - Effect (*iAtm, *.Effect, *.ImageLayer, *.iLight, *.iParticle)
  - Part (*iAcc)

- **Import Camera**

  - **CT** (*iCLP, *.CTS)
  - **Motion** (*iAML, *.iHand, *.iMotion, *.iMotionPlus, *.iPersona, *.iTalk, *.iMotion, *.iTalk)
  - **Import Camera** (New for v7.0): To import camera settings and animations from other 3D tools in FBX format.
Export

There are three commands in the item, **Export Alembic**, **Export Camera** and **Export to FBX**:

- **Export Alembic...**: To export motions of a character or animations of props or accessories into Alembic files.
- **Export Camera** (New for v7.0): To export the currently selected camera and its settings and animations into FBX format for reusing in 3D tools.
- **Export to FBX** (New for v7.0): To export the currently selected character, accessory or prop with or without their motions or animations into FBX format.

Merge MotionPlus

To merge partial motions from any **MotionPlus** file.

Exit

To exit **iClone**
# Main Menu - Edit

The **Edit** menu on the main menu bar contains all the commands for manipulating 3D entities in the scene.

<table>
<thead>
<tr>
<th>Command</th>
<th>Shortcut</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undo</td>
<td>Ctrl + Z</td>
<td>To undo or redo the last action.</td>
</tr>
<tr>
<td>Redo</td>
<td>Ctrl + Y</td>
<td></td>
</tr>
<tr>
<td>Delete</td>
<td>Del</td>
<td>To delete one or more selected objects.</td>
</tr>
<tr>
<td>Select / Select All</td>
<td>Q</td>
<td>- <strong>Select</strong> To switch to select mode for selecting objects.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- <strong>Select All</strong> To select every 3D entity in the scene.</td>
</tr>
<tr>
<td>Move</td>
<td></td>
<td>To transform the selected objects. However, the <strong>Scale</strong> tool does not work on characters.</td>
</tr>
<tr>
<td>Rotate / Scale</td>
<td>W / E / R</td>
<td></td>
</tr>
<tr>
<td>Multi-Duplicate</td>
<td>Ctrl + K</td>
<td>To duplicate a prop into multiple copies with identical settings.</td>
</tr>
<tr>
<td>Project Settings</td>
<td>Ctrl + Shift + P</td>
<td></td>
</tr>
<tr>
<td>Preference</td>
<td>Ctrl + P</td>
<td></td>
</tr>
</tbody>
</table>
Align

This item contains a sub-menu with two features.

- **Align Object**: This command aligns objects such as props, accessories and trees in an aligned position. You may also space objects within a fixed distance. This is useful when you need to re-locate scattered objects in order.
- **Align to (Ctrl + L)**: This command align and snap a 3D entity to another targeted object without moving the object.

Link

This item contains a sub-menu with two features.

- **Link**: This command sets a key or keys to connect one or more objects to another.
- **Unlink**: This command sets a key or keys to disconnect one or more objects that have been linked together.

Attach

This item contains a sub-menu in which two features exist.

- **Attach**: This command adheres one or more objects to another one.
- **Detach**: This command disassembles one or more objects that have been attached to another one.

Merge

This command merges a set of parent-child props that is composed by the **Attach** command into a single prop.

Visible

This command sets a key or keys to show or hide one or more 3D objects.

Camera

This item contains a sub-menu with two features.

- **Auto Level**: This command keeps the camera upright (Z-up) when you rotate it.
- **Smooth Movement**: This command curves the camera’s linear panning path that is generated by different transforming keys.

Terrain Snap

This item contains a sub-menu with three features.

- **Snap to Terrain**: This command forces 3D objects to be align on the ground, even if it is manually moved.
- **Follow Terrain**: This command not only forces 3D objects to be aligned on the ground when it is manually moved, but also rotates the objects to ensure they are perpendicular to the surface of the terrain.

- **Off**: This command turns off the Terrain Snap off.

- **Bake All Substance Textures**: This command bakes the substance texture to the eight channels of the prop.

- **Open Mouth**: This command opens the mouth of your character.

- **Hide Teeth**: This command hides the teeth in order to reveal the tongue. It is only enabled after the Open Mouth command is executed.

- **Conform**: This command opens the Conform Clothing panel in order to best fit the selected cloths to the character wearing them.

- **Real-time Smooth**: This command basically tessellates a prop with low polygons into a prop with 3-time-higher polygons.

- **Project Settings… (Ctrl + Shift + P)**: This command displays the Project Settings panel for you to adjust the Time Unit, Global Sound Settings, Global Physics Settings, 2D Background and shows the Information about the current project.

- **Preference (Ctrl + P)**: This command displays the Preference panel in which you may adjust the authoring environment of iClone to your customized one.
Main Menu - Create

The **Create** menu on the main menu bar contains commands for you to create certain basic objects, such as props in basic shapes, particles, lights and so on.

### Primitive Shape
This item contains a sub-menu for creating props of basic shapes so that you do not need to search for them in the **3D Blocks** libraries.

- Box
- Sphere
- Cone
- Cylinder

### Surface
This item contains a sub-menu for creating space props so that you do not need to search for them in the **3D Space** libraries.

- Sky
- Cave
- Room
- Plane

### Particle
This item contains a sub-menu for creating basic particles so that you do not need to search for them in the **Particle** relevant libraries.

- Rain
- Smoke
- Torch Fire
- Fog
Speed Tree  
This item contains a sub-menu for creating basic speed trees so that you do not need to search for them in the Tree relevant libraries.

Billboard  
This item contains a sub-menu for creating billboard so that you do not need to search for them in the Billboard libraries.

Physics  
This item contains a sub-menu for creating basic physics props, such as the infinite plane, the ball (rigid body) and the cloth (soft cloth), so that you do not need to search them in the Physics relevant libraries.

Light  
This item contains a sub-menu for creating different basic lights so that you do not need to search them in the Light libraries.

Shadow Caster  
This item contains a sub-menu for creating 2 different lights that cast only shadow without any lights. You can use them to simulate the shadow for objects that does not cast shadows.

Camera  
This command creates a new camera with all settings based on the current view on the preview window.

Create Path  
This command switches to path-creating mode. You may start to click and draw a path after this command is executed.
Main Menu - Modify

The **Modify** menu on the main menu bar contains commands related to the character, the props and terrain, or the constraint for rigid bodies.

**Create Face**

This command starts the create face wizard for you to generate a customized G5 (or earlier version) character's head.

**Facial Features**

This command opens the **Facial Feature** panel for adjusting the character's facial features.

**Avatar Proportion**

This command opens the **Avatar Proportion** panel for adjusting the body shape and appearance of a character.

**Collision Shape**

This command opens the **Collision Shape** panel for adding, editing or adjusting the collision shapes attached on the character.

**Convert to Terrain**

This command converts the currently selected prop or props into components of the terrain for forming a custom one.

**Convert to Prop**

This command converts one or more components of a terrain into props.

**Convert All Shaders to...**

This command converts the material shader modes of all materials in the entire project to **Traditional** or **PBR** mode.

**Convert Object Shader to...**

This command converts the material shader modes of all materials on the selected objects.
Convert Camera FOV

This command determines the target side (height or width) for calculating the field of view angle into length for all cameras in the entire project; the options in the list are horizontal and vertical.

* Please note that the camera FOV before iClone 6 or earlier versions are Vertical-based, while the ones in other 3D tools are Horizontal-based.

Constraint Manager

This command opens the Constraint Manager for you to identify the relationships between the constraints and its target rigid body.

Rigid Body Simulation

This command turns on or off the simulation feature for the rigid bodies in the scene.

Soft Cloth Simulation

This command turns on or off the simulation feature for the soft clothes in the scene.

Add Constraint

This command opens the Add Constraint panel for you to apply constraint templates from within it.
Main Menu - Animation

The Animation menu on the main menu bar contains commands related to the motions and animations of the characters, props and the entire project.

<table>
<thead>
<tr>
<th>Animation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create Script</td>
</tr>
<tr>
<td>Face Puppet</td>
</tr>
<tr>
<td>Face Key</td>
</tr>
<tr>
<td>Motion Puppet</td>
</tr>
<tr>
<td>Direct Puppet</td>
</tr>
<tr>
<td>Device Mocap</td>
</tr>
<tr>
<td>Edit Motion Layer</td>
</tr>
<tr>
<td>Reach Target</td>
</tr>
<tr>
<td>MxMoves</td>
</tr>
<tr>
<td>Prop Puppet</td>
</tr>
<tr>
<td>Edit Animation Layer</td>
</tr>
<tr>
<td>Morph Animation</td>
</tr>
<tr>
<td>Motion Setting Options</td>
</tr>
<tr>
<td>Apply Gesture Options</td>
</tr>
<tr>
<td>Clip Auto Extend</td>
</tr>
<tr>
<td>Remove Scene Animation</td>
</tr>
<tr>
<td>Remove Object Animation</td>
</tr>
</tbody>
</table>

Create Script: This item contains a sub-menu for creating voice scripts to currently selected character.

- **Record Voice**: Use this command to directly record a voice to create a voice script for the character.
- **Text-To-Speech**: Use this command to convert desired text into a voice script for the character.
- **Wave File**: Use this command to load an audio file (*.wav, *.mp3) as the voice script for the character.
- **CrazyTalk Script**: Use this command to load a CrazyTalk script file (*.cts, *.clp, voice + facial expressions) as the voice script for the character.

Face Puppet: This command opens the **Face Puppet** panel for manually creating facial expressions of the selected character.

Face Key: This command opens the **Face Key** panel for adding expression layer keys to an existing expression.

Motion Puppet: This command opens the **Motion Puppet** panel to record motions from templates to the currently selected character.
Direct Puppet  This command opens the **Direct Puppet** panel for simultaneously moving and recording the character’s body to generate motions.

Device Mocap  This command opens the **Device Console** panel for simultaneously capturing, recording your body motions and applying these motions to the selected character for generating character’s body motions.

Edit Motion Layer (N)  This command opens the **Edit Motion Layer** panel for adding motion layer keys to an existing motion.

Reach Target  This command opens the **Reach Target** panel to add or release reach keys for the character’s neck, hip and limbs.

MixMoves  This command opens the **MixMoves** panel to add rational and continuous motions to characters.

Prop Puppet  This command opens the **Prop Puppet** panel for simultaneously moving and recording the animations of a prop.

Edit Animation Layer  This command opens the **Edit Motion Layer** panel for adding animation layer keys to an existing animation of a prop.

Morph Animation  This command opens the **Morph Animator** panel for adding keys of character motions with morphing sliders.

Motion Setting Options  This item contains a sub-menu to adjust the settings for character’s motions.

- **Reset Motion Root**  Use this command to get the imported motion to happen at the same position where the previous motion ends.
- **Align Actor Motion**  Use this command to get the motion root to align to the pivot root of a character.
- **Bake Constraint Key**  Use this command to bake the constraint keys (including Reach, Look At and Link keys) to motion files (in iMotion or iMotionPlus formats) when you collect a motion clip.

Apply Gesture Options  This item contains a sub-menu for applying hand gesture clips to character’s hands.

- **Left Hand**  Apply the hand gesture clips to character’s left hand.
- **Right Hand**  Apply the hand gesture clips to character’s right hand.
- **Both**  Apply the hand gesture clips to character’s both hands.

Clip Auto Extend  When this command is activated, iClone will extend previous **Facial Expression** clip in order to include newly added key.

Reset Whole Scene Animation  This command removes all animations in the current project.

Remove Object Animation  This command removes all animations of the currently selected objects.
## Main Menu - Render

The **Render** menu on the main menu bar contains commands for exporting your project in different media.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Frame Preview</td>
<td>This command opens the <strong>Windows Photo Viewer</strong> with the output image of the current frame.</td>
</tr>
<tr>
<td>Render Video</td>
<td>This command opens the <strong>Render</strong> panel for exporting your project as video files in <strong>MP4</strong> (H.264), <strong>AVI</strong>, and <strong>WMV</strong> formats.</td>
</tr>
<tr>
<td>Render Image</td>
<td>This command opens the <strong>Render</strong> panel for rendering sequenced or one-frame image files in <strong>Bmp</strong>, <strong>Jpg</strong>, <strong>Tga</strong> (32-bit), and <strong>Png</strong> (32-bit) formats.</td>
</tr>
<tr>
<td>Export Audio</td>
<td>This command opens the <strong>Render</strong> panel for outputting the project as audio files in <strong>WAV</strong> format.</td>
</tr>
</tbody>
</table>
Main Menu - View

The View menu on the main menu bar contains commands for you to modify the camera position and angle and switch to different camera views.

Pan (X)  To pan the camera.
Zoom (Z) To zoom in and out of the scene.
Orbit (C) To rotate the camera in the Orbit mode.
Roll (V) To rotate the camera in the Roll mode. You have to uncheck the Edit >> Camera >> Auto Level command to activate the Roll mode.
Home (Home) To snap the camera to a 45 degree perspective to the selected object.
Center This command makes the camera snap to view the selected object in the current project.
Camera View This item contains a sub-menu for switching the camera to different views - Front (F), Right (S), Top (G), Left (A), Bottom, Back (D), Face (J) or All (K).
Main Menu - Window

The **Window** menu on the main menu bar contains commands for you to switch between different preset layouts and show/hide various toolbars and panels.

- **Workspace**
  - This item contains a sub-menu for applying preset layouts according to your working conditions.

- **Toolbars**
  - **Standard** (Ctrl + 2): This layout brings up the Modify, Visual Settings, Content Manager, Scene Manager panels and all toolbars.
  - **Animation** (Ctrl + 3): This layout brings up the Modify, Scene Manager, Timeline panels and all toolbars.
  - **Visual Effects** (Ctrl + 4): This layout brings up the Modify, Visual Settings, Scene Manager panels and all toolbars.
  - **Final Render** (Ctrl + 5): This layout brings up all toolbars as well as the Render panel.
  - **All Panels** (Ctrl + 6): This layout brings up all panels and toolbars.
  - **Full Screen** (Ctrl + 7): This command hides all panels and fits the entire working area to the screen of display.

- **Save Layout**
  - PRO
  - This command saves the current docking/floating places and visibility states of panels and toolbars as the default layout, and you may instantly load it each time you launch the main program.

- **Reset Layout**
  - PRO
  - This command restores all the panels and toolbars to the default docking places with the Standard layout.
Toolbar

This item contains a sub-menu for you to show/hide the **Project**, **General**, **Camera**, **Physics**, **Modify Tools**, **Slider Tools** and **Global Illumination** toolbars.

- Project
- General
- Camera
- Physics
- Modify Tools
- Slider Tools
- Global Illumination

Timeline (F3)

This command opens the **Timeline** panel to edit animation keys and clips for actors, props, cameras, lights, sounds, effects, etc.

Content Manager (F4)

This command opens the **Content Manager** panel for applying embedded and custom templates to your scene.

Scene Manager (F5)

This command opens the **Scene Manager** panel to view all the objects included in the current project.

Modify (F6)

This command opens the **Modify** panel for adjusting parameters belong to each object in the scene.

Visual Settings (F7)

This command opens the **Visual Settings** panel for modifying the settings of lights, shadows, **Toon Shader** and visual effects.

Mini Viewport (F8)

This command opens the **Mini Viewport** panel to display another mini preview window on the main preview window.

Play Bar (F9)

This command shows or hides the play bar right under the 3D view port.

Menu Bar (F11)

This command shows or hides the main menu bar.
Main Menu - Plugins

The Plugins menu on the main menu bar contains commands related to the plugins you have installed in your computer.

Plugins

This item contains a sub-menu for manipulating the iClone Indigo Render plugin.

- **Render Scene**: To render the current view of the 3D viewer into a temporary Indigo image file (*.igs).
- **Export Scene as**: To save the current frame into an Indigo image file (*.igs), or the specified range into the Indigo sequenced image files (*.igq).
- **Render Settings**: To open the Indigo panel for editing the Indigo materials, changing the Indigo environment, light and render settings.
- **Toolbar**: To show/hide the Indigo toolbar for quickly accessing the commands.
  - a. **Render Scene**
  - b. **Render Selected Object**
  - c. **Export Scene as**
  - d. **Render Settings**
- **About iClone Indigo Render**: To show the product information for iClone Indigo.
- **Indigo Program Path**: To assign the Indigo rendering program.
- **Indigo Material Path**: To assign the Indigo material library folder.

Note:

Please refer to the iClone Indigo Render Plugin Online Help for more information.
Main Menu - Help

The Help menu on the main menu bar contains commands that guide you to useful topics for learning, getting more content, or the latest version of iClone.

<table>
<thead>
<tr>
<th>Help</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online Manual</td>
<td>To access the online manual.</td>
</tr>
<tr>
<td>Product Demo</td>
<td>To go to the official web page for demo videos or tutorials.</td>
</tr>
<tr>
<td>Member</td>
<td>To login with the member account.</td>
</tr>
<tr>
<td>Check for Update</td>
<td>To check for available program update.</td>
</tr>
<tr>
<td>Technical Support</td>
<td>To view the product FAQs and get further assistance.</td>
</tr>
<tr>
<td>Feedback</td>
<td>To open the official 'Feedback Tracker' page for entering your comments or opinions or bug report directly.</td>
</tr>
<tr>
<td>iClone Marketplace</td>
<td>To access the Marketplace of iClone</td>
</tr>
<tr>
<td>Get More Contents</td>
<td>To access the official content web site for free Bonus Content Packs.</td>
</tr>
</tbody>
</table>
If you are using any trial content in your current project, watermarks will be overlapped on your preview window.

To remove the watermarks, you need to buy the trial contents, by clicking the **Buy All Trial Contents**, you will be led to the online shopping cart for purchasing the trial contents.

If the watermarks still remain on the preview window after the trial contents have been purchased, select **Content Activation** to authenticate online in order to remove the watermarks.

**iClone** will verify all contents in the **Template** and **Custom** libraries to make sure the trial contents that have been purchased will be converted into a fully licensed ones for freely being used.

To access the home page of **Reallusion**

To access the home page of **iClone 7**

To show the product information for **iClone 7**
Knowing the Environment - Docking Areas

The new Qt UI design lets you drag, dock and combine your various work panels to any area of the screen, allowing for the quickest workflow in any number of scenarios. You can then save your custom UI layout for future use. Quickly switch between different layout frameworks like animation view, scene setup view, or cinematic view.

Dockable Areas

The dockable areas of the program are divided into Top / Bottom and Left / Right areas. At the center, it is the Preview Window in which you observe the 3D contents you are editing.

- **Top Area**: On the top area, you are able to dock all types of toolbars, such as Project, General, Camera, Physics, Modify Tools, Slider Tools, and Global Illumination.
- **Bottom Area**: In addition to all the toolbars that can be docked on the top area, the bottom area can be docked with Project, General, Camera, Physics, Modify Tools, Slider Tools, Global Illumination, and Timeline.
- **Left and Right Areas**: Physics Toolbar, Global Illumination Toolbar, Content Manager, Scene Manager, Modify Preference, Project Settings, Visual Settings, Mini Viewport, or any plug-in panel, such as Indigo, can be docked to the right or left areas. The docking methods can be **Stack** or **Top-down**.
  - **Stack**: The Stack method means to dock every panel's into one single pane. You may thus click on (or mouse-rolling on) the **Vertical Tabs** to switch them.
- **Top-down** The **Top-down** method means to dock individual panel vertically. You can see each docked panel on the side.

**Benefits of Docking Panels**

There are several benefits to dock or undock panels.

- **Customizable Layout of User Interface** You are able to customize your desired layout by re-arranging and saving it as the **Standard** workspace layout.
  1. Re-arrange the workspace layout to your favorite one.
  2. Execute the **Window > Workspace > Save Layout** command.
  3. Execute the **Standard** command (**Ctrl + 2**) in the same main menu, the layout will thus be the one you saved in the previous step.
  4. Execute the **Reset Layout** to reset the layout to the original one when **iClone** was installed.
- **Convenient Embedded Layout Templates** **iClone** also provide several types of layouts for certain purposes.
- **Animation** (**Ctrl + 3**), Specially used for creating animations for the content in the preview window.
- **Visual Effect** (Ctrl + 4): When you want to adjust the visual effect or camera related settings, switch to this layout.

![Visual Effect Layout](image)

- **Final Render** (Ctrl + 5): Only the preview window and the Render panels will be shown for you to export the desired media type.

![Final Render Layout](image)

**Note:**
- You may also utilize the same method described above to overwrite the default layout template.
- If you want to reset an overwritten template, then switch to the template and execute the **Reset Layout**.

- **Wider Editing Environment for Dual Monitors**: If you are a dual-monitor user, then you have more freedom to rearrange your workspace.

![Dual Monitors](image)
# Project Toolbar

The **Project** toolbar is used to create a new project, open a saved project, save the current project, preview the export result, render the project and show the mini view port.

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>New Project</td>
<td>To create a new project.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Ctrl + N)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Open Project</td>
<td>To open a saved project.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>(Ctrl + O)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Save Project</td>
<td>To save the current project to a target directory.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>(Ctrl + S)</td>
<td></td>
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<td></td>
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<tr>
<td>4</td>
<td>Current Frame Preview</td>
<td>To render the current view of the 3D viewer into an image. You may then save this image afterwards.</td>
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<td></td>
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<tr>
<td></td>
<td>(F10)</td>
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<tr>
<td>5</td>
<td>Render</td>
<td>To render the project to desired media, including images or videos.</td>
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</tbody>
</table>

The **General** toolbar is used to manipulate the objects’ position and rotation, to align objects and to set keys for showing or hiding objects.

1 **Undo/Redo**
   - Click these two buttons to undo (Ctrl + Z) or redo (Ctrl + Y) the last operation.

2 **Select Object**
   - Toggles the **Select** mode. You may then directly pick the object in the 3D viewer.
   - You may also drag a rectangle around multiple objects to select them in this **Mode**.
   - Drag from left to right: Any object partially contacting the rectangle will be selected.

   [Image of objects being selected by dragging a rectangle]

   Drag from right to left: Only the objects covered entirely within the rectangle will be selected.

3 **Move Object**
   - To switch to **Move** mode. You may then directly move the selected object in the 3D viewer instead of manually entering the values on the **Modify** page.
   - **Left Mouse Button**: Move object along X/Y-axis.
   - **Mouse Wheel**: Move object along world Z-axis.
   - **Right Mouse Button**: Rotate object on local Z-axis.

4 **Rotate Object**
   - To switch to **Rotate** mode. You may then directly rotate the selected object in the 3D viewer instead of manually entering the values on the **Modify** page.
   - **Left Mouse Button**: Rotate on local Z axis.
   - **Right Mouse Button**: Rotate on local Y axis.
   - **Both Mouse Buttons**: Rotate on local X axis.

5 **Scale Object**
   - To switch to **Scale** mode. You may then directly scale the selected object in the 3D viewer instead of manually entering the values on the **Modify** page.
   - **Left Mouse Button**: Uniformly scale object.
   - **Right Mouse Button**: Scale object along local Z axis.
   - **Both Mouse Buttons**: Scale object along local X - Y axis.

In **Move Object Rotate Object** or **Scale Object** modes, you may also:
- **Alt + Left Mouse Button**: To Pan the camera.
- **Alt + Right Mouse Button**: To Rotate the camera.
- **Alt + Both Mouse Buttons**: To Zoom the Camera.

6 **Link/Unlink**
   - Click this button to set a **Link/Unlink** key for the selected object or objects.
   - Please refer to the Link section for more information.

7 **Align Objects**
   - Multi-select objects and align them with this button.
   - Please refer to the [Aligning Objects](#) section for more information.

8 **Align to Object**
   - You may use this button to align selected objects to any other object. Though it can be used to almost every object, it is especially useful for relocating a constraint to a certain position on a physics rigid body. Please refer to the [Aligning 3D Entity to Target Object](#) section for more information.

9 **Visible**
   - Click this button to set keys to show or hide the selected object. Please note that it can be used on one object at a time.
Aligning Objects

iClone provides features for easily aligning objects such as props, accessories and trees. You may also space objects within a fixed distance. This is useful when you need to re-locate scattered objects in order.

Aligning Objects

1. Select multiple objects for aligning.

2. Click the Align Objects tool.

3. Enable the X, Y and/or Z boxes of the Align Objects section according to the axis you want the selected objects to be aligned to.

4. Click the OK button to leave the panel.

5. Because the props align to an average value on the specified axis, you may need to move them together to the appropriate position.
Uniform Spacing Objects
If you need to keep a fixed distance between two adjacent props among currently selected props; instead of complicated mathematical calculations, you can use the Uniform Spacing feature.

1. Apply multiple objects. Move two of the props to the desired positions. Leave the other where they are.

2. Select all props that will be involved in Uniform Spacing.

3. Click the Align Objects tool.

4. Enable the X, Y and / or Z boxes of the Uniform Spacing section according to the props lining axis.

5. Click the OK button to leave the panel.
Aligning 3D Entity to Target Object

Unlike the Align feature that aligns multiple objects to an average position, the Align to feature helps you to align and snap a 3D entity to another targeted object without moving the object. Although it can be used to almost any 3D entity, it is specially useful for locating constraint to the certain part of a rigid body without moving the rigid body.

The Align feature relocates selected objects to an average position.

The Align to feature relocates selected objects to another target object without moving it.

Using "Align to" Feature

The Align to feature can be used to snap a certain 3D entity to another object without moving the object.

1. Prepare a prop and relocate its pivot.

2. Prepare another prop, transform it and adjust its material.

An embedded 3D block is applied, transformed and texture changed.

3. Make sure the new prop is selected, click the Align to button on the General Toolbar and then click on the object prepared in step 1 to make it a target for being aligned.

4. Enable the X, Y and/or Z boxes and choose the Pivot radio button on the Align to panel.

5. Click the OK button to leave the panel.
Aligning 3D Entity to Center of Another Object
In addition to align a 3D entity to the pivot of a target, you are able to align it to the center of the target. This method is most suitable for applying Constraint to the center of a rigid body.

1. Prepare a prop (in this case, a fan-blades set).

2. Apply a Hinge constraint to any place of the fan.

3. Adjust the angle so that the constraint is perpendicular to the front of the fan.

Note: In this case, the center of the fan-blades is a hollow, which provides no reference for you to manually adjust the position of the constraint to its center.

4. Make sure the constraint is selected and click the Align to button on the General Toolbar.
5. Click on the fan-blades set as the target for aligning the constraint. The Align to panel will show.

6. Individually activate the X Y Z axis according to your need for relocating the constraint.
7. Choose the Center radio button to align the constraint to the center of the fan-blades on the X Y or Z axis (by activating the boxes in the previous step).

8. If you are satisfied with the previewing result, then click the OK button to leave the panel.
9. Set the hinge as a motor. Play back to view the result.
Global Illumination (GI) Toolbar (New for V7.0)

The GI toolbar is used to turn on or off the simulations of GI or show / hide the GI Voxel.

1. Enable Global Illumination
   To turn on or off the entire GI feature. You must turn it on for export a media with GI effect.

2. Viewport GI
   To turn on or off the GI effect on the real-time rendering viewport. It does not affect the export result. You can also access the setting under Preference - Real-time Render Options section.

3. View GI Voxels
   To show the GI Voxels on the entire viewport.
Camera Toolbar

The Camera toolbar is used to manipulate the camera, switch to different view of camera and toggle the modify panel to the camera settings.

1. Show Mini Viewport (F8)  
   Click this button to show the Mini Viewport

2. Real-time Render Options  
   Select the render option in this drop-down list to determine the visual quality on the preview window.

3. Home Center  
   The Home mode snaps the camera to a 45 degree perspective of the selected objects while the Center mode snaps the camera in current perspective to view the selected objects.

4. Zoom (Z)  
   To zoom in and out of the scene.

5. Pan (X)  
   To pan the camera.

6. Orbit (C) Roll (V)  
   To rotate the camera. Click its down arrow to switch to Orbit or Roll mode.

7. Camera View  
   To switch the camera to different view, click the down arrow and choose from Front, Right, Top, Left, Bottom, Back, Face or All.

8. Camera Switcher  
   Select the camera in this drop-down list to display the camera’s view on the preview window.

9. Camera & Object Switch (U)  
   Click this button to switch the Modify panel to the selected object or the currently picked camera.
Physics Toolbar

The Physics toolbar is used to turn on or off the simulations of **Rigid Body** or **Soft Cloth**, to open the **Constraint** panel or to show or hide **Constraint Manager**.

1. **Rigid Body Simulation**  
   To turn on or off the simulation of the rigid bodies.

2. **Soft Cloth Simulation**  
   To turn on or off the simulation of the soft cloth.

3. **Constraint Manager**  
   To show the **Constraint Manager** for finding the relationships between rigid bodies and the constraints on the scene.

4. **Add Constraint**  
   To show the **Constraint** template panel for you to drag and drop the desired constraint to a rigid body.
Timeline Panel

You can open the Timeline panel in any of the following ways:

- Access the Window >> Timeline command from the main menu bar.
- Use the hotkey F3.
- Click the Timeline button on the play bar.

The Timeline panel is where you edit animation keys and clips for actors, accessories, props, LiveProp animations, cameras, lights and hand gestures etc.

- Timeline Operation - Basic
- Timeline Operation - Advanced
Timeline Operation - Basic

Basic Timeline Operation

1. Dock / Undock
   - Double-click on the caption to dock the panel to the docking place, or undock the panel and make it float above the main program.

2. Display Sub-Tracks
   - Click this triangle button to show selected sub-tracks.

3. Sub Track
   - This track shows the sub tracks when their grouped buttons are pressed down.
   - Single-click on the sub track name to select the object to which it belongs to.
   - Double-click on the sub track name to select all the data in the track.
   - Click the Cross icon beside the sub track name to collapse the track.
   - Click the arrow button to select sub track items in the drop-down list, you wish to show / hide on the Timeline.
   - Single-click on the name to select the object.

4. Main Track
   - This track shows the project or an object's name.
   - Click the arrow button to select main track items in the drop-down list, you wish to show / hide on the Timeline.

5. Track Menu list
   - Click the drop-down list and select the items, you wish to show / hide on the Timeline.

6. Object Related Tracks
   - When you pick an object in the 3D viewer with this button activated, the Timeline will only display the tracks of the picked object.

7. Open Same Track
   - When you pick an object in the 3D viewer with this button activated, the Timeline will display the similar tracks that belong to other objects, which are related to the picked object.

8. Previous and Next Key
   - Click these two buttons to snap the play head back to the previous or next key, or the start-frame clip.
   - The key or clip will be automatically selected.

9. Clip Editing Tools
   - Click this button to show the clip editing drop-down list.
   - Cut: Click the button to cut the target key, or clip, and add it into the clipboard.
   - Copy: Click on the button, or use hotkey Ctrl + C on selected keys or clips to copy (single or multiple keys).
   - Paste: Click on the button, or use hotkey Ctrl + V to paste to the target frame (single or multiple keys).
   - Delete: Click on the button or press Delete key to delete highlighted keys or clips.

10. Audio Editing Tools
    - Click the Sound button to show a panel to modify the clips on the Sound track.
    - Click the Lips Editor button to show a panel to add or modify lip-synched keys on the Lips track.

11. Zoom In / Out
    - Click the Zoom In button, or use hotkey “+” (or Alt + Rolling the mouse wheel) to increase the time (cell) unit size.
    - Click the Zoom Out button, or use hotkey “-” (or Alt + Rolling the mouse wheel) to decrease the time (cell) unit size.

    - Click the Fit to Window button to view the entire timeline items within the timeline window space.
    - Click the Actual Size button to show the time unit represented as 60 frames per second.
12 Play and Stop

- Click the **Play / Pause** button, or press the space bar to play the project; click again to pause playback.
- Click the **Stop** button, or press the *"* (comma) key to stop playing.

13 Current Frame

This field shows the current frame number when you click on the target frame in the timeline. You may also type in the frame number to jump to the target frame. This allows you to go to any precise target location. This is especially convenient for animation with clear timing control.

14 Play Head

Drag to move to the desired time frame.

15 Playback / Render Range

Drag the two flags to decide the range for playing back or rendering.

16 Play Bar Show / Hide

Click this button to show or hide the **play bar**.
Timeline Operation - Advanced

Advanced Timeline Operation

1. Add key
   - Double-click on the timeline cell area to add keys or press this button.
   - Keys can also be automatically added when users alter key information in the Modify Panel.
   - The Add Key button only works for the Transform, Motion Layer, Facial Layer, Visible, HDR, IBL, and Effect sub tracks, and all other sub tracks for cameras and lights (Constraint sub tracks are excluded).

2. Break
   - Break works for Clip type data in all tracks / groups.
   - Click the button, or use hotkey Ctrl + B to split the selected clip at a current frame into two new clips.

3. Motion Modifier
   - Click this button to launch the Motion Modifier panel.

4. Loop
   - The Loop button works to Clip data in all tracks / groups.
   - Click this button and drag the clip's right edge rightward to repeat the clip.

5. Speed
   - The Speed button works to Clip data in all tracks / groups.
   - Click this button and drag the clip's right edge rightward / leftward to decelerate / accelerate the speed.

6. Insert Frame
   - Click this button to insert a designated number of frames into the current time frame in order to increase the length of the project.
   - You may also use this feature to insert frames for individual objects without affecting the length of the project.

7. Delete Frame
   - Click this button to delete a series of selected frames in order to decrease the length of the project.
   - You may also delete data, within a range, of any object in the current scene without affecting the length of the project.

8. Add Flag
   - Click this button to add flag marks to specific time frames on the Project track. This allows you to easily hop between events.
   - You may quickly jump to the frame by using the Tab, and Shift + Tab keys.
Modify Panel

The Modify Panel contains adjustable parameters that belong to the object currently selected.

1. Double-click on the title bar to dock the panel to the docking place, or undock the panel and make it float above the main program.

2. This panel includes four category tabs. You may click the tabs to find different features that belong to the picked object.
   - Attribute tab: To adjust the attributes and set keys on the object, such as Transform, Linkage, Look At Path and Spring keys on the timeline.
   - Animation tab: To generate body motions and facial expressions for the actor, or animate the prop with various tools.
   - Material tab: To modify the material and texture settings, including Substance and Tessellation features for the object.
   - Physics tab: To activate physics settings (Rigid Body or Soft Cloth) for the object.

3. You may expand or collapse each section by clicking the +/- symbol. There are hotkeys you can use to jump to that section. Please refer to the Global Shortcuts >> Modify Panel for more information.

4. The adjustable parameters associated with the objects in the current project. You may set parameter value for all the objects in the 3D viewer.

5. There is a scroll bar at the right of the panel. Click and hold the mouse down anywhere on it and drag up / down to navigate the whole panel when it is longer than one page. Alternatively, you may roll the mouse wheel to scroll it up / down.

6. Drag the border to adjust the width of the panel.
Setting Parameter Value
There are 4 methods to set values for the parameters in the Modify Panel.

Dragging Sliders
When there is a slider present in addition to the numerical parameter, you can drag it to adjust the value.

Clicking Arrow Buttons
You can use the Up and Down arrows to increase and decrease a parameter's value by one.

Typing into Numeric Fields
You can also focus on the numerical field, type desired value and confirm it by pressing the Enter key.

Utilizing Transform Tools
If you use the manipulation tools or transform gizmo to move, rotate, or resize an object, the value will automatically be updated in increments or decrements of 1.

Transform Hotkeys
- Alt + Up/Down/Left/Right arrow keys: Move object by 1 unit on the X-Y plane.
- Ctrl + Up/Down arrow keys: Move object by 1 unit along the Z axis.
- Ctrl + Left/Right arrow keys: Rotate object by 3 degrees on the Z axis.
- Shift + any of the above hotkeys: Commands are increased tenfold (for faster transformation).
Content Manager

The Content Manager is used for managing the various iClone 3D files including models, animations and content associated with a project.

1 Dock/Undock
Double-click on the caption to dock the panel to the docking place, or undock the panel and make it float above the main program.

2 Category Tabs
Click these tabs to switch to the corresponding categories - Project, Actor, Animation, Stage, Set, Media and Package.

3 Location Bar
Display the file location of the content in the Content Manager. You may click the button to go back to the higher-level folder, or click any of the directory names to go up to any level.

4 Template and Custom Libraries
Each category is divided into two libraries:
- Template Library: Contains embedded templates installed along with the main program.
- Custom Library: Contains custom templates you add.
5 Menu Button

Click this button to show the menu for manipulating the Content Manager, including:

- **Show and hide (Shortcut: F4), dock and undock the Content Manager**
- **Basic editing for the custom templates.**
- **Capture Thumbnail**: Capture the view of the working area, in the current frame, as the thumbnail for the selected template in the Custom library.
- **Load Thumbnail**: Load an image as the thumbnail of the selected custom template.
- **Change View Mode**: Cycle through the content display options. (Shortcut: Ctrl + 1)
- **Apply**: Apply the selected content to the current project. This does the same as double-clicking the content thumbnail. Please refer to the Drag and Drop section for more information on applying methods.
- **Find File**: Browse to find the selected template. If you do not select any template and click this command, then iClone will open an explorer window with the path (Windows 7/Windows 8):
  
  C:\Users\Public\Documents\Realusion\Template\Clone 6 Template\Clone Template\(current tab)\

- **Find Related Content**: Browse to find the related content that share the same attributes with the selected template.
  *Please note that currently, you can find Base and Material relations in the following content packs only: G5 CloneCloth, G5 Next Gen, Chinese Civilian Outfits, Mr. Pose, Toon Maker 1 and Toon Maker 2.*
- **Hide Navigation Panel**: Show and hide the Navigation Panel.
- **Set as Default Project**: Set a selected custom project as the default project, and you may instantly load it each time you launch the main program.
- **Add to Virtual Folder**: Select multiple templates or template folders and then add into virtual folders that you have created under the Custom library of the Package category tab.

6 **Search**

Start typing in the text field to enable incremental search.

- **Local Content**: The search results will be listed in the right panel of the Content Manager.

- **Online Content (New for 6.03)**: The number of results from the Reallusion Content Store and Reallusion Marketplace will be listed besides the search field.

By clicking on these web links, you can browse the search results in the official Reallusion Content Store and Reallusion Marketplace website.

7 **Navigation Panel**

Display all the library folders under the picked Category Tab. You may click the Menu Button to show the Navigation Panel and drag the middle border to adjust its width.

- **Show the navigation panel to browse through all the library folders.**

8 **Resize**

Drag the border to resize the pane of the Content Manager.

9 **Templates**

In the library pane, you may manipulate the templates, including:

- Applying the selected template (by drag-and-drop or click the Apply button).
- Using the right-click menu to do basic editing, renaming or changing the thumbnail of the custom templates.

10 **Applying and Adding Templates**

- **Adding Templates**: Click this button to add the current object in the scene into the Custom library of the selected Category Tab. If you have selected a template in the Custom Library, then click this button to overwrite the selected template.
Scene Manager

The Scene Manager displays all the objects and actors included in the current project. You may select multiple items, show / hide the objects altogether, lock them from being selected in the working area, or even adjust the render state.

1 Dock / Undock Double-click on the caption to dock the panel to the docking place, or undock the panel and make it float above the main program.

2 Search Type full or partial names of objects in the search field to search for desired objects.
Click this button to show the menu for manipulating the Scene Manager, including:

- **Menu Button**
  - **Filter**
  - **Condition Settings**
  - **Select Inverted**
  - **Hide Unselected**
  - **Unhide All**
  - **List Expand**
  - **List Collapse**
  - **Rename**
  - **Delete**

- Use the **Filter** to show / hide specific categories. This is an easy way to keep the **Scene Manager** clean.

- **Condition Settings** dialog box to show / hide the object status icons, or change the display order of these icons.

- Invert current selection, hide unselected objects or show all objects in the scene.

- Collapse / expand all categories.

- Rename or delete the selected objects.

- **Sort**
  - Click the Name caption, to re-order the object by their alpha-numeric order.

- **Category Name**
  - Click on the triangle button beside the category name to collapse / expand the category.
  - Click on the category name to expand the category and select all the items under this category.
Multi-select object rows in different categories, and you can simultaneously change the following object status items:

### Status Icons

#### Show/Hide
- **Show**
- **Hide**
- **Lock**
- **Unlock**

#### Render State
- **Normal**
- **Smooth**
- **Wireframe**
- **Bounding Wireframe on Shaded**
- **X-Ray**

#### Shadow
- **All Shadows**
- **Cast Only**
- **Receive Only**
- **No Shadows**

#### Physics
- **None**
- **Rigid Body**
- **Soft Cloth**

#### Realtime Smooth
- **Original**
- **Smooth**

You may specify the render status for each object to relieve the load on system resources. This status does not affect the export result.

The status includes:

- **Basic Modes**
  - **Normal**
  - **Smooth**
  - **Wireframe**
  - **Bounding Mesh**

- **Wireframe on Shaded**
  This mode displays the surface of the object with wireframe covered. When the wireframe mode seems too difficult to identify the selected meshes due to the high density of the wireframes, then switch to the **Wireframe on Shaded** mode for getting more clues of the selected objects.

- **X-Ray**
  Since some objects, such as CC characters, maybe composed of multiple layers (clothes for characters), with this mode you are able to easily observe the relationships between each layers.

You may decide to turn the shadow effect on / off for each object, cast the object shadows only, or receive shadows from other objects only.

You may turn the **Rigid Body** or **Soft Cloth** simulation on / off.

You may turn the **Realtime Smooth** on / off.
## Light

- **De-activate**
- **Activate**

You may turn the light on / off by clicking on the sphere-shaped icon.

## Light Color

- **Color**

You may change the color of the light.

## Light Shadow

- **Activate Shadow**
- **No Shadows**

You may turn on / off the shadow of the light.

### Resize

Drag the border to resize the pane of the **Scene Manager**.

### Object Name

Double-click on the object name to enter the name-editing mode. You may rename all the items as you wish.

### Note:

- Some items such as water, trees, grass, particle emitters, and terrains cannot be selected or are difficult to be selected from within the 3D viewer. Use the **Scene Manager** panel instead to easily select them.
- The **Scene Manager** will also show the parent / child node structure of a 3D object, so you can use this behavior to select the child node directly.

- The object status on each icon item will be saved to **iClone** project files.
Project Settings Panel

You can open the Project Settings panel in any of the following ways:

- Access the Edit >> Project Settings command from the main menu bar.
- Use the hotkey Ctrl + Shift + P.
- Click the gear button next to the current time counter below the 3D view port window.

The Project Settings panel enables you to adjust the length of the project, the time unit shown on the time counter, the global sound and physics settings, and the viewing method of the background.

1. Double-click on the caption to dock the panel to the docking place, or undock the panel and make it float above the main program.
2. There are five sections included in the panel. You may expand or collapse each section by clicking the +/- symbol.
   - **Color Management section**
   - **Time Unit section**
   - **Display section**
   - **Visual Settings section**
   - **Global Sound Settings section**
   - **Global Physics Settings section**
   - **2D Background section**
   - **Info section**
3. The adjustable parameters associated with the objects in the current project. You may set parameter value for all the objects in the 3D viewer.
4. There is a scroll bar at the right of the panel. Click and hold the mouse down anywhere on it and drag up/down to navigate the whole panel when it is longer than one page. Alternatively, you may roll the mouse wheel to scroll it up/down.
5. Drag the border to adjust the width of the panel.
Color Management Section

Mode
Use the Mode drop down list to set the ability of the 3D view port to be able to render PBR or Traditional materials.
* Please note that the Shader Type of the material for the object in the illustration below is PBR.

PBR Environment Setup
Click the PBR Environment Setup button to perform certain settings to the environment or all materials in the entire project.

- **Set Ambient Color (#000000)**: Since the light-reflectivity of PBR effect performs best when the ambient color is set to black, activate this box in order to set the ambient color to black.

- **Use Default IBL Image**: Activating this box in order to replace any of the currently used IBL image with the default one.

- **Convert Shader to PBR**: When this box is activated, the shader mode of every material in the project will be converted in to PBR one, which can save times for converting one by one.
**Time Unit Section**

![Time Unit Section](image)

**Total Frames**
Shows the total length of the project in frame count. The default length for each project is 1800 frames and the maximum number is 54000.

**Play Mode**
Toggles playback loop on/off.

**Time Mode**
Switches between the **Realtime** and **By Frame** modes for physics simulation.

- **Realtime**

- **By Frame**

**Time Unit**
Determine to display the time unit in either time or frame format.

- **Time**

- **Frame**
Display Section
The settings in this section allows you to show or hide the dummies or the effects of auxiliary light.

<table>
<thead>
<tr>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dummy Object (Ctrl+D)</td>
</tr>
<tr>
<td>Aux Light</td>
</tr>
</tbody>
</table>

Dummy Object (Ctrl + D)
This box (Ctrl + D) decides whether the preview window displays all the dummy objects in the current project. For more information, please refer to Setting Prop as Dummy section.

Aux Light
During the authorization for the project, the GI, PBR and Lights consume a lot of system resources, which decreases the performance drastically. You may need to turn these effects off in order to edit smoothly. However, once you turn them off, the entire view port will turn to completely dark as shown in the left illustration below. In this case, you can turn on the Aux Light (auxiliary light) to temporarily light up the entire scene for editing only as shown in the right illustration in the table.

Note:
The auxiliary light does not cast any shadow, and its lighting result will not be rendered as well.
**Visual Settings Section (New for v7.0)**

The settings in this section allows you to show or hide the dummies or the effects of auxiliary light.

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**Voxel Mode**

These two buttons determine if you want to use a lower or higher resolution of the voxels to render the GI effect. The higher one can provide more details of the GI while lower performance of the system.

![Lower Resolution](image1.png) ![High Resolution](image2.png)

**Broad Color Gamut**

Due to the weakness of **Emissive** lighting (Glow texture, Self-illumination or Particles) when the **GI Illumination Strength** is applied, it is recommended to toggle on **Broad Color Gamut**.

When this box is activated, the render engine for the **GI** provides wider color range, which displays more levels and details of colors on the viewport. However, it increases the loading of the entire system.

![Wide Color Gamut - OFF](image3.png) ![Wide Color Gamut - ON](image4.png)

**Note:**

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**Light Flickering Restraint**

When the light sources moving from one voxel square into its adjacent ones, light flickers zone by zone as shown in the left footage. By activating this box, the flickering issue can be minimized as shown in the right footage below.
Global Sound Settings Section

Voice Volume
Adjusts the volume of the sound effect. You may also click the Vocal Volume button on the play bar.

Music Volume
Adjusts the volume of the background music. You may also click the Music Volume button on the play bar.
**Simulation**
Determines to simulate physics animations by iClone 6 PhysX or iClone 5 Bullet engine. Please refer to the [Dual Physics Engines](#) section for more information.

**Rigid Body**
Check these boxes to enable the Rigid Body simulation, show collision bounding color (red), and activate the collision detection for sharper and faster speed physics animation. Please refer to the [Setting Simulating Environments](#) section for more information.

**Soft Cloth**
Checks these boxes to enable the Soft Cloth simulation, bake the physics animation into motion clips, and decide the reaction range from the surface of a soft cloth during collision. Please refer to the [Setting Simulating Environments](#) section for more information.

**Gravity**
Types values in the X, Y and Z fields to set the gravity direction. By default, the (X, Y, Z) equal to (0, 0, -9.8), which are the gravity values of the earth in iClone. Please refer to the [Setting Simulating Environments](#) section for more information.

**World Scale**
Drags the slider in accordance to the size of your 3D world. Please refer to the [Setting Simulating Environments](#) section for more information.
2D Background Section

Background Color
Clicks the color picker to select a solid color as the background of the current project.

Activate Image
Activates the box and then click the button to load any prepared image as the background. Select from the Display Mode drop-down list to define the mapping method for the image background. You may save a background image into your desired directory, or modify the image in an external image editor.

Using Video as 2D Background
You may also load a background video for your project. The object in the scene is actually still while the animations come from the video itself.

External Image Path
Shows the external image file location when the File >> Import Settings >> External Texture command on the main menu bar is checked. You may browse to find the background image or embed the background image into the project.
Info Section

Length
Shows the project length in both frame and time formats.

Scene Totals
Shows the object count under each category in the scene.

External Files
Clicks the button to open the text file that contains a list of all external files and their locations - [External Image List] and [External Video List].
Visual Settings Panel

The Visual Settings Panel contains adjustable parameters belong to each object respectively.

1. Double-click on the caption to dock the panel to the docking place, or undock the panel and make it float above the main program.

2. This panel includes four feature tabs. You may switch tabs to enrich the visual effects to the project.
   - Atmosphere tab: To change the ambient light, activate the Ambient Occlusion, Fog, HDR (High Dynamic Range) and IBL (Image Based Lighting) effects.
   - Shadow Map tab: To turn the shadow effect On/Off on the objects.
   - Toon Shader tab: To toggle the Toon Shader effect On/Off for the project.
   - Visual tab: To modify the Effect templates that are currently applied to the project.

3. You may expand or collapse each section by clicking the +/- symbol.

4. The adjustable parameters associated with the objects in the current project. You may set parameter values for all the objects in the 3D viewer.

5. There is a scroll bar at the right of the panel. Click and hold the mouse down anywhere on it and drag up/down to navigate the whole panel when it is longer than one page. Alternatively, you may roll the mouse wheel to scroll it up/down.

6. Drag the border to adjust the width of the panel.
Render Panel

You can access the Render commands from the main menu bar to display the Render panel. Alternatively, you may click the Render button on the Project toolbar.

1. Double-click on the title bar to dock the panel to the docking place, or undock the panel and make it float above the main program.

2. There are five sections included in the panel. You may expand or collapse each section by clicking the +/- symbol.
   - Format section: To decide the format of the exported media.
   - Output Size section: To specify the resolution for the output frame.
   - 3D Stereo section: To export your project as 3D stereo media.
   - Render Quality section: To determine the render quality of the exported media.
   - Output Range section: To specify the frame range for rendering.

3. The adjustable parameters associated with the rendering results.

4. There is a scroll bar at the right of the panel. Click and hold the mouse down anywhere on it and drag up/down to navigate the whole panel when it is longer than one page. Alternatively, you may roll the mouse wheel to scroll it up/down.

5. Drag the border to adjust the width of the panel.
Preference Panel

You can access the **Edit >> Preference** command from the main menu bar or use the hotkey **Ctrl + P** to display the Preference panel.

1. Double-click on the caption to dock the panel to the docking place, or undock the panel and make it float above the main program.

2. There are six sections included in the panel. You may expand or collapse each section by clicking the +/- symbol.
   - **Control** section: To define the object snapping method in the scene, show/hide the transform gizmo, and enable/disable motion clip auto-play and file compression.
   - **Grid** section: To adjust the grid settings, including visibility, color, spacing and size.
   - **Display** section: To show/hide FPS information, world axis, dummy object and polygon count on the 3D viewer.
   - **Real-time Render Options** section: To determine the render quality in the preview window, and switch on/off the LOD effect.
   - **System** section: To set the undo times, determine the temp folder for saving temporary files, and assign the external image editor for modifying texture images.
   - **Interface** section: To change the appearance of the user interface, such as the icon and font size and the color theme of the main program.

3. The adjustable parameters associated with the current project.

4. There is a scroll bar at the right of the panel. Click and hold the mouse down anywhere on it and drag up/down to navigate the whole panel when it is longer than one page. Alternatively, you may roll the mouse wheel to scroll it up/down.

5. Drag the border to adjust the width of the panel.
Control Section

- **Snap to Grid (Ctrl+G)**
  Check this box so that your objects always snap to the intersection points of the floor grid when they are manipulated by the **Move** tool (X and Y values only).

- **Snap to Model (Ctrl+M)**
  Check this box so that your props always snap to planes of the adjacent props when they are manipulated by the **Move** tool.

- **Transform Gizmo (Ctrl+T)**
  You may check this box to toggle the gizmo mode on/off in the preview window. Please refer to the **Gizmo of Objects in Preview Window** section for more information.

- **Timeline Audio Scrubbing (Ctrl+H)**
  Scrubbing the timeline will play back the sounds and voices.

- **Quick Thumbnail Generation**

- **Snap to Grid when saving file**

- **Angle Snap (Ctrl+E)**

- **Confine Face Puppet area to 3D viewport**
  When this box is activated, then the interaction area for facial puppeteering will be restrained within the 3D view port. However, if it is deactivated, the entire display screen will be the interaction area.

- **Compression**
  (Smaller file size, slower loading.)
Quick Thumbnail Generation

Zoom to Mouse Position
When this box is deactivated by default, zoom in and zoom out behavior with the mouse roller is based on the center of the 3D viewer; while if it is activated, then it is based on the position of the mouse.

Zoom to Mouse Position = ON

Zoom to Mouse Position = OFF
(Based on the center of the view port)

Angle Snap
You may check this box and define an angle that your objects will snap to when they are manipulated by the Rotate tool. They will rotate by the specified angle each time.

Angle Snap = 45

Compression
Activate this box in order to save project files with higher compression rate. However, loading the compressed file will take longer time for the decompressing procedure.
Grid Section
When setting an iClone scene, it may be useful to draw a grid to represent the floor (X - Y plane).

Show Grid
If you want to show the grid in the 3D viewer, you may check the Show Grid box. Alternatively, you may press Ctrl + G to toggle the grid.

Grid Color
You can change the color of the grid by using the color picker.

Grid Spacing
You may also change the Grid Spacing value to decide the size of the grid cell.

Grid Size
The Grid Size decides the number of the grid cells on both sides of the grid.
Display Section
The settings in this section provide information for your reference during editing. However, this information cannot be seen in the output files.

Info
Info displays the FPS (Frames Per Second) and Poly Count(s) of the current project.
- **FPS**: Displays the Frames Per Second information in the 3D viewer.
- **Poly Counts**: Polygon count information of the entire project and the selected objects will be shown at the top-left corner of the preview window.

World Axis
When the **World Axis** box is on, a coordinate displays in the origin. It is very useful when you need to input x, y, z value, or create custom Helper.
- Check/Uncheck the **World Axis** box to show/hide the world axis, or press Ctrl + A to toggle on/off.
- The R.G.B. color of the World Axis represent the X, Y, Z direction (R=X, G=Y, B=Z)

Message Panel
Activate / deactivate this box to show / hide the message panel at the right bottom corner of the 3D viewer.
External Texture Section (New for V7.2)

External Texture
Activate this item so that each time you load an image, it will be an external texture. The channel with external texture will be marked with a chain icon.
Real-time Render Options Section (New for V7.1)

iClone provides render options for users to quickly switch to their desired preview method. Refer to the Render Quality of 3D Viewer section for more information.

- The **Quick Mode** render option produces an efficient real-time render with most 3D effects disabled for faster performance.
- The **Medium** render option disables some of the 3D effects for a mid-level of visual quality.
- The **High** render option allows you to view all of the 3D effects, including Displacement, Bump / Normal, Glow, Reflection Map, Realtime Smooth, Substance, HDR, Environment Reflection, Refraction effect, Anti-alias, Mipmap and Tessellation shadow, and more options in the Advanced settings. Turning these options on increases the visual quality but eats up system resources.
- The **Custom** render option allows users to save their desired render settings for later usage.

**TAA (for Real-time Rendering only)**

An advanced anti-alias technique (Temporal Anti-Aliasing) for the view port can minimize jagged edges and pixilated areas. Check the box to turn on **TAA**. Real-time anti-aliasing starts to calculate only when the viewport is standing still. During playback, **TAA** will be forced **OFF**.

**Mipmap**

The **Mipmap** is used for gradually reducing texture quality as the object strays from the camera.
**Tessellation Shadow**
The shape of shadow do not follow the contour of the tessellated or displaced objects, unless, **Tessellation Shadow** is on. However, the performance of the system may degrade.

![Tessellation Shadow OFF](image1)

![Tessellation Shadow ON](image2)

**Viewport GI**
When the GI main switch is turned on and the performance is negatively impacted, the **Viewport GI Switch** can be turned off temporarily to regain crucial framerates. Toggling the view-port GI switch does not affect the GI for final rendering. You can also click the middle button on the **GI Toolbar** for turning on or off the view port GI effect.

![Viewport GI OFF](image3)

![Viewport GI ON](image4)
Depth of Field
This group contains two settings that can be used to remedy some rendering artifacts in the 3D view port for DOF. However, activating them increases the consumption of the system resources. Please refer to the Fixing Visual Defects of Out-of-focus Objects section for more information.

Anisotropic Filtering and Mipmap
As the camera angle becomes too oblique, MipMap feature may cause some surfaces that are near the camera to blur. To compensate for this, you may increase the Anisotropic Filtering value to regain some texture quality.

Max Texture Size
Your textures may look blurry when you apply them to large objects or view them close-up. This could be a result of the maximum allowable texture size setting.

The default texture size setting for iClone is 512 x 512. This setting determines the maximum allowable texture size. Therefore, if any texture is larger than 512 x 512, after you apply it to a 3D object, the texture size will be scaled down to 512 x 512 (pixel as unit), which results in the blurry look of your texture.

Users can define the maximum allowable texture size applied to 3D objects from the Max Texture Size drop-down list. If you have high-resolution textures, you can set the texture size higher (from 1,024 x 1,024 to 16,384 x 16,384) to maintain your original texture quality. Since texture images take your graphics card memory, please consider the overall texture budget for the optimized visual quality.

LOD (Level of Detail)
You may activate the Level of Detail box to increase the real-time rendering performance. Users can adjust the Performance / Quality slider to determine the camera distance for starting the LOD effect, which is especially useful when you want to preserve close-up details, while saving system resources by reducing the distant details.

LOD Off
All details are rendered during real-time playback, which increases the load on your system resources.

LOD On
The details on far surfaces are rendered with lower detail in order to achieve faster real-time playback and editing.
System Section

**Undo Times**
Set the **Undo times** to decide how many actions you can **Undo/Redo**. The maximum is 180. A higher value requires more resources of your system.

**Temp Folder**
The temp folder is a folder for temporary files created by **iClone** during operation. You can define where temporary files are saved in the preferences settings.

- Click the **Choose** button in the Temp Folder option and browse to a folder you wish to use as the temp folder.
- Make sure the hard disk the temp folder is located on has sufficient free space especially when you are using **iClone** to produce high resolution videos.

**Texture Editor**
You can select an **external** application for use as a texture editor with **iClone**. Textures edited using the "Launch" feature of the **iClone** material editor will open with the image editor selected in this section. (E.g. Adobe Photoshop)

- Click the **Choose** button in the Texture Editor option and browse to the executable file of a suitable texture editor application.
Interface Section
You may change the appearance of the program user interface in this section.

Icon and Font Size:
Choose the desired DPI (Dots Per Inch) from the three options, large, medium and small, to best fit the resolution of your display device.

Color Theme:
Select the color scheme of the user interface.

Note:
- The Interface settings takes effect by the next time you launch the iClone program.
- You can restore the default values by clicking the Back to Default button.
Default Key Tangent Section (New for v7.1)

Prior to iClone 7.1, when a key is added, the transition type is set to Linear by default. Now, you are able to determine the default tangent type with version 7.1 and beyond.

In this section of the Preference panel, you can determine the default tangent types for newly added keys, including the ones in the Transform and Motion / Animation Layer tracks.

Setting Default Key Tangent
1. Open the Preference panel (Ctrl + P).
2. Scroll down to the Default Key Tangent section.
3. Click on either of the cells to change the default key tangent.
4. Add transform or layer keys and play back to check the results.

Note: Hover the mouse cursor over the keys and you will see the tip of the key read “Default”.

Displaying Key Tangent Type in Curve Editor
If you have purchased and installed Curve Editor plug-in, then you can observe the visualized Tangent Type for the keys.

1. After the default key tangent is set, add transform or layer keys to the object.
2. Right click on the Transform or Layer tracks to open the Curve Editor.
3. Show the curves to view the tangent types.
3D Real-time Viewer (Preview Window)

The incredible power of iClone real-time 3D filmmaking is seen inside the 3D viewer pane which displays the current camera view and is also your workspace when creating an iClone project.

The iClone Message Panel on the bottom right of the 3D Viewer shows useful information for the current feature. You can show/hide the panel by clicking its button.
Render Quality of 3D Viewer (Preview Window)

The 3D viewer provides several render options when you are using iClone. It may reduce the strain on your system resources for editing or recording. Each option supports various mapping methods or effects individually. You may find them from the main menu bar by clicking the Edit >> Preference command.

### Real-time Render Options

<table>
<thead>
<tr>
<th>Render Quality</th>
<th>Quick Mode</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bump/Normal Map</td>
<td></td>
<td></td>
<td>Support</td>
</tr>
<tr>
<td>Glow Map</td>
<td></td>
<td></td>
<td>Support</td>
</tr>
<tr>
<td>Reflection Map</td>
<td></td>
<td></td>
<td>Support</td>
</tr>
<tr>
<td>Displacement Map</td>
<td></td>
<td></td>
<td>Support</td>
</tr>
<tr>
<td>Environment Reflection</td>
<td></td>
<td></td>
<td>Support</td>
</tr>
<tr>
<td>Refraction</td>
<td></td>
<td></td>
<td>Support</td>
</tr>
<tr>
<td>Realtime Smooth</td>
<td></td>
<td></td>
<td>Support</td>
</tr>
<tr>
<td>HDR</td>
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<td></td>
<td>Support</td>
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<tr>
<td>Substance</td>
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<td></td>
<td>Support</td>
</tr>
<tr>
<td>Anti-alias</td>
<td></td>
<td></td>
<td>Support</td>
</tr>
<tr>
<td>Mipmap</td>
<td></td>
<td></td>
<td>Support</td>
</tr>
<tr>
<td>Tessellation Shadow</td>
<td></td>
<td></td>
<td>Support</td>
</tr>
<tr>
<td>Advanced - Ambient Occlusion</td>
<td></td>
<td></td>
<td>Support</td>
</tr>
<tr>
<td>Advanced - Tree Billboard</td>
<td></td>
<td></td>
<td>Support</td>
</tr>
<tr>
<td>Advanced - Soft-edged Particle</td>
<td></td>
<td></td>
<td>Support</td>
</tr>
<tr>
<td>Advanced - Tri-planar Texture Terrain</td>
<td></td>
<td></td>
<td>Support</td>
</tr>
<tr>
<td>Advanced - Water Reflection</td>
<td></td>
<td></td>
<td>Support</td>
</tr>
<tr>
<td>Advanced - Soft-edged Water</td>
<td></td>
<td></td>
<td>Support</td>
</tr>
<tr>
<td>Advanced - Spring and Flex</td>
<td></td>
<td></td>
<td>Support</td>
</tr>
</tbody>
</table>

**Note:**

If you want to increase the performance of your system, multi-select all the objects in the Scene Manager, and then switch the render state to Wireframe. It will display all the objects in wireframe.
Drag-and-Drop to Preview Window

Instead of using the Content Manager or Import methods to load your assets, you can drag and drop them into the iClone Preview Window from your system explorer.

This way you can store all your desired files in a single folder and use the Drag-and-Drop feature to quickly load them into iClone.

If you are using a dual-monitor environment, you can have multiple explorers displaying your assets on one monitor and then drag the assets into iClone running on the other monitor to increase your production efficiency.

Drag and Drop

Drag and Drop Media to Space
If you drag and drop an image or video onto the space of the project, it will be set as 2D background.

Drag and Drop Media to Object
Drag and drop an image or video onto an object and it will be mapped to the Diffuse channel of the object.
Drag and Drop With Ctrl Pressed

- If you drag and drop an image or video while holding the Ctrl key, a simple board that is mapped with the image or video will be generated. And it works great with popVideo as well.

- If you drag and drop a PNG image that contains alpha channel data, iClone will automatically take care of the masking for you.

- You can modify the transformation data of the board to increase its size, width, depth, etc.

- The board will snap to the grid differently depending on your viewing angle to the world axis.

Drag and Drop from Content Manager to Folder

Not only can you drag and drop assets into iClone but also the other way round. Assets can be dragged from the iClone Content Manager to any target folder for better management.
Drag and Drop Media with Right Mouse Button

When you drag and drop media files with the right mouse button, you are prompted with a menu to select the desired action for how the media is applied.

- **Image or Video**: If you want to apply an image or video to a specific channel, please select the **To: XXX** entry, where the XXX is the material name of the target object, and select the target channel in the submenu.

![Menu for selecting image or video](image)

Drag and Drop Mesh Objects

You can drag any object with meshes such as **Actors, Props, Accessories, Terrain, Sky**, etc. into **iClone** to load it at the location you drop it.

Variations of Accessories

If you drag and drop an accessory file (.iAcc) on an actor, it will follow the accessory’s conventional behavior; if dropped on the floor, it will become a prop.

![Drag and Drop on Actor](image)

Drag and Drop on the Actor

![Drag and Drop on Floor](image)

Drag and Drop on the Floor (become a prop)

Drag and Drop Non-Mesh Objects and Media

Non-mesh objects (**Particles, Grass, Material**) and Media (**Images, Videos, Audios**) can also be applied into **iClone** by using the drag-and-drop method.
Material
Drag and drop a material file (.iMtl) to any draggable object (with mesh, trees excluded) and the images in the seven channels will be replaced with the ones saved in the material file.

Before Drag and Drop .iMtl file onto the prop
Drag and Drop .iMtl file to the target face
Result

Image and Video
By dragging an image or video and dropping on any draggable object (with mesh, trees excluded) or sky, you can replace their original image in the Diffuse channel.

- **Image formats**: JPG, BMP, GIF, PNG and HDR.
- **Video formats**: AVI, WMV, RM, RMVB, MPEG, ASF, MOV, FLV, iWidget and any video that can be played on your system.

Audio
When you drag and drop an audio file (.wav, .mp3) into the preview window, the file will be imported and set as the background music of the project.

Supported Asset Files
In general, any asset file with an extension that starts with ‘i’ can be dragged and dropped into the preview window.

* Please note that asset files from before version 3 (.VNS files) can not be imported into iClone 6. However, the asset files whose extension starts with ‘cc’ can also be dragged and dropped or applied into the preview window.

---

**Content Manager Tabs**

**Navigation Pane**
- **Project**
- **Avatar**
- **Head**
- **Parts > Eyes**
- **Parts > Lower**
- **Parts > Skin**
- **Accessories**
- **Motion-Plus**
- **Hands**
- **Image Layer**
- **Camera**
- **Props**
- **Particle**
- **Sky**
- **Sound**

**Ext. File Name**
- **.iProject**
- **.Avatar**
- **.Face**
- **.Eye**
- **.Lower**
- **.Skin**
- **.Acc**
- **.MotionPlus**
- **.Hand**
- **.ImgLayer**
- **.Cam**
- **.Prop**
- **.Particle**
- **.Sky**
- **.mp3**

**Navigation Pane**
- **Parts > Gloves**
- **Parts > Oral**
- **Parts > Upper**
- **Motion**
- **3D Scene**
- **Light**
- **Tree**
- **Terrain**
- **Path**

**Ext. File Name**
- **.iGlove**
- **.iOral**
- **.iUpper**
- **.iMotion**
- **.Scene**
- **.Light**
- **.Tree**
- **.Terrain**
- **.Path**

**Navigation Pane**
- **Parts > Hair**
- **Parts > Shoes**
- **Facial Animation**
- **Atmosphere**
- **Effect**
- **Grass**
- **Water**

**Ext. File Name**
- **.iHair**
- **.iShoe**
- **.iTalk**
- **.iAtm**
- **.iEffect**
- **.iGrass**
- **.iWater**

**Content Manager Tabs**

**Navigation Pane**
- **Hair**
- **Cloth**
- **BodyPart > CC Hair**
- **BodyPart > CC Cloth**
- **BodyPart > CC Shoes**
- **BodyPart > CC Gloves**

**Ext. File Name**
- **.ccHair**
- **.iProp**
- **.Particle**
- **.iSky**
**Gizmo of Objects in Preview Window**

The iClone Preview Window provides a visualized Gizmo to handle and modify the RTS (Rotate, Transform, and Scale) data of selected objects by dragging the Gizmo on the preview window. You may turn on the Gizmo mode by means of the Preference panel.

**Rotate**

Drag the three circles around the object to rotate it along the 3 axes.

**Transform**

Drag the handles to move the object along the 3 axes.

You may also drag the square at the corner to move the object on the planes of two intersecting axes.

**Scale**

Drag the handles to scale the object along the 3 axes.

You may also drag the yellow cube in the center of the gizmo to scale the object at a uniform ratio.

Note:

Only Actors, Accessories, Props, Emitters, Trees and Paths possess a Gizmo:

- Gizmo with RTS: Accessories, Props, Trees and Paths
- Gizmo with RT only: Actors, Emitters and Control Points (of a path).
Play Bar

The play bar is used to control the real-time playback of iClone scenes.

1. Realtime/By Frame: Switch to Realtime or By Frame mode for simulating physics.
2. Play: To play back current project.
3. Stop: To stop playing.
4. Jump to Start Frame: To jump to the cue in frame of the playback range or the start frame of the whole project.
5. Previous Frame: To jump one frame backward.
6. Next Frame: To jump one frame forward.
7. Jump to End Frame: To jump to the cue out frame of the playback range or the end frame of the whole project.
8. Loop On/Off: To toggle playback loop on/off.
9. Vocal Volume: To adjust the volume of the sound effect.
10. Music Volume: To adjust the volume of the background music.
11. Current Time: To show the current time/frame.
12. Project Settings: Use the Project Settings panel to set the total length for the current project, select the time unit, adjust the volume of the sound, configure the physics settings, and modify the background color or load a background image.
13. Show Timeline: To evoke the Timeline (F3).
14. Mark In/Out of Playback/Export Range: Drag this mark to set the mark in/out frame for playback or exporting.
15. Play Head: Shows the current frame of the project. You may also drag it to any desired frame quickly.
### Operating with Camera and Transform Tools

For the ease of use and convenience, iClone is designed with the same mouse controls for both camera operation and object transformation. This method of control allows you to edit scenes with one hand on the mouse and the other on the keyboard, saving you from moving your hand back and forth among the keys.

### Camera Tools

<table>
<thead>
<tr>
<th>Icons</th>
<th>Mouse Operations (Buttons pressed and drag)</th>
<th>Hotkeys</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Roll Mouse wheel</td>
<td>Z</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Both Mouse Buttons</td>
<td></td>
</tr>
</tbody>
</table>

### Pan

- Left Mouse Button: Scroll Left/Right
- Right Mouse Button: Scroll Up/Down

### Orbit / Roll

- C: Orbit
- V: Roll

### Focus to Selected - Perspective view

- Home: A: Left
  S: Right
  D: Back
  F: Front
  G: Top
  J: Face
  K: All

### Transform Tools

#### Select

- In **Transform Mode**, single click on the target object.
- In **Camera Mode**, double-click to select the target object.
- In **Select Mode**, hold down the Ctrl key and single click on objects. May **Multi-select** them.
- Alternatively, you may drag a box on the 3D viewer to enclose desired objects.

#### Move

- **Along World** or **Local X Axis**: Left Mouse Button + Cursor. Moves Left/Right.
- **Along World** or **Local Y Axis**: Left Mouse Button + Cursor. Moves Up/Down.
- **Along World** or **Local Z Axis**: Roll Mouse Wheel.

#### Rotate

- **Rotate Along World** or **Local Z Axis**: Press Left Mouse Button and drag.
- **Rotate Along World** or **Local Y Axis**: Press Right Mouse Button and drag.
- **Rotate Along World** or **Local X Axis**: Press Both Mouse Buttons and drag.

#### Scale

- **Uniform Scale**: Press Left Mouse Button and drag.
- **Local Z Scale**: Press Right Mouse Button and drag.
- **Local XY Scale**: Press Both Mouse Buttons and drag.

### Hotkeys

- Q: Press to temporarily lock the Z movement of the 3D space reference.
- W: Press to temporarily lock the X movement of the 3D space reference.
- E: Press to temporarily lock the Y movement of the 3D space reference.
- R: Press to temporarily lock the X, Y, and Z movements of the 3D space reference.

**Note:**

- Throughout all the documents, we assume that you are using your right hand to control your mouse. Therefore, clicking the **Left Mouse Button** means click the A button as shown in the illustration, while **Right Mouse Button** means the B button.
- **Temp Switch**: Hold down the ALT key will switch to the Pan of the Camera Mode temporarily.
- **Accelerating**: Hold the SHIFT key to 10X the operation unit.
- **Ctrl + G**: Turn on/off the Grid for 3D space reference.
- **Snap to Terrain**: Go to Edit >> Terrain Snap and choose Snap to Terrain. The Z movement will be locked to the terrain as you manipulate the camera or objects. Please refer to the Snap To or Follow Terrain section for more information.
- **Follow Terrain**: Go to Edit >> Terrain Snap and choose Follow Terrain. The Z movement will be locked to the terrain as you manipulate the camera or objects. Besides, the angle of the camera or objects also aligns to the face normals of the terrain. Please refer to the Snap To or Follow Terrain section for more information.
- **Snap to Grid/Custom Grid**: Please refer to the Grid Section for more information.
- **Angle Snap**: Please refer to the Control Section for more information.
Picking and the Right-click Menu

Picking
- You are allowed to pick almost every object directly in the 3D viewer window except the Grass, the Sky, the Terrain and the Particle Emitter.
- You may use the Transform Tools above the 3D viewer to Move/Rotate/Scale objects.

Right-click Menu
- Click the right mouse button on the objects to pop up the Right-click Menu in which various operation functions relevant to the object can be found.

Application Key
You may also use the Application Key on the keyboard to have the right-click menu shown on the top left of the Preview Window.
System Requirements

I. General

iClone 7 is designed with DirectX 11 architecture in mind, and thus requires an up-to-date game ready computer to enjoy the best it has to offer.
iClone 7 has the same system requirements as iClone 6 iClone 6 DX11 System Requirements.

II. For Real-time GI Editing in iClone 7

Please refer to the recommended requirements for NVIDIA VXGI:
- Graphics card GeForce GTX 970 (4GB Memory), or above
- Intel i5 dual core CPU, or higher
- 8GB main memory, or higher

Note:
- To know more about NVIDIA’s VXGI, visit NVIDIA GeForce - Technology - VXGI Technology
- For more about GPU requirements for VXGI, refer to VXGI – Supported GPUs (GTX 10 Series included).
- For computers with lower GPU hardware, you will need to turn off real-time GI viewport render for smoother editing.
- GI also works with ATI cards, delivering correct visual results but with less performance boost.

III. iClone Real-time GI vs. Graphics Cards

The current Graphics card market can be separated into three levels. The following chart provides the test scenario and FPS data:

<table>
<thead>
<tr>
<th>Level</th>
<th>Definition</th>
<th>Graphics Card</th>
<th>GPU</th>
<th>VRAM</th>
<th>Real-time Edit</th>
<th>Export Video</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Nvidia</td>
<td>GTX 10 Series</td>
<td>2 - 12GB</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nvidia</td>
<td>GTX 60 Series</td>
<td>2 - 12GB</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>High</td>
<td>NVIDIA’s next generation GPU - Maxwell, Pascal</td>
<td>AMD</td>
<td>RX 460</td>
<td>4GB</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AMD</td>
<td>RX 470</td>
<td>4GB</td>
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<td>RX 460</td>
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<td></td>
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<td>AMD</td>
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<td></td>
<td>Nvidia</td>
<td>GTX 860 Series</td>
<td>860 &amp; above</td>
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<td>Nvidia</td>
<td>GTX 700 Series</td>
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<td>Nvidia</td>
<td>GTX 500 Series</td>
<td>660 &amp; above</td>
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<td>Video Memory Size &gt;2G</td>
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<td>O</td>
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<tr>
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<td>Video Memory Size &gt;2G</td>
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<td>Nvidia</td>
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<td>1G</td>
<td>X***</td>
<td>X***</td>
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</tbody>
</table>

- * It is suggested to turn off Viewport GI for smoother editing experience on complex scenes.
- ** You might encounter iClone crashes when loading complex projects, possibly due to exhausted system / video memory.
- *** GI related features are fully disabled in iClone 7, no GI render for viewport or export.

Note:
For graphics card specification please visit the website for NVidia and AMD.

**Performance Test Result**

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</table>

Note:
- iClone FPS UI display, the max is capped at 60 FPS.
- This table will be updated in 7.0 final release.
Video Memory Usage

Due to VXGI consuming large amounts of GPU memory, if found to be inefficient, it will start to utilize system memory (at this point the FPS in iClone may drop by half).

Once the memory burden exceeds capacity then iClone may promptly shut down. Provided is a tool for detecting video memory usage:

Accessing HUD (Heads Up Display) for "FPS" and "Used Video Memory"

- **Used Video Memory**
  - The new Used Video Memory information is provided for checking the amount of memory used by iClone 7.
    - Turn on "info" display
    - Checked Preference > Display > Info (Ctrl+F) to access used video memory

![Image of HUD displaying FPS and Used Video Memory](image.png)

A. **the amount of video memory currently used by iClone**
   - **Yellow text** the memory usage is within range of what the video card can provide.
   - **Red text** (as shown below): the memory usage is beyond the range of what the video card can provide.

![Image of HUD displaying FPS and Used Video Memory](image.png)

B. **The total size of the video memory.**
- **FPS (Frame Per Second)**
  - When the timeline is playing one will notice the FPS number constantly refresh.
Visual Enhancements

Visual quality in iClone 7 has made a big leap. That means that lots of new technologies have been implemented which will be visually distinguishable from iClone 6. Please use this chance to experience these new features to further enhance your projects.

The features that enhance the visual quality are:

- **PBR**: It is the new real-time renderer for iClone users. Not only does it deliver high visual realism, but it also serves as a new material content standard that maintains a consistent PBR look between iClone 7, 3D game engines, and popular PBR design applications such like Substance Painter.

- **IBL for PBR**: It's a more flexible sync-to-sky design, and IBL bake-from-scene capabilities.

- **Shadow**: It allows darker shadows, casting shadows on invisible mesh, and cast-shadow-only lights.
• **Ambient Occlusion:** The new HBAO+ gives much better AO details.

Ambient Occlusion:

iClone also provides an AO only viewing mode for easy observation.

• **HDR:** The flickering and red halo issues are fixed; in addition, you can have better adjustments for **Tone Mapping**.

HDR:

Please click [Here](#) to view the differences.
Performance Notes

Features Slowing Down System

For the sake of the realism, iClone provides many powerful features that drastically increase the real-time visual quality or better using experience. However, these features may cause poor real-time animation editing or playback because they all consume a lot of system resources such as the Ram Space CPU and GPU processing power.

The features that can cause the inferior performance can be divided into different aspects as shown in the sections below:

- For Loading Files
- For Authoring with iClone
- For Real-time Rendering or Playback
- For Saving Files
- For Final Rendering
For Loading Files

When you are loading various files, including project or other objects, you could sometimes encounter slowing issues. The issues can be due to different reasons as shown below.

Reallusion Substance Files

**Situation:** When you load the Substance files (SBSAR) released by Reallusion, the loading process can be very slow.

**Reason:** The graph in the substance files are build in complicated method with abundant textures of large sizes.

Loading Project Files Failed

**Situation:** Some particular projects can not be loaded successfully.

**Reason:** This problem is possibly caused by insufficient space on your C drive. When iClone loads a project, some data will be saved in the temp folder (Preference > System > Temp folder). These data files might even exceed the size of the project itself. When the storage space is insufficient, the project will fail to load.

Crashing when Loading

**Situation** iClone crashes for loading certain projects.

**Reason:** iClone 7 uses Nvidia Gameworks VXGI which consumes large amounts of video memory (VRAM); therefore, a project with a lot of objects and Global Illumination enabled will likely exhaust all system resources. If you are experiencing system crashes, you can create a new project with Viewport GI turned off and then load the project again.

IBL Loading HDRI

**Situation** Loading HDRI image as the source of the IBL is very slow.

**Reason:** HDRI image is of high resolution for PBR materials to take a long time for post processing.

**Solution:** Downsize the HDRI image to 4k x 2K or 2K x 1k
For Authoring with iClone

Realtime Smooth

**Situation:** When you turn on the *Real-time Smooth* for objects, the result does not show instantly.

**Reason:** iClone subdivided objects, which takes a lot of time calculating for generating new meshes.

**Solution:** Turn on and off the feature once and save the project. Next time when the feature is on, the speed will be faster (in trading off the file size).

GI Related

**Situation:** Operating iClone becomes very slow.

**Reason:** A complicated scene with *High Voxel Mode* or *High Voxel Cones Value* can cause this issue.

**Solution**
- Set to *Low Voxel Mode*: There are about 8 times size between the high and low voxel cube resolutions. Which can have up to **20 FPS** differences in speed. However, lower voxel mode can get a more coarse and fewer levels of GI result.
- **Lower Voxel Mode** with **Glow / Self Illumination Scale** and **Light Bounce Strength** slider adjustments for objects can increase more levels for GI.

- Decrease the **Voxel Cones Value**
- A better graphic card is highly suggested. Please refer to the [System Requirements](#) section for more information.

**Situation**: Operating iClone becomes very slow.

**Reason**: Too many objects are set to the Translucent GI mode in the **GI > Opacity** settings, or the object with this setting occupies too much of the preview window.

**Solution**: Unless the transparent objects are big or close to the camera view, it is recommended that you turn on the **Alpha Threshold** feature to change the opacity map (alpha transparency) into binary mode (either black or white) so that the grayscale area will not be calculated all the time.

**Situation**: Operating iClone becomes very slow.

**Reason**: FPS tremendously drops when there are particles contributing GI light and you activate the **Suppress Light Flicker** under the **Project Setting** panel.

**Solution**: Because the particle emits lots of image planes, while they contribute GI lights, iClone calculates the light-bouncing result from each of the planes intensively. It is highly suggest that you turn OFF the **Viewport GI** effect temporarily.

**Timeline On**

**Situation**: iClone becomes very slow.

**Reason**: Timeline contains many elements and setting data; when you scrub across time frames in the view port, timeline must redraw the UI constantly, which slows down the entire system.

**Solution**: Turn off the timeline for authoring unless you want to use any feature provided merely on timeline.

**Substance Related**

**Situation**: The more objects applied with **Substance** materials, the more slowly the system turns.

**Reason**: Substance materials consume system resources a lot.

**Solution**: After the substance material settings are set and done, bake the textures from the substance to the texture channels and then remove the substance sources.
Object Related

**Situation:** Too many objects in the scene decelerate the authoring speed.

**Reason:** Each object with its setting of material, tessellation, displacement, shadow and so on can slow down the system.

**Solution:**

- **Using Quick Mode**
  Go to the preference panel and switch the Real-time Render Options to Medium or Quick Mode to ignore some effect for the preview window.

- **Using Wireframe and Hidden Modes**
  Set the objects that you do not need to edit in the scene to wireframe mode or even hide them.
  - **Wireframe Mode** This mode for the objects mainly make them for reference.
  - **Hidden Mode** You do not need them for reference and you will not modify them afterward.
For Real-time Rendering or Playback

**GI Related**

**Situation** FPS drops seriously when playback.

**Reason** If GI effect is activated, then the constantly calculating the light-bounding between surfaces can slow down the entire system.

**Solution** Turn **OFF** the GI effect only on the view port (but the GI main feature is still on) by click up the Viewport GI button on the GI toolbar.

**Substance Related**

**Situation** Editing substance settings with a slow response.

**Reason** The resolution for the Substance settings are set too high.

**Solution** Set the resolution in the substance section to lower than 2048 (1024 or 512). When you want to bake the texture or do the final rendering, switch it back to 2048 or above.

**Situation** The Substance material of a prop slows down the entire system.

**Reason** The Substance material of a prop contains up to four layers of different sub-materials. Each sub-material can contain at least a single texture. In addition, generating animation for different layers such as gradual weathering creates an excessive load on system resources.

**Solution** Decrease the use of substance materials if unnecessary, or avoid using substance animations keys.
### TAA Related
**Situation**: Screen flickering or delaying when playback with TAA on.
**Reason**: The screen flickers when TAA and HDR are both turned on; the fast moving object can also cause delaying issues.
**Solution**: Temporarily turn off the TAA effect if there are not obvious differences.

![TAA Settings](image)

### Tessellation Related
**Situation**: Playback slow when the Tessellation Shadow is turned on.
**Reason**: GPU dynamically calculates the tessellation shadow intensively when it is on.
**Solution**: Turn off tessellation shadow effect temporarily if there are no obviously differences. Turn it back on only when you want to do the final rendering.

![Tessellation Settings](image)

**Situation**: Playback slow when the Tessellation value of objects is increased.
**Reason**: Tessellation can decreases the playback frame rate due to repeated calculation of the tessellated result frame by frame.
**Tessellation Level** = 1.
**FPS** = 60.

**Note:**
If you turn on the **LOD** in the **Preference** panel and set it to the **Quality** end, then you may experience slower performance.

**Solution:**
Turn off tessellation effect for objects that are not important or obvious in the scene or decrease the tessellation value for certain objects.

**Sky Blur**
**Situation:** When the IBL image is sync to the sky and the **sky blur** setting is increased, system slows down.
**Reason:** The performance is the worst when the value is low because the feature consumes a lot of video memory.
**Solution:** Stop using the **Sky Blur** setting or downsize the resolution of the sky image texture.
Material and Texture Related

**Situation:** It playbacks slow without knowing reasons.

**Solution:** Check out the Max Texture Size setting in the Preference panel > Real-time Render Options to see if it is set to a high value. Set it to $1024 \times 1024$ to see if the situation is eased.

**Situation:** The FPS drops for layered opacity objects.

**Reason:** The enhancement for the object with alpha transparency constantly calculates the layers for each object of this type in order to get the best results, especially when multiple objects of this type obstruct or intersect with each other, which can cause a lot of consumption of the system resources and slow down the performance. A few objects that use this feature are Grass Particles, or Character's Hair (with DOF effect), or any other 3D entities that use the Opacity channel for trimming the appearance.

**Solution:** Avoid using this type of object as possible unless it is necessary.
- Turn on the Alpha Threshold feature to change the opacity map (alpha transparency) into binary mode (either black or white) so that the grayscale area will not be calculated all the time.

**Situation:** Turning ON the Reflection and Refraction settings, the FPS drops down

**Reason:** iClone calculates the environment and then render the result to each of the objects, which will slow down your computer.

**Solution:** Use the Transparent or Reflection texture maps instead.

**Lights and Shadows Related**

**Situation:** When the Shadow Resolution is increased, the FPS drops.

**Reason:** The shadow in iClone is determined by a shadow map. The higher resolution of the map means a better quality of the shadow. However, it also creates a heavier load on your system resources.

**Solution:** Decrease the Shadow Resolution to 1024 or 512 (shadows can be blurry or flickering). Turn off the shadow effect for some lights that are no need to cast shadows.

**Situation:** The FPS drops with multiple lighting resources.

**Reason:** The interaction between the light and the surfaces that it hits needs to be calculated, therefore, an excessive amount of lights can also slow down performance.

**Solution:** Decrease the number of the lights.
For Saving Files

**Saving Contents**

**Situation:** It takes a long time to save the custom contents, including regular contents or projects.

**Reason:** iClone calculates the thumbnails for the contents for a certain time.

**Solution:** In the **Preference** panel, activate the **Quick Thumbnail Generation** box.
For Final Rendering

Render Quality with Large Size Export

**Situation:** Rendering slows.

**Reason:** If the **Super Sampling** is set to $2 \times 2$ or $3 \times 3$, the actual rendering size behind the scene is $4$ to $9$ times of the target export resolution.

**Solution:** Turn **OFF** the Super Sampling feature.

![Render Quality](image)

**Shadow Related**

**Situation:** Rendering very slow.

**Reason:** The **High Quality Shadow** is turned on. It increase the rendering time drastically.

**Solution:** Turn off the feature if the shadow quality is not so important for your scene, such as cloudy day or night scene.

![Render Quality](image)

**Situation:** Final rendering slows when the **Suppress Shadow Flicker** is on.

**Reason:** The system pre-processing all the exporting frames to get and save a value for rectifying the shadow, therefore, the more the export frames, the more time it takes for pre-processing the frames.

**Solution:** If the shadows in the project do not flick much, then turn off this setting.

![Visual Settings](image)
GI Related
Situation: Rendering slow when GI is on.
Reason: If the scene is complicated and your video graphic card is lower-ended, then the High Resolution Voxel mode or higher Voxel Cone Value can slow down the rendering speed.
Solution: Use the Low Resolution Voxel mode or lower Voxel Cone value.

Opacity Related
Situation: Partial breaks show on the view port for semi-transparent objects.
Reason: Too many semi-transparent pixels.
Solution:
- Decrease the layers for the transparent objects.
- For users with Windows 7 NVidia GTX 900 graphic card or above, please upgrade your OS to windows 10.

Situation: Normal on the view port, but partial breaks show on final rendered images or videos for semi-transparent objects with Super Sampling on.
Reason: Too many semi-transparent pixels.
Solution:
- For users with Windows 7 NVidia GTX 900 graphic card or above, please upgrade your OS to windows 10.
- Decrease the size of the view port until the breaks are gone.

AO Related
Situation: The view ports shows only the AO effect but it can not be exported for further editing.
Solution: In the Render panel activate the Preview radio button under the Render Quality section and do the final rendering.
Sharing Projects and Props with External Files

Instead of saving everything in your project, iClone also gives you the option to load texture images and videos as external files. When sharing or moving such a project or prop, the external files that the project or prop refers to have to be moved along with it.

Turn on the External Files Mode for Drag-and-drop Feature

If you want to have all the image files applied as external files as you use the Drag-and-drop feature, please follow the steps:

1. Access the File >> Import Settings command.
2. Check the External Texture option.

All the image files applied by means of the drag-and-drop feature will be external afterward.

Before sharing project or prop files, please click the Project Settings button on the play bar and click the External Files button in the Info section. A text file that contains a list of all external files and their locations, [External Image List] and [External Video List], will be opened.

Sharing Projects with External Files

After you move a project to a new folder, the external files it refers to MUST also be moved to one of the following:

- The project’s new folder.
- The video of popVideo folder (if any) in the new folder.
- By default, the C:/Users/Public/Documents/Reallusion/Shared Templates/Video (Windows 7/Windows 8) directory.
- By default, the popVideo ImageLayer Intro Facial Animation Water or Digital Juice folders under the C:/Users/Public/Documents/Reallusion/Shared Templates/Video (Windows 7/Windows 8) directory.

Sharing Props with External Files

If you want to move a custom prop with external files to a new folder, you MUST also move the external files to one of the following:

- The props’ new folder.
- The Texture Textures image images img picture folders (if any) in the new folder.
- By default, the iClone Diffuse iClone Opacity Animated Face Normal IBL iClone Bump iClone Blend iClone Glow iClone Normal iClone Reflection or iClone Specular folders under the C:/Users/Public/Documents/Reallusion/Template/iClone 6 Template/iClone Template (Windows 7/Windows 8) directory.
Selecting Entities

Selectable entities in iClone include Actors Props Accessories Cameras Lights, etc. There are several methods to select them. You may select one, or multiple entities to facilitate further editing instead of just one at a time.

Selecting on Preview Window

Selecting Single Objects
- If you are initially using the camera tools like pan, zoom and others, then Double-Click on the target object to select it.
- If you are using object tools like Select (Shortcut: Q), Move (Shortcut: W), Rotate (Shortcut: E) or Scale (Shortcut: R), then Single-Click on the target object to select it.

Selecting Multiple Objects
- If you are using the Select Move Rotate or Scale tools, then hold the Ctrl key and Single Click on the target objects to select them.
- You may use the Select tool to:
  - Drag from left to right: Any object partially contacting the rectangle will be selected.
  - Drag from right to left: Only objects covered entirely by the rectangle will be selected.

Selecting with the Scene Manager

This is useful when the entities you wish to select are too small, too far away from the camera, scattered around the scene or somewhere out of view.

Selecting Single Objects
- Simply Single-Click on the target object to select it.

Selecting Multiple Objects
- Hold the Ctrl key and Click on the target objects to select them.
• Hold the **Shift** key and **Click** two objects to select continuous objects in between.

**Using the Search Feature**

You may also use the **Search** feature when you need to find objects by typing full or partial names.

1. Type in a string in the search field on the top of the **Scene Manager** for searching the name. This string can be the full name of the object or a part of the name.
2. The object whose name contains this string will show.

   - **All** the entities whose names containing '0' are selected. **Props** whose names containing 'b' are selected.
   - You may click the **Menu** button and select the **Filter** command to show/hide specific categories. You may then use the **Search** feature to select the objects you want.
   - Click the **All** button to show all the categories in the **Scene Manager**
   - Click the **None** button to hide all the categories in the **Scene Manager**
   - Click the **Invert** button to show the hidden categories, and hide the shown categories in the **Scene Manager**

   - You may click the **Name** caption first to re-arrange the order in the **Scene Manager**. Then you may use the **Search** feature for fast searching.
Removing Animations and Preserving Project States

iClone provides a feature for removing all the animations in the current project; in addition, you are able to retain the scene state after the removal. This feature can be used when your project is messed up with accidental animations you do not want to have. Removing the animations for each and every object is tedious, troublesome, and time-consuming; you may use this feature to keep the project in a certain state with the following simple steps.

Furthermore, if you are creating several takes for your story, then this feature is useful for you to set the state for the next cut based on the current one.

Removing All Animations

1. Create a new project with assigned animations or motions to the objects within it.

2. Make sure everything is deselected.

3. Go to a desired time frame.

4. Right click on the empty space in the working area.

Note:
The project states for the first, current, and last frames are as shown below:
5. In the right-click menu, hover to the **Remove Scene Animation** item.

- **Keep First Frame**: Remove all animations but keep the project state in the first frame.
- **Keep Last Frame**: Remove all animations but keep the project state in the last frame.
- **Keep Current Frame**: Remove all animations but keep the project state in the current frame.

6. The project afterward will be no animations with the selected state kept at the first frame.
World or Local Axis

Although the pivot of a prop is merely a point, it still has its own orientation; the orientation of the pivot can be aligned to the world coordinate or to the local coordinate, which tremendously affects the Local movements and the Scaling directions of the prop.

Pivot Orientation

- Each prop has only one pivot. However, each pivot contains two coordinates: World and Local.
- The Look At feature of the prop is based on the local coordinate of the pivot.
Transform Tools in World and Local Mode

- **Move - World Mode** in iClone, you are allowed to move an object in World Mode with the World Move tool; which means to move the object along the X, Y, Z of the world coordinate.

You can not easily move the jeep along the ramp with World Move tool.

- **Move - Local Mode** You can move an object in Local Mode with the Local Move tool; which means to move the object along the direction of the prop.

Use the Local Move tool instead.

- **Rotate** The Local Rotate tool is for Local Rotation only. If you want to rotate the object according to world coordinates, you may either switch to the World Rotate tool, or go to the Modify panel >> Attribute tab >> Transform section, and enter values into the Rotate numeric fields.

Local rotation only.

Type in values for world rotation.

- **Scale** The Scale tool is also for Local Scale only. This can prevent the prop from skew or distortion when you scale it.

The prop is scaled by the Local coordinate. (No skew)

The prop is scaled by the World coordinate - not used in iClone except with the Prop Puppeteering feature. (Skew occurs)
About G6 and CC Character

In iClone (version 6.3 or above), two types of new characters are provided, one is **G6 Character** and the other is **CC Character** (CC stands for Character Creator). They are both well-made and optimized for meshes, animations, facial expressions, texture settings and even the mappings for **Indigo Renderer**.

**G6 Character**

- Compatible to all features and templates that are related to character motions and facial expressions.

**CC Character (Character Creator)**

- Physics collision shapes are optimized.

- Physics soft cloth settings are applied to clothes and hair, especially the female characters.
Realistic skin textures and optimized texture mappings rendered with **Indigo Renderer**.

However, there are still some differences between them.

<table>
<thead>
<tr>
<th></th>
<th>G6 Character</th>
<th>CC Character</th>
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</thead>
<tbody>
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<td></td>
<td>Non-standard Character</td>
<td>Standard Character</td>
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<tr>
<td>Face Creation</td>
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<td>Facial Feature Adjustments</td>
<td>X</td>
<td>by <strong>Loading RL Head created in CrazyTalk 8</strong> and only transformations for hair and teeth in <strong>iClone</strong> by morphing features in <strong>iClone Character Creator</strong></td>
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<tr>
<td></td>
<td></td>
<td>by morphing features in <strong>iClone Character Creator</strong></td>
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<td>Body Proportion Adjustments</td>
<td>by <strong>Avatar Proportion feature in iClone</strong></td>
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<td>CC Cloth, Eyes, Hair, Shoes and Teeth</td>
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<td></td>
</tr>
<tr>
<td>G5 Head Template Applying</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>G5 Hair</td>
<td>X</td>
<td>Supported</td>
</tr>
<tr>
<td>G5-related Templates</td>
<td>X</td>
<td>Only Skin Template Supported</td>
</tr>
<tr>
<td>(Eyes, Upper Body, Lower Body, Shoes, Skin)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Editing Body Proportion for CC Characters

iClone (version 6.3 or above) is able to use CC Characters. However, the body proportion can not be adjust inside of iClone because this is achieved more robustly in Character Creator.

1. Apply a CC character from the avatar library. And make sure the character is selected.

2. In the Modify panel, go to Edit tab >> Character Creator section and click the Edit in Character Creator button.

3. The character will be transmitted to Character Creator for further modification.

4. Use the morphing sliders or drag direction the specific body parts to adjust the body appearances and proportions.

Note:
For more information about using morphing sliders in iClone Character Creator, please refer to its official online manual.

5. Make sure the character in iClone is selected in order to be replaced with the modified character from iClone Character Creator.

6. Click the Send Character to iClone button on the tool bar in iClone Character Creator.

7. The modified character will be transferred back to iClone.
Editing Body Proportion for CC Characters

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6. Click the Send Character to iClone button on the tool bar in iClone Character Creator.

7. The modified character will be transferred back to iClone.
Scaling CC Characters in iClone (New for v7.1)

Besides using Character Creator for modifying the body proportion for CC characters, iClone (version 7.1 or above) is also able to apply uniform scale.

1. Apply a CC character from the avatar library and make sure the character is selected.

2. In the Modify panel, go to Edit tab >> Avatar section.

3. Set a scale value in the Body Scale field (in this case, 45.000).
Layering Clothing

In iClone, the clothing for the characters from iClone Character Creator follows the regular order for wearing daily clothes. And they are grouped into several different layers: Underwear, Pants or Skirt, One-piece, Shirts, and Coats.

The items of these layers can be seen in the Scene Manager panel >> Avatar.
Applying Cloth Template

In iClone, you are able to freely clothe the character from iClone Character Creator by means of embedded templates, and then, manually adjusting the provided parameters for shapes, textures and materials to change the clothes into different styles.

Clothing Character with Templates

1. Apply a base (nude) character from iClone Character Creator.

![Base Character](image)

2. Switch the Content Manager to Avatar Template >> Part.

![Content Manager](image)

3. Open the desired library, with names of prefix CC, under the Part (in this case, the CC Cloth).

![Content Manager](image)
4. Apply either one of the template (in this case, the Jeans) by double-clicking on the template. The cloth will be instantly put on the character.

5. Repeat the same steps until the character has a desired outfit.

Note:

The clothing will auto adapt to the body shape even if the body proportions are different.

If you encounter any body skin penetration issue, please refer to the sections below to solve the problem:

- How to Show or Hide Inner Meshes
- Conforming Clothing

**Getting Content Pack**

If you want to have more options for the cloths of the character, then go to the [official website](#) for purchasing additional content packs.
How to Show or Hide Inner Meshes

In order to hide the inner mesh that clips the outer ones, you can use two methods:

**Hiding Inner Meshes**

When you apply a cloth to a character, the inner meshes of a skin sometimes penetrate out of the outer ones as the illustration shows:

Turn the upper layer of the mesh into wireframe mode to get a better view of the penetration.

You can do the following steps to solve the issue:

1. Select the cloth at the topmost layer (in this case, the blue dress).

2. Execute the **Edit >> Conform** command to launch the **Conform Clothing** panel.
Alternatively, click the Conform button on the toolbar.

3. Activate the Hide Inner Mesh box at the bottom of the panel.

The meshes passing through the cloth will become hidden.

Masking Penetrating Meshes
In addition to the method described in the previous section, you are able to use customize an Opacity map for more precise fix instead of Hide Inner Mesh. Here the same character is used as the demonstrated example.
Getting UV Reference Map for Modifying Mask Texture

1. Make sure the character is selected.
2. Switch the Modify panel to Material tab.
3. Select the Skin Body material from the material list.

4. Click the UV button in the Texture Settings section.

5. The UV map of the selected material will be exported to your favorite image editor (in this case, Photoshop).
6. You can then use the image as reference for creating a mask image in grayscale mode to filter out the penetrating meshes from being displayed.

![Image of mask](image)

7. Save the image for further usage.

**Filtering Off Mesh with Mask Image**

1. Make sure the **Skin_Body** material is selected.
2. Double click on the **Opacity** channel in the **Texture Settings** section.

![Texture settings](image)

3. Load the image prepared in the previous section.
4. The meshes of the body that penetrate the cloth will be filtered out with the help of the grayscale image.

![Filtered meshes](image)
**Conforming Clothing**

In addition to the **Showing or Hiding Inner Meshes** method, you can adjust the parameters in the **Conform Clothing** panel to edit the shape of the cloth in order to fix the penetration issue caused by the size increase caused by morphing.

- **Collision Settings** group: The settings in this group deal with merely the penetrating vertex and meshes. It will thus detect them and offset them in order to solve the penetrating issue.
- **Outfit Settings** group: The settings in this group smooth out the entire cloth with or without changing the basic shape of the cloth.
- **Increase Size**: This slider increases the entire cloth to make it offset more from the meshes below it, the meshes can be any other cloth or skin.
Solving Penetrating Meshes Issue
To simply solve the issue of penetrating meshes and vertex, you can follow the steps below:

1. Create a new project and dress the character.

2. Increase the size of the entire body or specific body part. Sometimes the partial mesh of the skin maybe pass through the cloth as the illustration shows.

3. Select the cloth at the topmost layer (in this case, the blue dress).

4. Execute the Edit >> Conform command to launch the Conform Clothing panel. Alternatively, click the Conform Clothing button on the toolbar.
5. The **Conform Clothing** panel will be displayed on screen.

6. Adjust the **Iteration**, **Subdivision Level** and **Margin** values.
   - **Iteration**: The frequency of pushing the penetrated vertex and meshes of the cloth outer according to the **Subdivision Level** and **Margin** value.
   - **Subdivision Level**: Adding reference vertex between two adjacent ones to detect the penetrating issue for each calculation for pushing up.
   - **Margin**: Set the offset distance from the meshes underneath it.
7. Repetitively click the **Calculate Collision** button to push the meshes up.

Note: If **iClone** detects no penetration issue, then clicking this button will not make a difference.

**Making Clothes Smoother**

There are two more parameters that smooth the cloth in the **Outfit Settings** group, **Close-fitting** and **Smooth**.

- **Close-fitting** This parameter will change the shape of the entire cloth to make it smoother.

  ![Original shape of the cloth](image1)
  ![Shape changed for smoothing the cloth](image2)
  
  **Close-fitting** = 3

- **Smooth** This parameter smoothes the entire cloth while keeps the shape of the cloth as possible.

  ![Original shape of the cloth](image3)
  ![Shape kept as possible while surfaces are smoothed](image4)
  
  **Smooth** = 5

**Saving Current Cloth Status as Default**

After you have calculate and create a new style of the cloth, you may want to keep it and test another possible shapes of it, then you can use the **Save as Default** feature.

1. Create a new project and then dress the character.

2. Use the **Conform Clothing** panel to set the cloth to an ideal look.
3. Click the **Save as Default** button to keep the current shape of the cloth.

4. Use the **Conform Clothing** panel to test another look of the cloth.

5. Click the **Reset to Default** button at the bottom of this panel.
6. The cloth will instantly retrieve the shape you have saved in step 2 and 3 instead of the initial look in step 1.
The newly introduced .RLHead format is a Universal 3D Head file format that works across all major Reallusion products. Once it's installed in your shared folder, then you can apply them to iClone Character Creator and CrazyTalk 8 characters. This new format is also fully compatible with morph and skin adjustments in Character Creator, making them an even more versatile design asset.

- Loading Heads from Library
- Creating RLHead from CrazyTalk
- Importing RLHead to iClone CC Characters
- Verifying Head Appearance between iClone and CrazyTalk
Loading Heads from Library

Unlike other stylish, hand-crafted Character Creator content packs from Reallusion, these 3D head textures from the Realistic Human 100 Content Pack are especially made with high resolution (up to 2K), real human photos that were licensed from 3D.sk, a famous human photo reference company for 3D artists and game developers.

Note:
The required Reallusion Products are:
- iClone Character Creator: v1.42 or above.
- iClone: v6.42 or above.
- CrazyTalk: v8.02 or above.
- 3DXchange (For exporting characters to other 3D tools): v6.42 Pipeline or above.

Finding and Loading the Content Files for Realistic Human 100

1. After you have installed the Realistic Human 100 Content Pack, you can find the files in: Content Manager >> Template >> Realistic Human 100 folder.

2. Create a new project with a CC Character applied.
3. Drag and drop the desired template in the library onto the character.

4. Alternatively, select the target character and double-click on the desired head template for applying. Note:

Please note that these head templates can only be applied to **CC Characters**.

5. You will be asked the method for applying the template. Please keep the default settings and click the **OK** button.

   ![RL Head Import Options](image)

   **Note:**

   Please refer to the [Importing Options](#) for more information.

6. The head will be replaced with the selected template.
Creating RLHead from CrazyTalk

To create a custom face for a CC Character use the Creating 3D Actor feature provided in CrazyTalk 8.

Note:

Please note that this feature only applies to CC Characters.

1. Launch CrazyTalk 8 or above version.
2. Create a new 3D actor.

3. Click the Export RLHead button on the toolbar.

4. Save it to your destination folder as a head file (*.RLHead).

Note:

The RLHead can be applied to the 3D characters in CrazyTalk 8, iClone Character Creator and the CC Characters in iClone.
Importing RLHead to iClone CC Characters

1. Before starting this section, make sure you have created a RLHead from CrazyTalk.

2. In iClone, apply a CC character (poses, motions or expressions are optional).

3. Drag and drop the saved head file onto the character.

4. A dialog box will appear with the options to load the morphing and texture data in the head file. Click the OK button to load them completely.

```
RLHead Import Options

- Import Head Morph
- Import Texture:
  - Head and Body
  - Head Only

OK  Cancel
```

Note:
Please refer to the Importing Options section in this page for more information about these settings.

5. The original head is replaced with the one you created from CrazyTalk.
Importing Options

The settings for the Import Options determine if the applying items from the universal 3D head are either shape, or texture of the head, or both.

**Import Head Morph - Different Head Shapes, Same Original Texture**

The morph data from the RLHead can be applied while the original facial texture is kept. The concept is as shown below:

**Import Texture - Same Head Shape, Different Textures**

Textures from any RLHead, including their unique Normal and Specular maps, can be applied to a same head to create different looks.

Note:

Choose the Head and Body or the Head Only radio button to determine if you want to replace the head and body or only the head textures from the selected RLHead template.
Verifying Head Appearance between iClone and CrazyTalk

After having created a face for a CC character, it may not look identical to the original one in CrazyTalk 8 because these two applications utilize different system resources when they are running.

The head of 3D actor in CrazyTalk 8

In order to verify the appearances of the character's faces in CrazyTalk and iClone, you need to first set these two applications in identical statuses as shown below:

To verify the appearances of the heads between iClone and CrazyTalk, please follow the settings listed below:

Settings for CrazyTalk 8

- Apply the Atmosphere >> _LightB template from the library.

- Execute the command File >> New Script to clear any transformation, expression, or motion data of the 3D actor.

The animation-related data are removed
• Apply the Animation >> Idle Motion >> _Blank3D to remove the actor's idle motion.

The final project status in CrazyTalk is as shown below:

Settings for iClone

Environmental Settings
• Setting the graphics mode to DirectX 9 (because CrazyTalk currently utilizes it only). Restart iClone
You may change the mode by Start >> All Programs >> Reallusion >> iClone 6 >> iClone Graphics Mode Selection

• Set the real-time rendering mode to Quick Shading
• Set the camera lens to **200 mm**.

  ![Image of a close-up view of an actor's head]

  Zoom out to view the entire actor’s head.

• Set the ambient light to **(107, 107, 107)** (equals to **#6B6B6B**).

  ![Image of an actor's head with ambient light set]

• Apply a default light, set the **Rotate X** to **55** and **Rotate Z** to **340**.

  ![Image of an actor's head with default light applied]

**Texture Settings**

Select the character, switch to the **Modify panel >> Material tab >> Material List** section and then set the texture settings for it.
Select the material **Skin_Body** and change its settings to:
- **Ambient Color**: (150, 150, 150) (equals to #969696)
- **Specular**: 10
- **Glossiness**: 10

Set the material **Skin_Head** parameters:
- **Ambient Color**: (150, 150, 150) (equals to #969696)
- **Specular**: 10
- **Glossiness**: 10

Set the material **Cornea** parameters:
- **Ambient Color**: (150, 150, 150) (equals to #969696)
- **Specular**: 75
- **Glossiness**: 60

Set the material **Eye** parameters:
- **Specular**: 75
- **Glossiness**: 60

**Verifying Characters**
Move the view ports of these two application to compare. You will see the two characters are completely identical.

The head of 3D actor in **CrazyTalk 8**
The head imported from **CrazyTalk 8** in **iClone**
How to Change the Proportion of Each Sub Node of an Actor

iClone allows you to adjust the size, length and thickness of each sub node (parts of the body) of the actors. You may adjust the sub nodes of each finger as well.

Adjust Proportion

1. Select an actor.

2. Click the Avatar Proportion button in the Avatar section under the Attribute tab in the Modify panel.

3. Click on the six preset templates in the Preset tab.

4. If you want to adjust the individual body parts, then switch to the Body tab.
5. Select the sub node of the actor from the drop-down list. You may also click directly on the nodes of the dummy.

6. Adjust the **Width**, **Length**, or **Depth** to change the proportion of the node.

   ![Default Character, Slim Model, Strong Man]

   **Note:**
   - If you want to adjust the node of the limbs of both sides at the same time, activate the **Mirror** option and repeat steps 1 and 2 to modify the node.
   - The **Width**, **Length**, and **Depth** settings can be locked according to the node you picked.

**Adjust Finger**

1. Select the sub node of the fingers for the left or right hand from the drop-down list.

   ![Avatar Proportion]

2. Adjust the **Length** or **Thickness** to change the look of the target finger.

   **Note:**
   - To select the whole finger, you need to select it from the drop-down list first.
   - Activate the **Mirror** option and repeat steps 1 and 2 if you want to adjust the node of the fingers or the whole finger of both hands at the same time.
CloneCloth - Creating Your Own Fashion Designs and Collections
(G3 and G2 Actors Only)

iClone provides you an easy and powerful method to create a custom actor wardrobe. Using an image-editor application installed on your system, you can be a fashion designer too.

Please note that there are two categories of G3 and G2 actors. One is with only a single layer of skin, like the G1 actors. The other is more realistic since the actors are designed to be garnmented with clothes on them, which means there are two layers (the body layer and the cloth layer) for each avatar. Simply modify the opacity texture of the upper body and you will see the differences. CloneCloth is designed to work only with G3 and G2 avatars that possess an outer garment 2nd layer mesh.

Note:
- The Upper Body, Lower Body, and Shoes for the G3, G2, and G1 are not interchangeable due to the different skeletal systems used by each actor body style.
- For purchasing more actors, please visit our website: http://www.realillusion.com/templates/linkcount/linkcount.asp?lid=icenus59.

- Modifying cloths and pants
- Modifying shoes
- CloneCloth tutorial
Modify CloneCloth (G3 and G2 Actors)
If you want to design clothing for the upper/lower body of your actor, please follow the steps:

1. Apply the actor’s upper/lower body in the Template library.
2. Go to Modify page, scroll down to the Material & Texture Settings section.
3. Press the Launch button of the diffuse map setting. It will open the diffuse for the cloth in the image-editing software.
4. Paint or edit the image in accordance with the body mesh. Remember to save it.

5. Press the Launch button of the opacity map setting. The opacity texture will be opened in the image-editing software in grayscale format.
6. Paint the part you want to cut off in black, white for clothing that will be seen or paint in gray to make the cloth semi-transparent. Save the texture image.

"How does opacity work?"
(Black = transparent, Gray = Semi-transparent, White = Opaque)

7. Save the image in your image editor and then click the Update button in iClone to apply the customized texture to your model.
8. You can click the Save button to save the texture of the cloth for further use or for packaging the texture map for a Texture Pack.

Note:
- This feature can only be applied to the G3 and G2 actors.
- See CloneCloth tutorial for more details.
**Modify Shoes (G3 and G2 Actors)**

To create, apply and save G3 and G2 customized shoes, please follow the steps:

1. Apply the G3 and G2 actor's shoes.
2. Go to **Modify** page.
3. Press the **Launch** button of the diffuse map setting. It will open the diffuse texture map for the shoes in the default image-editing software.
4. Paint, edit and save the image in your image-editing software.
5. Click the **Update** button in iClone to change the diffuse texture map of the shoes.
6. Press the **Launch** button of the opacity map setting, then press the **UV Ref.** button to open the mesh image of the shoe. The opacity texture and the mesh will be opened in the image-editing software in grayscale format.

7. Paint the part you want to cut off in black, or paint in gray to make the shoe semi-transparent, in accordance with the mesh image. Save the opacity texture.

8. Click the **Update** button.

9. You can click the **Save** button to save the texture of the shoes for further use or packaging for Texture pack.

Note:

- This feature can only applied to the G3 and G2 actors.
- See CloneCloth tutorial section for more details.
CloneCloth Tutorial

In this section, you will see some examples on how to create customized outfits. You may generate limitless character CloneCloth fashions guided by your imagination.

1. Photograph your shirt and pants first.
2. In the image editing software, paste your shirt and pants onto the diffuse image texture of your character. Update the texture in iClone.
3. Now, edit the opacity to cut off the part in black as if you were cutting a real cloth.

4. Save the result of each image and simply click the Update button and you will see the result of the outfit.
5. Click the **Launch** button of the **Bump** map setting, and draw wrinkles or the brand’s tags on the outfit.

6. Use the glow map as seen in the following image, the brand on your cloth glows and attracts your audience’s attention more!
7. Optionally, if you want to create a plastic wrapping or latex effect, you may use the Reflect map as well.

Tips:

- The Minimum Bleed Area in the UV reference image indicates you to fully overlap your cloth texture paint or image. This can prevent image-distortion at the side seam of the outfit.
- The edges of the same color contour lines will later be stitched together.

Edges with color contour lines Stitched result
- Please refer to the Multiple Channel Texture Mapping section for more details.
Gloves and Shoes

Gloves and shoes templates are available for you to bring out the characteristics of the avatar.

Gloves
Switch the Content Manager to Actor tab >> Parts >> Gloves library and apply different glove templates.

When you have applied gloves that do not fit properly to the hands, you may use the CloneCloth technique to trim off the extra cloth/skin.

Shoes
You may also apply shoe templates to the character.
**Actor - Look At**

Instead of manually adjusting the head of an actor to look at a moving target, you may use this time saving feature.

**Look At**
1. Select the desired actor.
2. Switch to the Attribute tab in the Modify panel. In the Look At section, click the Pick Target button.
3. In the 3D viewer, click on a target.

**Note:**
- You can have the actor Look At the target object over a certain period of time and then have it stop looking outside that time range.
- You may optionally select the sub node of the target by clicking on the button and select a desired node in the tree view.

**Look At the Camera**
If you want the actor to Look At a camera all the time, simply click the Look at Camera button.
The actor rotates her head and looks at the camera all the time even if the camera moves away.

**Weight and Convergence**
You may drag the Look at Weight slider to adjust the rotation weight of the eyes or the head.

To adjust the **Eye Convergence**, drag the slider to the **Inward** or **Outward** side.
Persona

What is Persona
A Persona is the characteristics given to the actor so that the actor can animate in a unique style, e.g. a sexy dancer acts differently from a ninja warrior. The definition of the persona is stored in an AML file (Action XML), which defines the actor's multiple idle animations, keyboard movement behaviors and special perform actions. One Persona file may include several sets of movement behaviors. Use Behavior Mode Switch (hotkey X/Z, next/previous mode) to trigger different animation sets, such as walk mode, run mode, or even a custom defined fly mode. Animation defined in the Persona can be triggered by the right-click menu.

Using Persona from Library
After applying a default actor, you may right-click on it and see the motions embedded in it; which is because each default actor contains its own persona.

The default Perform commands

The default Move commands

The Laugh motion in the Perform entry.

The Walking style in the Move entry.

You may replace the default persona with a new one from the Persona library.

1. Select the actor whose persona you are about to replace.
2. In the Content Manager switch to the Animation tab >> Persona library.
3. Double-click on one of the templates in the Template library. Take the Jimmy Toon for example.

- These persona templates are of different gender or age.
- Every persona template contains different motions of performance and individual walking styles.
- Each persona can be applied to either G3 or G5 characters.
- If you use older actors than G3 or G5, then you must apply one persona before command it to move or perform.
4. After the replacement, the motions in the **Perform** and **Move** entries are also replaced.

   ![](image1.png) The new **Perform** commands.
   ![](image2.png) The new **Move** commands.

The **Confused** motion in the **Perform** entry.

The **Walking** style in the **Move** entry.

**Export and Import Persona**

You may export the persona of a specific actor, modify the content of the file and apply it to the original or another actor. To export a persona, right click on the actor and select **Persona Export Persona**.
CloneBone

CloneBone is an universal human bone with which users can create any creature by attaching props as body parts. Since CloneBone is designed with the standard human bone structure, any CloneBone actor can share standard human motion data, or do motion editing in iClone. Once you attach a prop to the selected bone segment, it turns into an accessory of the CloneBone actor. You may then save the whole actor as a custom CloneBone actor. Please view the CloneBone download page for more information: http://www.reallusion.com/contentstore/csproduct.aspx?contentid=080808-2&MenuItem=ic_bonus&Type=Bonus

Benefits
- You may attach any downloaded prop to the CloneBone to create your ideal actors, especially for creating robots.
- Easily transform any body part before or after attachment to CloneBone.
- Accessories are able to have an option for inheritance, which means you can scale the bone and theCloneBone attached parts scale accordingly.
- Directly pick specific parts of CloneBone actors for quick motion editing - just like with regular avatars.

Creating CloneBone Actors
Adjusting Body Parts of CloneBone Actors
Motion Editing for CloneBone Actors
Creating CloneBone Actors

If you plan to create a CloneBone actor, please follow the steps below:

1. Apply a CloneBone actor from the Content Manager.

2. Prepare desired prop for one bone node.

3. Right-click on the selected prop and select Attach, then click on the target bone node.

4. Make sure the prop is selected and the target bone node is picked in the Attach section under the Attribute tab of the Modify panel.

5. Click the button. In the Attach to Sub-node panel, activate the Move, Rotate and Scale options (this step will ensure that the prop follows the motion of the bone) and select the Position option. Click OK to confirm.

6. Repeat above steps to attach your props piece by piece until your actor is completed.
Adjusting Body Parts of CloneBone Actors

Adjusting after Attaching

After you attach and align a prop to the CloneBone, the position, size or orientation may still be in need of some adjustment:

1. Pick the desired part (if you are using any camera tools, you may not select the specific piece of the part but the CloneBone only. Please switch to the tool to click on or the tool to double-click on the desired part to select it instead of picking the whole CloneBone).

2. Go to the Attribute tab under the Modify panel and adjust the data in the Transform section to fine tune the part.

Adjusting Along the Body Proportion

If you intend to have the part to be changed along with the CloneBone’s specific bone node, you may follow the steps:

1. Pick the part and make sure the Inherit relationship boxes (Move, Rotate, Scale) between the target part and the bone node are all checked.

2. Pick the actor and go to the Avatar section under the Attribute tab.

3. Change the body proportion in an ordinary manner. Please refer to the How to Change the Proportion of Each Sub Node of an Actor section for more information.
Motion Editing for CloneBone Actors

Since a CloneBone actor behaves exactly the same as the standard actors, you may modify its motion the same way as with normal human actors:

1. Pick the CloneBone actor.

2. Go to the Animation tab of the Modify panel. Click the Edit Motion Layer button.

3. Select or tools to utilize the IK or FK method to modify the motion of the CloneBone actor.

Note:

- You may directly pick the specific bone node without being hindered by the props or accessories attached to it when you are using IK or FK methods.
- Please refer to the Using the Edit Motion Layer Panel section for more information.
G5 Heads with Better Lip-sync

In iClone (version 5.4 or above), two default heads (Chuck and Gwynn) have been updated with improved skin-weight and redesigned lip-sync with more accurate mouth shape and tongue movement for more vivid facial and talking animations.

Accessing New G5 Characters

1. Update your iClone to version 5.4 or above.
2. Switch the Content Manager to Actor tab >> Avatar >> 02_G5 Character library. Apply the Chuck or Gwynn template.

Alternatively, you may apply the new G5 head from the Actor tab >> Head >> G5 Character library.

3. Apply a voice file to the actor and the lip shapes will be auto-generated according to the voice content.
4. The actor talks with better lip shapes and tongue movements for specific phonemes such as for d, f, l, n, r, t, th, and v, in comparison with the actors of the earlier version before 5.4.

Actor before version 5.4 (simple lip shape and no tongue movements)  
Actor after version 5.4 (better lip shape with tongue movements)
Creating a head

The head of your actor can either be one of the predefined template heads or created from a photograph or imported image. This section is a reference guide to creating a custom 3D head.

This section contains information covering:

- Creating A Face
  1. Loading facial images
  2. Photo enhancement
  3. Importing Photo Image
  4. Defining the Facial Angle
  5. Adjusting the Facial Boundary
  6. Adjusting the Angle and Orientation of the Face
  7. Adjusting Feature Points and Contours
Loading the Facial Image

If you choose to use a photograph to create the head of your actor, it should be a clear, well lit picture of a full head facing front, with nothing obscuring the facial features. It can be a BMP, JPG, JPEG, GIF, PNG or TGA image file.

To load the image:
1. Select the actor and go to the Avatar section under the Attribute tab of the Modify panel.
2. Click the Create Face button to open the browser window.
3. Browse to the location of the facial photo and click the Open button to load the selected image file.
4. The facial image is loaded and can be adjusted and enhanced if necessary. Please see next step Photo enhancement.
Photo Enhancement

The photo enhancement screen helps you adjust an imported facial image to make it ready for creating a head. After importing a head image, the photo enhancement screen is displayed.

Use the tools on the left side of the image processing menu to adjust the usable area, quality and color settings of the image as follows.

1. Cropping an image
   - To select only a part of the image. This can be useful when you want to select a face from a group photo or remove a large background area which is not needed for the model. You can also refer to Defining the facial angle.

2. Rotating an image clockwise
   - To rotate the image by 90 degrees in the clockwise direction.

3. Rotating an image counterclockwise
   - To rotate the image by 90 degrees in the counter clockwise direction.

4. Mirroring an image
   - To create a mirrored reflection of the image. This function is useful for images obtained from scanners or cameras.

5. Adjusting color levels automatically
   - To adjust the color levels of the image automatically. The program analyzes the color levels and adjusts the brightness, contrast, hue, and saturation levels to achieve optimum image quality.

6. Adjusting color levels manually
   - To adjust the brightness, contrast, hue, and saturation levels of the image manually. Use the sliders in the menu box to adjust the values or enter the numerical values for each parameter in the boxes next to the sliders.

7. Adjusting color balance
   - To adjust the color balance manually. Drag the sliders to adjust the Cyan - Red, Magenta - Green, and Yellow - Blue levels. The box next to each of the respective properties shows positive or negative values depending on the position of the slider, with the center being zero. Click Highlights to apply these color settings to emphasize the brighter areas. Click Midtones to apply these color settings to the entire image with average intensity. Click Shadows to apply these color settings to emphasize the darker areas in the image.

For more details about importing a photo, see the Importing a face photo tutorial.
Importing Photo Image

Creating a face for your actor is simple. To begin the procedure, you can select one of the pre-made face styles from the selection in the file manager pane, or you can create one from a photo of your own. If you decide to use a photo, be sure to use a clear, front-view photo with no hair hanging or blocking the view of the face. The mouth of the face in the picture should be closed and with a normal emotionless expression. You may crop and adjust the image using a photo editing application before you attempt to use it with iClone.

To import a face photo:

1. Select the actor and go to the Avatar section under the Attribute tab of the Modify panel.
2. Click the Create Face button to open the browser window.
3. Browse to the folder where your face image file is saved using the Look in drop down menu.
4. Click the Open button to select the highlighted image file.
   The Import Photo Image Window opens.

   ![Import Photo Image Window]

5. Use the side toolbar to make any adjustments to the image as required.
   For more details about photo enhancement, see Photo enhancement.
6. Click the Next button to proceed to the next step, or if the head in your photo isn't straight and needs adjustment, go to defining the facial angle.
Defining the Facial Angle

If the picture is not straight you will need to correctly define the angle of the image. Use the Select Face tool to frame the outline of the face with the arrow pointing to the top of the head. Draw the rectangle around the face and drag the corners with the mouse to rotate it. Use the guide in the upper right corner to see how to properly correct a tilted head.

Note:
- Each corner of the rectangle has a small square around it. Click in the square inside the rectangle to resize the rectangle. Click the square outside the rectangle to rotate it. Click and drag inside the rectangle to move it.
- Click and drag outside the rectangle to redraw it.

Click point 1 to rotate.
Click point 2 to resize.

When your face is properly framed with the rectangle, click the Apply button. Click the Cancel button to abort.

Tip:
Zooming during the fitting process is recommended to ensure a good fit for your facial image.

Use the buttons on the left-side toolbars to rotate or flip the image, or adjust the color balance or contrast settings. For more details about photo adjustment, please see Photo enhancement.

When your image is properly edited, click the Next button to proceed to the next stage, setting the facial boundary.
Adjusting the Facial Boundary

When you import an image to use with iClone, you must define facial boundaries.

1. First, use the drop-down menus above the 3D view port to define the gender of the face.

2. Then drag the facial boundary points to frame the oval face exactly.
   - Click and drag inside the rectangle to move it.
   - Drag the left or right boundary points to scale the rectangle horizontally.
   - Drag the top or bottom boundary points to scale the rectangle vertically.
   - Drag the corner boundary points to scale or rotate the rectangle.

   Tip:
   You may click the Wireframe button and cycle through different wire frame colors. This can be used if both the original image and the wire frames colors are the same color, as it would make it difficult to view and make corrections.

Click the Next button to proceed to the next stage, adjusting the angle and orientation of the face.
Adjusting the Angle and Orientation of the Face

The face you have imported may not be facing directly forward. In this case, adjust the angle of the face slightly using the Roll X-Z tool. Drag the mask left and right or up and down to match the mask to the angle of the face in the photo.

The other tools above the 3D view port are:

- **Reset**: reset the position and angle of the 3D contour.
- **Move**: move the 3D contour.
- **Rotate X-Y**: roll the 3D contour.
- **Scale**: adjust the scale of the 3D contour.

**Tip:**
You may click the *Wireframe* button and cycle through different wire frame colors. This can be used if both the original image and the wire frames colors are the same color, as it would make it difficult to view and make corrections.

Click the **Next** button to proceed to the next stage, *Adjusting feature points and contours*. 
Adjusting Feature Points and Contours

Adjust the eye, nose, mouth and eyebrow points to exactly match your imported picture.

Select the Move tool and drag a point to move it or drag on a contour (ex. the mouth contour) to move the group of points.

Select the Scale tool and drag on a contour to scale the group of points.
Check the Mirror option to adjust the points symmetrically, uncheck it to switch to independent point adjustment. The default setting is on.

Use the Dropper tool to pick the middle tone of the skin color. iClone samples the skin tone automatically for matching the skin color. Check how the front photo blends with the profile image, if the skin tone does not match properly (this could happen when the face is covered by something or the contrast of the photo is too high), you can pick the middle skin color manually and check the 3D head to get a better result.

Tip:
- You may click the Wireframe button and cycle through different wireframe colors. This can be used if both the original image and the wireframe colors are the same color, as it would make it difficult to view and make corrections.

When the features and contours on the front of the face are properly set, click the Edit Side tab to set the profile if necessary.

Move the points or the group of points the same way as in the front view. Drag the 2 vertical lines to define the texture blend area and check the result on the 3D head.
You can import your own profile photo by clicking the **Import Side Image** button. Click the **OK** button when you are happy with your settings. When the following dialog box appears, click the **OK** button to apply the changes.

![Facial Model Generation Dialog Box]

Give the 3D head a name and save it in the default facial folder. The new head you have created is automatically applied to the current project.

You have now created a 3D head that can be applied to any new project by double-clicking it. The new head you have created can be found in the list of custom faces of the **Head** library under the **Actor** tab of the **Content Manager**.

To find a custom face, click the **Facial Features** button in the **Avatar** section under the **Attribute** tab of the **Modify** panel to begin facial settings and go to the **Head** library and click the **Custom** tab to display the list of custom heads.
Synchronizing Skin Color of Head and Body

To synchronize the skin color of a head and a body after applying a different head, please follow the steps below:

1. Select an actor for the head change operation.

2. Apply a different head from the head library. The skin color of the head might differ from the body.

3. Go to the Material tab under the Modify panel, use the Picker tool in the Material List section and click on the head to pick its color.

4. Activate the Affect all materials with the same name option or multi-select the same items in the list.

5. Synchronize the skin color of the head and the body in the Adjust Color section.

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iClone 7 User Manual - 193
**Adjusting Facial Features**

For each G5 or earlier standard character, you are able to adjust its initial facial features to form a favorite face of it before any facial animations are applied.

**Basic Adjustments**

1. Make sure the character is selected.

   ![Character Selection](image1)

   **Note:**
   You may press the **F** key to quickly snap the camera to focus on the head of the character.

2. In the Modify panel, click the Facial Features in the Avatar section.

   ![Facial Features Panel](image2)

   The Facial Features panel will show up.

3. Pick one of the facial features by clicking its respective area on the selection dummy.
4. Drag the related sliders at the right pane to determine the look of the selected facial feature.

5. Repeat the same step to change the basic look of the facial features.

Note:

The functions of the buttons in the panel are:

- Randomize: Click this button to randomly set the sliders of each facial feature to create a new look of the face.
- Reset All: Click this button to reset all sliders of each facial feature to its initial status.
- Reset: Click this button reset all sliders of the current facial feature to its initial status.

Detailing Overall Facial Features

After the basic adjustments are done, you are able to modify in further detail by adjusting various vertices.

1. Follow the example described above to do the basic facial feature adjustments.

2. Click the Detail Settings button at the bottom-left corner of the Facial Features panel.

The panel will change to the detail mode.
3. Switch to the desired tab (Right Face Front Face and Left Face) to change the perspective of the face at the top of the panel for further adjustments.

4. Select the green points for adjustments.

5. Drag within the pane to move its corresponding vertex on the face.

Note:
- If you want to select multiple points, then press down Ctrl key and click on the point you want to adjust.
- Alternatively, hold the Ctrl key and drag a rectangular to form a region to select multiple points.
- Activate the Mirror box to enable symmetry for both sides of the face.
- You may click the Clear All button to deselect the vertices.
**Full Head Morph**

After you create a head for the actor, you may adjust the features on the face individually. However, you can also apply one of the built in **Full Face Morph** templates to automatically change your actor's look in one click.

1. Select the desired actor and go to the **Attribute** tab of the **Modify** panel.

2. Click the **Facial Features** button in the **Avatar** section.

3. Click the button in the **Facial Features** panel.

4. Pick one of the templates to apply the full facial morph.

5. Drag the **Weight** slider to adjust the strength of the facial features. You may click the **Reset** button at any time to remove the effect of the template.

Note: You may adjust facial feature deformation after the **Face Morph** has been applied, however, you can only apply one **Full Face Morph** template at a time.
Using Custom Head Morph Template
If you have created a custom morphing template, then you may also import it to change the head shape of your actor.

1. Follow the pipeline of creating custom shape for head morphing to prepare a morphing template.

2. Select the actor and click on the Facial Features button in the Attribute tab of the Modify panel.

3. Click the button and the Custom icon in the Facial Features panel.

4. Load the prepared template.

5. Adjust the Weight.

Note:
The morphing result is based on the head shape of the current actor. If you want the morphing result to be completely identical to the custom head morph template, then you need to apply the Neutral Head Shape to the current actor.

Basic Head shapes in iClone (Male, Female, Neutral)

Morphing Results with Weight set to 100 (Only the result of the neutral head is identical to the template)

Multi-Full Head Morph Effects
If you want to blend two or more Face Morph templates to one actor, please follow the steps:

1. Pick the desired actor and apply one Face Morph template. Adjust the Weight value.

2. If you want to blend two Face Morph templates together, you may first apply one of them, save it by adding it to the Content Manager/Custom library, apply it back and then add the other Face Morph template.

3. Pick any other Face Morph.

Thus, two Face Morph templates take effect on the same actor.
Randomizing Facial Features

iClone gives you the opportunity to randomize facial features.

1. Have a character in selection.
2. Toggle to the Attribute tab >> Avatar section in the Modify panel.
3. Access the Facial Features panel by clicking the Facial Features button.
4. iClone randomizes the 9 facial features from the dummy pane to create a new face.

5. Click the Randomize button to produce randomized facial features.
6. If you are satisfied with the randomized face, but you want to further enhance each feature of the face, then select the facial section in the dummy pane and adjust the sliders to refine the selected area.

7. A whole new look has been created.

Note:
The randomizing function is a progressive function that continues to randomize the appearance of the face from your last generated one. You may press the Reset All button to start from the original face or simply press the Reset button to reset each facial feature.
Detailing Overall Facial Features

You can create an overall detailed facial expression by adjusting the **Detail Settings** in the **Facial Features** panel.

1. Select an actor and focus on the actor’s face.

2. Toggle to the **Attribute** tab in the **Modify** panel.

3. Click the **Facial Features** button in the **Avatar** section.

4. Click the **Detail Settings** button.

5. Select the white points to move each **Facial** region from any of the perspectives: **Right**, **Front** or **Left**.

   - Front Face
   - Left Face

6. If you have selected multiple points, you can move all the points all at once.

7. You can select a single point or hold the **Ctrl** key and drag a rectangular to the select a region of points in the panel.

   - Single Select
   - Multiple Select

8. After you have selected a point, the point turns to green which enables you to drag it in the panel.

9. Click the **Clear** button to clear all the selected green points.

10. Check **Mirror** to enable symmetry for both sides of the face.

   - Enable the **Mirror** option if you want to move a selected point and its corresponding mirror at the same time.
   - Selecting a point and its corresponding mirror without enabling the **Mirror** option will move their overall position on the face instead of moving them closer to or further away from each other.

11. Click the **Reset** button to undo the last modification.

12. Click the **Reset All** button to revert all changes back to the beginning.

**Note:**

- In the selection mode, hold the **Ctrl** key and drag the mouse to select multiple points.
- The **Detail Settings** button in the **Facial Features** panel under the **Attribute** tab allows you to set the overall facial look, whereas the **Face Key** feature under the **Animation** tab allows you to create facial animation for an actor.
Using the MixMoves Panel

The MixMoves (motion graph) system consists of hundreds of well-calculated, daily motions for top mocap quality. The system automatically generates natural transitions between previously selected motions for male or female actors. Its motion graph technology presents a general framework for human motion states to blend together, seamlessly. Storytellers simply need to select target motions under different states such as standing idle, sitting, kneeling or lying down. The system then automatically sequences motions and blends them together in a natural, believable manner.

1. Apply a character.
2. Move to another time frame where you wish the character to start acting.
3. Pick the character, go to the Animation >> Motion, and click the MixMoves button in the Modify panel (Shortcut: Shift + F5).
4. Select the motion category from the **Profile** drop-down list.

![Profile dropdown](image)

5. Select one of the motion categories from the left tree view. The right pane auto-refreshes as well.

![Left tree view](image)

6. Double-click on one of the templates in the right pane. The character will start to act accordingly.

![Right pane templates](image)

The character acts the target motion after an auto-generated transition motion.

The motion clip in the timeline.

7. You may then double-click another motion template from the same or another category before or after the previous motion stops.

![Character performing new motion](image)

The character performs the new motion with a natural transition motion ahead of the new motion.

The motion clips starts with a transition motion (T).

**Note:**

- **iClone** will automatically pause once the target pose is finished.
- If you enable the **Auto Loop Motion** box, then **iClone** will keep generating the motion without pausing until you press the Space bar or stop playing.
- The transition motions emphasis on correctness rather than instant timing.
- You may use this feature to connect various motions with natural transition motions in order to create prototypes of custom motions.
Using the Motion Puppet Panel

You may use a mouse or any other handheld device to create an unlimited number of motion variations to reflect your character’s personality. You may select body parts and add puppet behaviors, while they control their animations during playback or real-time recording. You may also manually control the puppeteering speed and direction, or let the animation loop with slider alterations. You are also able to create frequent male and female motion alternatives with various puppet profiles found in 4 categories.

Getting Familiar with Motion Puppet in Preview Mode

Before puppeteering and recording, you may need to use the Slider mode and Preview feature to get yourself familiar with what motion you are about to record.

1. Choose from the four categories: Idle, Mood, Move and Talk.

2. Select a preset from a category.

3. Switch to the Slider Control mode (default mode), and then switch to the Preset tab. Please refer to the Puppeteering Principles for Motion Puppet Panel section for more information.
4. Click the Preview button and press the space bar to preview the motion pattern (Shortcut: Space bar).

5. You may drag any sliders during the preview procedure in order to better choose the motion style you will be using during recording.

**Getting Ready to Start Recording**

Once you are familiar with the motion pattern, you are then ready to start recording the motion.

1. Switch to the **Mouse Control** mode.

2. Click the Record button and press the **Space Bar** to start recording (Shortcut: Alt + Space bar).

3. Swing the mouse cursor around the puppet mark in the center of the 3D preview window, in order to control the motion tempo with the speed of your mouse.

4. The motion will be recorded according to your mouse cursor.

   **Note:**
   - In addition to using the mouse for recording, dragging the sliders in the **Slider** mode can also be used to puppeteer and record.

**Masking Puppet Motion**

Once you are acquainted with the previewing and recording method, then you are ready to start **Mask Puppeteering** recording; this is a unique way to extract different motions of body parts from various motion presets, and combine them into a whole new motion.

1. Switch to the **Mask** mode.
2. Click on the dummy's body part to select certain parts of the body for puppeteering.

   - Click the **Eraser** button to deselect all the body parts.
   - The motions of the orange body parts are going to be recorded.
   - The motions of the additional body parts will not be recorded.

3. By using this method, you can extract different motions of individual body parts and combine them into a new motion, which is also known as **Multi-layer Recording** method.
Checking out the Result in Timeline
After recording, you may need to check out the result by playing or searching the result in the timeline.

- Click the Play button on the play bar, in order to view your recording results.

- Open the timeline (Shortcut: F3) and open the Motion main track of the character to view the recorded result (in clip form).
Introducing the Motion Puppet Panel

1. Body Control Template Category
   Select one of the template categories from the drop-down list.

2. Preset and Mask Pane
   - **Mask** tab: Select the body part of the dummy for mask puppeteering. Only the selected part will be triggered during the previewing or recording process.
   - **Preset** tab: Define the motion weight of the selected body parts. Please refer to the Slider Control and Mouse Control section for more information.

3. Save and Open Profile
   Click these two buttons to load and save profiles.

4. Triggering Methods
   Switch tabs to define a triggering method for character motions.

5. Preview (Space bar)
   Click this button and then press the Space bar to preview the motions triggered by your input device (Mouse by default).

6. Record (Ctrl + Enter)
   Click this button and then press Space bar to start recording a motion clip. When you move your mouse during recording, the results will be captured as a clip and stored into the Motion track.
Slider Control and Mouse Control

There are two methods to triggering motions within the Motion Puppet panel, Slider Control and Mouse Control.

Slider Control Mode

If you switch to the Slider Control tab, then you can constantly change the character’s motion weights and speed values during Previewing or Recording. The character’s motions react instantly to the values.

The main purpose for the Slider Control Mode:

- Previewing motions.
- Fine-tuning motion parameters and finding desired motion patterns.

Exaggeration and Speed

During the previewing or recording procedure, the character starts to perform the preset motion in a loop. You may drag the Exaggeration or Speed sliders to affect the motion in real-time.

- Adjust the Exaggeration value to strengthen or weaken the preset motion.

- The Speed value decides the speed of the looping motion.
Sliders in the Preset Tab
The sliders in the preset tab are divided into several sections which individually control the motion weight of different body parts. During the previewing or recording procedure, you may drag these sliders to alter the value to produce a derivation motion from the preset.

- The sliders control the body movements. Please refer to the Puppeteering Principles for Motion Puppet Panel section for more information.
- The derivation motions are produced from the preset motion.

Note:
- Click the Play button on the play bar to view the puppeteering recording results.

Mouse Control Mode

- The mouse movements trigger the motion of the character. Swing the mouse cursor around the mark, in the center of the working area, to puppet the body motion.
• The circular direction triggers the motion forwards or backwards.

Swing clockwise  Swing counterclockwise

• You do not always need to make a full circle around the mark in order to produce a complete motion. You can move back and forth in a simple arc movement to puppet the character to a partial preset motion.

Various partial motions are produced by hovering the cursor at different positions around the mark.

Note:

• The **Exaggeration** value must be set before **Previewing** or **Recording** when you use the **Mouse Control** mode.
• The **Speed** of motion is decided by the speed you hover your mouse.
• Click the **Play** button on the play bar to view the puppeteering recording results.
Matching Walking Loop to the Transformation Distance

1. Given a motionless character that moves from left to right, along a path, as below:

   ![Image of a character moving from left to right](image)

2. In the Motion Puppet panel, select the Basic Walk preset from the Base Motion category.

   ![Image of Motion Puppet panel with Basic Walk preset selected](image)

3. Switch to the Slider Control tab.

   ![Image of Slider Control tab](image)

4. Start to preview (hotkey: Space bar) or record (hotkey: Alt + Space bar).

5. The character then starts to perform the preset motion in a loop. You may drag the Speed sliders to affect the motion in real-time. Because the Speed value decides the speed of the looping motion, you may use it to match the distance of the path.

   ![Image of character walking with different Speed values](image)

   One step by a lower Speed value.

   Two steps by a higher Speed value.
Masking Puppeteering and Multi-Layer Recording

Masking Puppeteering means to puppeteering individual body part by masking out the unwanted body parts of a Body Dummy. You may extract a specific body part motion from the presets in the base motion.

Masking Puppeteering

1. Select one of the presets in the Base Motion.

![Preset Selection](image1)

2. Make sure that you have switched to the Mask tab in order to show the body dummy.

![Mask Tab](image2)

3. Press the Space Bar to start previewing. (Or click the Preview button and press the Space bar)

![Preview Button](image3)

The complete base motion.
4. Deactivate the body parts of the **Body Dummy** in order to mask out the motions from these body parts. Ignore the legs motions.

5. Use the standard method to preview or record the character’s motion. Only the selected body parts will be puppeteered.

Only the motions of the upper body are recorded.

**Note:**

- Click the button to deselect all the body parts.
- Click the **Play** button on the play bar to view the puppeteering recording results.

---

**Multi-Layer Recording**

**Multi-layer Recording** is about recording character motions, layer by layer. It is helpful when you need to do mix-recording. This way, the character can generate thousands of motion combinations from a limited number of templates.

1. Follow the **Masking Puppeteering** procedure described earlier on this page, and record a motion of a specific body part.
2. Go to the time frame when the previous motion starts. Select another motion preset.

![Motion Presets]

3. Pick other body parts on the Body Dummy

![Body Dummy]

Select only the legs for recording their motions.

4. Puppeteer and record the motions of the un-masked body parts.

![Puppeteer]

5. Repeat to record motions of individual body parts (layer by layer). This way you may generate a whole new motion with your own puppeteering.

Note:

- If you do not select other body parts in Step 3, then the motions recorded in Step 1 will be overridden.
- Click the Play button on the play bar to view the puppeteering recording results.
Defining Custom Motions with the Parameter Sliders

Each category preset has adjustable parameters. These parameters decide the motion weights of specific body parts. With these parameters, even a single motion preset can create various motion styles.

Defining Custom Motions

1. Select a character.
2. Select a category and pick a preset.
3. Switch to the Preset tab. You will then see parameters sliders provided for this preset. Please refer to the Puppeteering Principles for Motion Puppet Panel section for more information.

4. Start to preview or record. The character will keep repeating the motion.

5. Drag the sliders during previewing or recording, to change the motion weights of the body parts.

Note:
- The number of parameters are different from preset to preset.
- Please note that if you are using the Mouse Control mode, then the parameters in the preset tab will all be disabled. You must adjust the values before previewing or recording.
Saving and Loading Body Puppet Profiles
When you are satisfied with the previewing or recording results, then you may save the settings into a file and load them onto another character.

- ![Button to create a custom body puppet profile](image)

- ![Button to load a pre-saved body puppet profile](image)

What is saved in a Body Puppet Profile?
- Exaggeration and Speed Values.
- Selected body parts from the Mask tab.
- All sliders and their motion weight settings from the Preset tab.
Puppeteering Principles for Body Puppet Panel

When you use the *Preset* mode on the **Body Puppet** panel, there are number of sliders that control how each body part performs during previewing or recording. The mapping methods are shown in the illustrations below. By adjusting these sliders, the presets can be mix-used for either male or female characters.

**Offset Sliders**
These sliders are mainly affecting the position or offset of each joint. They are useful for defining the basic appearance of a character with different slider status combinations. Furthermore, the motion templates can then be applied to male or female characters by simply adjusting the body part offsets.

![Image of Offset Sliders]

- **A. Head, chest and shoulder offsets**
- **B. Elbow positions**
- **C. Pelvis height**
- **D. Leg adjustments**

**Youth to Elderly**
- Basic idle motion
- Lean Forward
- Lower Hips
- Elbow Out
- Actor Changed

**Man to Woman**
- Male depressed motion
- Elbow In
- Hands Back
- Narrow Stance
- Toes In
- Actor Changed

**Woman to Man**
- Female idle motion
- Shoulders Down
- Upright More
- Wide Stance
- Toes Out
- Actor Changed
Motion Elasticity Sliders - Body Parts
These sliders define the stiffness or looseness of each joint in the body, which can affect body motions and personalities of characters.

A. Neck elasticity - affects head sway
B. Shoulders elasticity - affects arms sway
B. Elbows elasticity - affects forearms sways
C. Pelvis horizontal translation
C. Pelvis rotation
D. Step Distance

Happy to Depressed
Strut walk motion → Stiff Arms Swag, Stiff Elbow, Static Hips → Short Stride, Elbow In → Slouch

Motion Elasticity Sliders - Entire Body
These sliders can define the stiffness or looseness of entire body motions.

A. Entire body wiggles
B. Entire body elasticity
Sways Less → Sways More, Calm → Energetic
Using the Direct Puppet Panel

By using the **Direct Puppet** panel, you may puppeteer your characters and record the animation progress in real-time with the motion editing controls. **iClone** also incorporates a comprehensive new IK engine that allows you to pin body parts to certain locations, while allowing you to move characters naturally or use **iClone** to animate the rest of the body for you.

**Direct Puppet - Basic Concept**

The basic concepts and recommended steps for direct-puppeteering are followed below:

1. Select any one of the effector points from the dummy pane.

2. At the right side of the panel, choose one of the radio buttons in the **Puppet** section. The buttons in the **Move** group are for moving the selected effector points; the ones in the **Rotate** group are for rotating the selected effector points.
3. Click the **Preview** button and press the space bar to hover your mouse cursor and preview the motion pattern (Shortcut: Space bar).

4. If some other effector points are triggered to move during preview, which is not what you want, then select the effector points and activate the **Lock Move** or **Lock Rotate** boxes; the effector points will be locked from being moved or rotated.

5. Repeat Step 1 to 3. The locked body part will not be triggered to move.

6. If you are satisfied with the preview results, then click the **Record** button and press the **Space Bar** to start recording (Shortcut: Ctrl + Enter). You may repeat the steps described above and apply to other effector points for multi-layer recording.

**Note:**
- Click the **Play** button on the play bar, in order to view your recording results.
Introducing the Direct Puppet Panel

1. Dummy Pane
Select one of the effector points for puppeteering.

- A selected effector point. You may use it to lock the corresponding body part or puppeteer the effector point to produce movements for the corresponding body part.
- A free effector point. Auto-update the location and orientation of the corresponding body part when you are puppeteering another body part.
- A move-locked effector point. It causes the corresponding body part not to move when you are puppeteering another body part.
- A rotate-locked effector point. It causes the corresponding body part not to rotate when you are puppeteering another body part.
- A locked effector point. It causes the corresponding body part not to move nor rotate when you are puppeteering another body part.
- A quick lock. Use it to quickly lock or unlock the T and R (←→) of the corresponding body part.

Please refer to the Locking Bones section for more information.

2. Preview (Space bar)
Click this button and then press the **Space bar** to preview the motions triggered by your input device (Mouse by default).

3. Record (Ctrl + Enter)
Click this button and then press **Space bar** to start recording a motion clip. When you move your mouse during recording, the results will be captured as a clip and stored into the **Motion** track.

4. IK Settings
- Enable the **Mirror** option so that you can simultaneously adjust the effector points of both limbs.
- Enable the **Realistic Shoulder** option so that when you move the character’s elbows or hands higher than the shoulders, the shoulders will raise automatically.
- Select either/both boxes in the **Pinning** section to lock either the **Move** and/or **Rotate** values of any particular effector point.
- Please refer to the Locking Bones section for more information.

5. Triggering Methods
Switch tabs to define a triggering method for character motions.

Please refer to the Direct Puppeteering - Move and Direct Puppeteering - Rotate sections for more information.
Locking Bones
When you are moving a specific body part with an effector point in the dummy pane, you may find that the chain-reaction happens to other body parts. This is because these body parts are connected to each other with virtual bones.

Although you may not break the bones, you may lock some effector points from the dummy pane so that when you are moving or rotating another body part, this locked one will try not to be moved or rotated.

Lock Move
If you use the Lock Move, then the corresponding body part will be pinned to where it is. So that when you move another body part, it still remains.

1. Apply a character with a start pose. You may need the left hand and foot to be pinned when you move another body part.

2. In the dummy pane, select the left hand and foot effector points and activate the Lock Move (Direct Puppet panel) or the Pinning Move (Edit Motion Layer panel) box.

3. Select another effector point.

You may also right click on one of the effector points to quickly switch its status.
4. Move the corresponding body part of the effector point. The locked left hand will stay where it is.

This is what you see if the orientation of the head is not locked.

**Lock Rotate**

When an effector point is moved, and you do not want another specific body part to rotate itself, then you can use the **Lock Rotate** feature.

1. Apply a character with a start pose. You may need to lock the head orientation when you move another body part.

2. In the dummy pane, select the head effector point and activate the **Lock Rotate** (Direct Puppet panel) or the **Pinning Rotate** (Edit Motion Layer panel) box.

You may also right click on one of the effector points to quickly switch its status.

3. Select another effector point.
4. Move the corresponding body part of the effector point. The head tries to keep at the original angle.

This is what you see if the rotation of the head is not locked.

**Realistic Shoulder**

If you want to produce a motion layer key or a puppeteering a motion with the hands raised up high, then you need to activate this box. It ensures you with optimized results.

![Realistic Shoulder Off](image1)

![Realistic Shoulder On](image2)

However, when you lower arms down, the shoulders may shrug. Please [set motion layer key](#) to fix them back to normal.

![Shoulder shrugs](image3)

**Note:**

- Please note that if you select any effector point that is T, R, or TR, then you can still move, rotate or even puppet it because your control has higher priority than the locks or pins.
- Only in the [Edit Motion Layer](#) panel can you select multiple effector points by holding your Ctrl key and clicking on the desired effector point.
- The multi-selected effector points can then be locked or pinned at the same time.
Direct Puppeteering - Move

In the Puppet section of the Direct Puppet panel, you can find the Move group with 3 radio buttons. You may select one of the buttons to decide the way you wish to puppet the selected body part.

Screen-based Movement

This is a way to puppet a body part on the plane of the screen. Take note that the angle of the camera does affect the puppeteering result. This is the freest puppeteering mode available; however, the body part may sometimes penetrate the body.
Horizontal Movement and Vertical Movement

The **Horizontal Movement** is suitable for puppeteering body parts along the horizontal plane, such as a table, while the **Vertical Movement** is for body parts to move along the vertical plane, such as a wall.

When you want to use these two modes for wiping on a surface, remember to activate the **Lock Rotate** of the hand so that it does not rotate, as this auto-triggered by the forearm bones.

Use **Horizontal Movement** to puppeteer the left hand.

The hand can only be puppeteered on the horizontal plane.

Use **Vertical Movement** to puppeteer the right hand.

The hand can only move along the vertical plane. It is highly suggested that you rotate the camera so that the camera viewing plane is parallel to the wall.

Note:

When you are previewing or recording, you may press 1, 2, or 3 to switch to another move mode.
Direct Puppeteering - Rotate

In the Puppet section of the Direct Puppet panel, you can find the Rotate group with 3 radio buttons. You may select one of the buttons to decide the way you wish to puppet the selected body part.

- Screen-based (4)
- Primary (5)
- Secondary (6)

Screen-based Rotation

This is a way to rotate a body part on the plane of the screen. Take note that the angle of the camera affects the puppeteering result. This is the freest puppeteering mode available.

The camera viewing plane.

The screen-based puppeteering result.

Rotate the camera viewing plane.

The screen-based puppeteering result changes.
Primary Rotation

Primary Rotation is a character-based rotating method, which has the body part rotate in the same often rotating pattern. It takes less energy to do such a movement and it is more frequent in human motion, so it is put as the primary mode.

Hover your cursor left and right. Hover your cursor up and down.

Basically, when you move your mouse left and right, the Primary Rotation mode rotates the bone around its long axis.

However, there are some body parts that have different primary rotate directions.

Secondary Rotation

The Secondary Rotation rotates the body part around its less used rotation pattern. When you move your cursor up and down, the rotation is identical to the Primary Rotation mode; however, as you move your cursor left and right, the body part rotates in a rare rotation direction.

Move your cursor left and right; the rotate direction is different, which is an uncommon rotation pattern.

Move your cursor up and down to have the same results as with the Primary Rotation mode.

Note:

When you are previewing or recording, you may press 4, 5, or 6 to switch to another rotate mode.
Multi-Layer Recording

The **Direct Puppet** allows you to record body motions layer by layer. You may then separately record motions for different body parts and the outcome is a combination of motions you have designed. This method is suitable for generating a brand new motion from scratch.

**Multi-Layer Recording**

1. Apply a character. Initially, it is still with only an idle pose.

2. Open the **Direct Puppet** panel.
3. Go to the time frame where you want to start producing your custom motion.
4. Puppet and record a motion for one specific body part. Please refer to the [Using the Direct Puppet Panel](#) section for more information about recording body part motions at once.

5. Toggle the **Screen-based Movement** mode and record the hip panning to the left motion.
6. Go to the same start frame again and repeat the last step for other body parts.

7. Toggle the **Screen-based Movement** mode and record the leg stepping aside motion.
8. You may optionally rotate the camera to another view to puppeteering another body part.

9. Toggle the **Screen-based Movement** mode and record the hand stretching up motion.
7. Follow the same method to repeat puppeteering and recording with other body parts.

Toggle the **Primary-Rotation** mode and record the waist rotating motion.

**Note:**
- If you are not satisfied with a motion outcome of a certain body part, then you may individually remove the motion and record again. Please refer to the *Removing Motions of Body Parts* for more information.
- Click the **Play** button on the play bar to view the puppeteering recording results.
Puppeteering with an Existing Motion or Pose

Once you have created or applied a motion or pose to a character then you may need to amend some body motions or start acting with the pose in order to generate a whole new motion. For this you can use the puppetteering methods.

Preparing Motion or Start Pose for a Character

Motion

If you want to start puppetteering with underlying motions, you may need to apply or create a motion for the character first. The methods are:

- Apply one of the G5 (generation 5) motion templates from the Content Manager >> Animation tab >> 01 ~ 05 libraries.
- Use the Motion Puppet Panel.
- Use the Direct Puppet Panel.
Start Pose
If you want to puppeteering a character with a start pose, then you may either:

- Apply one of the G5 (generation 5) pose templates from the Content Manager >> Animation tab >> Motion >> 00_Pose library.

- Create a custom start pose by Creating and Saving a Unique Pose.

Puppeteering with a Motion or a Pose
1. Select the character that has an applied motion or pose.

2. Use the Masking Puppeteering and Multi-Layer Recording in the Motion Puppet panel, or the Multi-Layer Recording in the Direct Puppet panel to puppet and record the motion for the static body part.

Note:
- After puppeteering, the original motion of the body part will be replaced with the puppeteered motion.
- If the underlying motion has intense movements, and you want to puppet and rotate a specific body part, then it is highly suggested that you use the Primary Rotation or Secondary Rotation modes in the Direct Puppeteering - Rotate method.
Puppet to Timeline Clip - How It Works

Due to its original design, iClone 5 uses the Motion Puppet to produce new motions and the Direct Puppet to modify existing motions, or add new motions; thus we have different approaches to handling motion clips in the timeline.

Puppeteering to Create a New Motion Clip without Existing Motions in Place
If you use the Motion Puppet or Direct Puppet panels to produce and record new body motions for a character, then the results are stored in a clip form in the main Motion track.

Overlapping Puppet Motion to an Existing Motion Clip

Start from the Same Frame
If you produce a new puppeteering clip from the same starting frame as the previous clip, then the new motion will be blended into the previous motion. Therefore, only one blended clip (with two different motion types) will be left in the track.

Start from the Middle of the Previous Clip
If you puppet and record a new clip from the middle frame of the previous clip, then you will produce two clips in the track. You may drag to move both clips, or do further editing to them.
Introducing the Edit Motion Layer Panel (New for V7.1)

1. IK / FK Tabs
   Click the tabs to switch to IK or FK modes for editing bones.

2. Dummy Pane
   Select one of the effector points to offset the corresponding bones.
   Icons:
   - A selected effector point. You may use it to lock the corresponding body part or move the effector point to offset the corresponding body part.
   - A free effector point. Auto-update the location and orientation of the corresponding body part when you are editing another body part.
   - A move-locked effector point. It causes the corresponding body part not to move when you are editing another body part.
   - A rotate-locked effector point. It causes the corresponding body part not to rotate when you are editing another body part.
   - A locked effector point. It causes the corresponding body part not to move nor rotate when you are editing another body part.
   - A quick lock. Use it to quickly lock or unlock the T and R (→TR) of the corresponding body part.
   Please refer to the Locking Bones section for more information.

3. Editing Extend Bones
   The bone or bones that are applied with spring effects can be manually animated by clicking this button when the spring effects are turned off.

4. Default / Reset Pose / Set as Default
   Click these two buttons to retrieve the base pose. Please refer to the Setting Default Keys and Resetting Motion Layer Keys section for more information.

5. Bone Displaying Methods
   Activate the Bone Edit Mode box to show the bones or the bounding boxes for each body parts, which facilitates the picking of the parts.
Bone Edit Mode: Off.

Click the Bone Settings button to adjust the appearance of the bones. (Please note that you may activate Affect to all bones to change the appearance of all the bones.)

- **Bone Size**: Adjust the bone size for more easier picking or to avoid obstructing the character.
- **Activate Affect to all bones**: box so that the adjustments in this panel affect all bones instead of a single one.
- **Display Settings**: Determine the color and opacity of the bone(s).

6. **IK Settings**

When you are editing an effector point, the status of other effector points can be defined in this section. Please refer to the sections below for more information:

- **Using the Edit Motion Layer Panel**
- **Locking Bones**

7. **Adjusting Fingers**

Use the palm dummies to set hand gestures for the selected character.

8. **Bake Constraint**

Click this button to create a new motion layer key by baking the constraint keys, which is especially useful for preserving the Reach key.
### Producing a Custom Pose or a Key-frame Motion

Key-frame animation is a traditional method for creating motions for a character. It involves setting different keys at different time frames and creating a transition between them. The interpolation between two keys, which is also called "transition," will also be auto-produced. It is time consuming and the animation may need to be fine-tuned, repeatedly.

#### Producing a Custom Pose

1. Select a character.

![Custom Pose Image]

2. Click the **Edit Motion Layer** button under the **Animation** tab of the **Modify** panel.

3. Set a motion key by editing the effector points in the dummy pane. Please refer to the [Using the Edit Motion Layer Panel](#) section for more information.

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#### Producing a Key-frame Motion

When you are familiar with the usage of setting one motion layer key in a certain time frame, then you can go to another time frame to set more motion layer keys, which can produce so-called key-frame motions. The transition between two keys will be auto-generated by iClone.

1. Set a pose in a time frame.

![Key-frame Motion Image]
2. Go to another time frame and set again another motion layer key.

Setting another motion layer key. The motion layer keys in the tracks.

3. The in-between animation is automatically generated.

Key-frame animation is auto-generated.

4. You are able to right-click on the keys in the Motion Layer main track and select a transition curve to vary the transition speed between two adjacent motion layer keys.

The Ease In curve is applied.

5. Optionally, you may right-click on the later key in the sub-track under the Motion Layer main track, and select a transition curve to vary the transition speed between two adjacent keys. This is very useful if you want each body part to move in a non-synchronized way.
Layering Motion Keys to Existing Motions

Once you apply a motion clip to an actor, then you may want to fine tune the offset (position) for each bone. This can be done via the **Edit Motion Layer** feature. The pose with the edited bones will be kept as a key in the **Motion Layer** track, and its effect will remain throughout the clip unless another key is set. The transition between the two motion layer keys will then auto-generate.

**Making an Absolute Motion Layer Key**

An absolute motion layer key is for setting a motion layer key that takes charge in the angle of a specific bone, and ignores the effects of the underlying motion.

In **iClone 5**, setting absolute keys has been replaced with a combination of 1. **Removing Motions of Body Parts** and 2. **Adding Motion Layer Keys** by the **Edit Motion Layer** panel.

**Making a Relative Motion Layer Key**

If you want to set a relative motion key, also known as a relative key, so that the effect of the key blends into the underlying motion, then follow the steps below:

1. Select a character that already has an applied motion.

2. Click the **Edit Motion Layer** button under the **Motion** tab of the **Modify** panel.

3. Move to the specific time where you want to overlay the offset key in the clip.

4. Select and adjust the effector points you wish to edit with the **Position** or **Rotation** tools. The key will automatically be added into the **Motion Layer** track and be blended in the pose of the motion in the **Motion** track. Please refer to the **Using the Edit Motion Layer Panel** section for more information.

Adding a motion layer key for offsetting bones. The motion layer keys affect the motion clip.
Setting Default Keys and Resetting Motion Layer Keys

In the Edit Motion Layer panel, there are two buttons under the dummy pane. They can be used for retrieving poses, but they can also have different results for individual purposes.

What is the Default Pose in iClone?

Our definition of a Default Pose in iClone indicates the default personality reflecting the nature of the character. You can see it as the Default Pose when first loading the character. It is also the initial pose for the idle motion loop of a character’s persona (e.g. the first frame for idle motion); usually it is used to connect all motion loops.

The Default Pose of the embedded G5 (generation 5) male - Chuck.

The Default Pose of the embedded G5 (generation 5) female - Gwynn.

Note:

Please note that the Default Pose is different from the T pose or Y pose (as shown in the illustration below) that other traditional 3D editing tools usually use. If you want to use these poses, then you can find them in the Motion >> 00_Pose library under the Animation tab of the Content Manager.
Setting Default Keys (Reset Pose Key)

When you use the Edit Motion Layer panel to modify the pose of the character, you may find it hard to initialize the character to its original pose. By clicking the Default button, you can add a motion layer key that rectifies all the offsets and has the character stand straight in the default pose. In addition to that, if you click the Animation >> Reset Whole Scene command from the main menu bar or right-click on the character and select Remove Object Animation, then the character will stay in the current pose. Use the Default feature so that you can have the character stand back to the default pose again.

1. Select a character with a motion or any pose.

2. Click the Animation >> Remove Object Animation command from the main menu bar, or right-click on the character, then select Remove Object Animation from the right-click menu.

3. The character's default pose will be replaced by the current pose.

4. Click the Default button in the Edit Motion Layer panel.

5. You can click this button at any time frame to retrieve the default pose. A motion layer key will be automatically added into the Motion layer track and its sub-tracks.
Resetting Motion Layer Keys

This feature is designed especially for the Motion Layer track. Press the button to add a pose key to counteract the Motion Layer effect of the previous key.

When you are modifying the pose via the Edit Motion Layer panel and are not satisfied with the results, then you may also click this button to neutralize the data in the key and start all over again.

1. Select a character that already has an applied motion.

2. Go to the desired frame, set one Motion Layer key to tune the bone offsets for the Perform motion.

3. If you are not satisfied with the result then you may want to reset all the offsets:
   - Delete this key and add a new key again.
   - Click the Reset button in the Edit Motion Layer panel.

   The Reset button actually adds a motion layer key that gives the priority back to the underlying motion clip.

4. Go to another frame. Click the Reset button again. The transition motion between the keys will auto-generate.
Creating Custom Default Pose

The Default Pose for CC Characters are set, by default, to a T pose. However, if you want their default pose to be different then you can designate a custom default pose to the CC Characters. Nevertheless, you can change the default poses for the G5 and G6 characters as well.

The Default Pose of the embedded CC male - Christian.

The Default Pose of the embedded CC female - Natalie.

Creating Custom Default Pose

1. Select a character (in this case, a CC Character from iClone Character Creator with T pose only).

2. Click the Animation >> Edit Motion Layer command from the main menu bar.

3. Adjust the pose of the character with the controls in the panel.
4. Click the **Set as Default** button in the panel.

5. Exit the panel.

6. Add this character to the **Custom** library.

7. Each time you apply this new character, the default pose will be the one you designed in the previous steps.
Fixing G3 Motions for G5 Character

G3 (generation 3) motions are designed and suitable for G3 (generation 3) or earlier iClone characters. However, you can still use them for characters in iClone 5 (G5 character) but you need to do some small adjustments.

Using Edit Motion Layer Panel to Fine-tune G3 Motions

1. Prepare a project and add a G5 character.

2. Apply any G3 motions to it. You may then find visual artifacts in the character.

Artifacts of the G3 Motion

- Shrugging shoulders
- Stiff arms
- Leaning forward
- Bending knees
- Stiff neck

Fixing with the Edit Motion Layer Panel

1. Click the Edit Motion Layer button under the Motion tab of the Modify Panel.

2. Select the Pelvis effector point. Move it up to straighten the knees.

Move up the pelvis to straighten the knees.

3. Select the Chest effector point. Drag it back to straighten up the upper body.

Drag the chest backwards to straighten up the upper torso.

4. Select the Head effector point. Push the head forward and rotate it to have the character look straight forward with a loose neck.
Push the head out and rotate to raise the head.

5. Select the **Shoulder** effector points. Move them down and rotate to open them.

Move and rotate the shoulders to loosen the stiffness.

6. Select the **Elbow** effector points. Rotate them to make the character’s arms less stiff.

Push the elbows back and rotate them to loosen the arms.

7. Drag down on the **Palm** effector points so that the palms close a bit.

Drag down the palm effector points to loosen the hands.

The fine-tuned G3 motion result is shown in illustration below:
**Locking Bones**

When you are moving a specific body part with an effector point in the dummy pane, you may find that the chain-reaction happens to other body parts. This is because these body parts are connected to each other with virtual bones. Although you may not break the bones, you may lock some effector points from the dummy pane so that when you are moving or rotating another body part, this locked one will try not to be moved or rotated.

**Lock Move**

If you use the Lock Move, then the corresponding body part will be pinned to where it is. So that when you move another body part, it still remains.

1. Apply a character with a start pose. You may need the left hand and foot to be pinned when you move another body part.

2. In the dummy pane, select the left hand and foot effector points and activate the Lock Move (Direct Puppet panel) or the Pinning Move (Edit Motion Layer panel) box.

3. Select another effector point.
4. Move the corresponding body part of the effector point. The locked left hand will stay where it is.

![Image showing the locked left hand](image1.png)

This is what you see if the orientation of the head is not locked.

**Lock Rotate**

When an effector point is moved, and you do not want another specific body part to rotate itself, then you can use the **Lock Rotate** feature.

1. Apply a character with a start pose. You may need to lock the head orientation when you move another body part.

![Image showing a character with a start pose](image2.png)

2. In the dummy pane, select the head effector point and activate the **Lock Rotate** (Direct Puppet panel) or the **Pinning Rotate** (Edit Motion Layer panel) box.

![Direct Puppet Panel with Lock Rotate](image3.png)

![Edit Motion Layer Panel with Pinning Rotate](image4.png)

You may also right click on one of the effector points to quickly switch its status.

![Image showing right-click options](image5.png)

3. Select another effector point.
4. Move the corresponding body part of the effector point. The head tries to keep at the original angle.

This is what you see if the rotation of the head is not locked.

**Realistic Shoulder**

If you want to produce a motion layer key or a puppeteering a motion with the hands raised up high, then you need to activate this box. It ensures you with optimized results.

However, when you lower arms down, the shoulders may shrug. Please set motion layer key to fix them back to normal.

**Shoulder shrugs.**

**Note:**

- Please note that if you select any effector point that is **T**, **R**, or **TR**, then you can still move, rotate or even puppet it because your control has higher priority than the locks or pins.
- Only in the **Edit Motion Layer** panel can you select multiple effector points by holding your Ctrl key and clicking on the desired effector point.

**Multi-selected effector point**

- The multi-selected effector points can then be locked or pinned at the same time.
Animating Hand Gestures

Hand gestures can be created within minutes, no matter if you need to hold a fist or create a gesture with fingers.

1. Import a character into the scene.

2. Click the Edit Motion Layer button under the Motion tab of the Modify Panel.

3. The Edit Motion Layer window appears for you to control.

4. Focus to the character’s hand effector point and rotate the wrist.

5. You may also curl all the fingers all at once by dragging the palm control.

6. Press and drag the dummy’s dark grey part of the fingers to set gestures.
Fine Tuning the Actor with IK, FK
This section covers how to fine tune the actor with IK (Inverse Kinematics) and FK (Forward Kinematics).

What is IK/FK
How to Use IK
How to Use FK
What is IK/FK

What is IK

IK, Inverse Kinematics, refers to a process utilized in 3D computer graphic animation. In this process, the parameters of each articulation, in a jointed flexible object (a kinematic chain), will be automatically calculated to achieve a desired pose, especially when the end point moves.

Basically speaking, IK is how the child node, as it moves, affects all the parents’ position and orientation values.

What is FK

FK, Forward Kinematics, is how the positions of particular parts of a model at a specified time are calculated from the position and orientation, together with any information on them, of an articulated model.

To sum up, FK refers to the effect on the child nodes as the parent moves or rotates.
How to Use IK

If you want to utilize IK to animate your actor, please follow the steps below:

1. Select the target actor.
2. Click the Edit Motion Layer button under the Animation tab of the Modify panel.
3. Change to the tool in the general toolbar.
4. In the Edit Motion Layer panel, pick the hand effector point.
5. Drag your mouse in the 3D viewer; the right arm thus moves along with your cursor in the 3D scene. To precisely move the target node in the 3D scene from a 2D mouse movement, please make your target body parts face right to the camera.

Note:
The blue box shows the start bone of the IK chain, which means the parent of the start bone will be fixed to prevent from moving, so only from the Blue Box to the Yellow Box will move.
How to Use FK (New for V7.1)

If you want to utilize FK to animate your actor, please follow the steps below:

1. Select the target actor.

2. Click the Edit Motion Layer button under the Animation tab of the Modify panel.

3. Click the FK Mode tab.
4. In the dummy panes (of character and palms), pick any body or finger bone for editing.
5. Drag the gizmo in the 3D viewport.
6. You can also enter numbers in the XYZ fields to set precise angles.

You can then use the FK method to set the rotation for all bones to generate a custom pose.
IK, FK for Actors or Extend Bones
If you have actors applied in iClone, you may use IK and FK to adjust the poses and generate motions. Furthermore, the extended bones (with spring effects off) of a standard or non-standard actor can also be adjusted by means of the IK, FK methods in this section.

Launching Panels
According to the type of the object you select, the panels for editing with IK/FK methods are a little bit different. You need to launch the Edit Extend Motion Layer panel:

- **Standard and Non-Standard Actor Modify Panel**: Modify Panel >> Animation tab >> Edit Motion Layer button >> Edit button.

- **Non-Human Actor Modify panel**: Animation tab >> Edit Motion Layer button.

At the top-right corner, you may see the Bone Edit Mode box and the Bone Settings button.
- **Bone Edit Mode**: Activate to view the bone structure of the object for accurately picking the part of the object. Deactivate it to view in bounding box mode.

- **Bone Settings**: Click on the wrench button to show the Bone Settings panel.

- **Bone Size**: Adjust the bone size for adequate picking or to get a better view of your character's material/mesh.
- **Affect to all bones**: Activate the Affect to all bones box to ensure that the changes affect all the bones and not just the selected one(s).
- **Display Settings**: Determine the color and opacity of the bone(s).

### FK Method

1. Select an actor and launch the panels as described in the previous section.
2. Select the Rotate tool in the general toolbar.
3. Pick a bone in the 3D viewer. Alternatively, you may pick a bone by clicking on the node in the tree view in the Edit Motion Layer panel.
4. Use the rotate gizmo to rotate the selected bone.

Click on the actor to pick the bone. Click bone in the panel.

Please refer to the What is IK/FK and How to Use FK sections for more information about FK.
**IK Method**
Since IK relates to a chain of nodes, then it is necessary to anchor the head of the chain in order to move the end node with the IK method.

1. Select an actor and launch the panels as described in the previous section.
2. Select the Move tool in the general toolbar.
3. Hold down the Ctrl key and click on a node to define it as the start of the IK chain. It will then be marked with a blue box.
4. Pick another node to be the end node of the chain. (Ctrl key released)

![Ctrl-click to anchor the start of the IK chain.](image1.png)  ![Click another bone as the end of the IK chain.](image2.png)

5. Use the move gizmo to move the selected bone and affect the entire IK chain.

Please refer to the What is IK/FK and How to Use IK sections for more information about IK.
Using the Reach Target Panel

In stead of setting several Motion Layer keys to reach a character's head, hands or feet or a target object, you may use a Reach Target key to easily accomplish this animation.

Setting Reach Target Keys
1. Apply a character and a target object (such as a prop).

2. Move to another time frame where you wish the character to point at the target object.

3. Pick the character, click the Reach Target button under the Animation tab of the Modify panel to access the Reach Target panel.

4. Select the right hand effector point from the left dummy pane.
5. Click the **Pick Target** button, and then pick any object on the 3D preview window to specify the target. The right hand effector point will turn from ![0](image) to ![0](image), which indicates that the corresponding body part is pointing at an object.

![Image of character reaching out right hand to target]

The character reaches out the right hand and points at the prop.

Note:

Please note that the body part of the character only points at the target after this step.

6. Optionally change the hand gesture so that the character really looks like it is pointing at the target.

![Image of character with right hand gesture changed]

7. Move to another forward time frame. Select the same effector point and then click the **Release** button.

8. The character then stops pointing at the target.

![Image of character with right hand down]

The character gradually puts down his right hand.

Note:

- After releasing the target, you may then have the character point at another object.
- If you set **Reach Target** keys to the **Pelvis** or **Chest** effector points, then they will instantly snap to the target's pivot. You can drag them back where they are by Keeping the Original Poses or Motions to the effector points of the limbs.

![Image of character releasing target and adjusting pose]

- Please refer to the following sections for more information:
  - Character Contacting with Targets
Transition Keys
In case reaching and releasing keys cause body parts to act abruptly, these two kinds of keys contain transition durations. You may then adjust the duration so that the reacting time can be prolonged or shortened. In addition to that, you may use the transition keys to avoid body parts from twisting when they are pointing or contacting with targets.

- **A** - Reach Target key and Release key.
- **B** - Transition Start key and Transition End key.

If the durations are prolonged, then the reaching or releasing motions will be slower.

Note:

Transition Keys will only appear when the Path or Release keys are selected.

Drag the transition keys away from the Reach Target and Release keys. The motions are slower.

On the contrary, the motion will be quick and sudden.

Drag the Transition keys close to the Reach Target and Release keys. The motions are quicker.
Introducing the Reach Target Panel

1. Dummy Pane  Select one of the effector points to reach the corresponding bone to a specific target object. Icons:
   - A selected effector point. You may use it to set or release reach keys of corresponding body parts.
   - A free effector point. Its corresponding bone will be driven to move by the motions of the other bones.
   - A reaching effector point. It causes the corresponding body part to contact with a target object.
   - A motion-compelling effector point. It causes the corresponding body part to act its original pose or motions.

2. Target Setting  Use the controls in this section to set keys to change an effector point to a different status. Please refer to the sections below for more information:
   - Using the Reach Target Panel
   - Character Contacting with Targets
   - Keeping Original Poses or Motions
Character Contacting with Targets

In the Using the Reach Target Panel section, you learned how to have the character point at a certain target. In addition to this, the Reach Target feature also allows you to have the character contact with the target.

Reach Mode - Reach Object

1. Apply a character and a target object, in this case the coffee cup.

2. Have the character's right hand point at the coffee cup. Please refer to the Using the Reach Target Panel section for more information.

3. If you wish the hand to contact with the cup, then press the Reach to... button to open the Reach to Sub-Node panel.

4. Activate the Reach Object box under the Reach Mode group so that the hand will be snapped and aligned to the pivot of the coffee cup.
Reach Mode - Rotation

If the reached target has or will have motion or animation, especially Rotation, then you may find that the body parts that only contact with the target will be penetrated by the target when the target rotates. By activating the Rotation box in Reach Mode, the body parts will not only touch the target but also follow the orientation of the target.

1. Apply a character and have the character’s right hand reach out and touch (Reach Object activated) the target prop.

   - The hand reaches towards the prop.
   - The fingers are adjusted with the Edit Motion Layer panel.

2. Rotate the prop.

   - The prop rotates.
   - The hand does not rotate, which causes the prop to go through the fingers.

3. In the Reach to Sub-Node panel, activate the Rotation box for the hand.

4. Rotate the prop again.

   - The hand rotates along with the prop.
Keeping Original Poses or Motions

Because the bones of a character are all connected, when a body part is forced to contact with an object then the others will also be driven to move, which can destroy the original pose or motions that you created. iClone provides the Lock to Original feature to pin body parts in order to maintain their original poses or motions.

1. Apply a character with a start pose (or a motion) and a target object (in this case, the king on the chessboard).

2. Have the character’s right hand touch the king (Please refer to the Character Contacting with Targets section for more information). All body parts are driven to move because of the Reach Object mode.

- The right hand touches the king (which means that its corresponding body part sticks to the target).
- The left hand and legs penetrate each other.
- The hip moves and sinks into the box.
- The left leg goes through the supporter.

3. To keep the pose, select one of the effector points in the dummy pane (multi-selection is not allowed). Click the Lock to Original button.

- The hip moves back to its original position.
4. Because the left hand is still driven by the effect of the right hand. Select the left hand effector point and click the **Lock to Original** button again.

- The left hand is placed back on the right calf.

5. Because the pelvis effector point is already locked to the original pose, you may optionally lock the feet to their original pose; however the changes will not be obvious.

- The original pose or motion is kept.
Using Embedded Reach Effectors

In iClone version 7.0 or earlier version, to have a body part to reach to and be controlled by a dummy takes complicated steps. However, after version 7.1, the steps are simplified into one single button. All you need to do is to select one or more body parts and then click the Reach Effector button and then you can modify the characters motion with the effectors.

Please refer to the sections below for more information:

- Creating Body Motions with Effectors [New for v7.1]
- Fixing Motions with Effectors [New for v7.1]
Creating Body Motions with Effectors (New for v7.1)

By using the Reach Effector feature, you can use the effectors to control characters and their motions.

1. Apply a character and a prop.

2. Make sure the character is selected, open the Reach panel and select both hands (hold the Ctrl key for multiple selecting).

3. Click the Reach Effector button. The effector of the hands show and the hands automatically reach to them.
4. Select and adjust the transformation data of the effectors to desired positions around the prop.

5. Adjust the body parts with the **Edit Motion Layer** panel.

6. Attach the effectors to the prop ax.

7. Select the prop of the effectors (in this case, the ax) and set transform keys to animate the prop. You may also use the **Prop Puppet** panel to quickly animate the prop (the effectors are hidden in the illustration).
Fixing Motions with Effectors (New for v7.1)

After you apply a motion to the character by use of Motion Puppet Direct Puppet or even by Motion Capturing, the motions could be raw and sometimes contain jiggling issues in some body parts. By using the Reach Effector feature, you can pin the body parts so that they stop popping.

1. Apply a character and a motion.

2. You probably see that the feet are sliding when the character acts.

3. Open the Reach panel, and with the Ctrl key pressed and hold, select the target body parts (in this case, the both ankles).
4. Click the **Reach Effector** button and you will see two **Reach** keys on the feet tracks on the **Timeline** are added.

![Timeline Image]

5. The corresponding effectors will show and the body parts will reach to the effectors automatically.

![Feet Image]

6. The feet are pinned to the dummies and will not slide anymore.
Creating Body Motions

By using the **Reach Target** keys and **Dummy Props**, you may use props to control characters and their motions.

1. Apply a character and a paddle prop.

2. Attach two primitive props (the lower the polygon the better) to the paddle to be the targets of both hands. **Set them as dummy**.

3. Set the two hands to reach to the dummies, and also **activate** the **Reach Object** and **Rotation** modes (You might sometimes encounter flipping issues in the body parts).

4. **Rotate the pivot** of the dummies so that the hands rotate in the correct direction.

5. **Adjust the body parts** by using the **Edit Motion Layer** panel.

6. Select the parent prop of the dummies (in this case, the paddle) and set transform keys to animate the prop. You may also **use the Prop Puppet** panel to quickly animate the paddle.

Manually set transform keys to the paddle (left illustration) or use the **Prop Puppet** panel to add keys to the paddle (right illustration).
Fixing Motions

After you apply a motion to the character by use of Motion Puppet or Direct Puppet, the motion could be raw and sometimes contain jiggling issues in some body parts. By using the Reach Target keys and Dummy Props, you can pin the body parts so that they stop popping.

1. Apply a character and a motion.

2. You probably see that the feet are sliding when the character acts.

3. Apply two primitive props (the lower the polygon the better) to the feet of the character. Set them as dummy.

4. Set the two feet to reach the dummies, and also activate the Reach Object mode.

5. The feet are pinned to the dummies and will not slide anymore.
Baking Reach Keys to Pose (New for v7.1)

When you use the Reach Effector feature, especially the one for the hip, you will encounter an issue when the hip effector is rotated and you want to use the IK mode in the Edit Motion Layer panel to adjust the character's pose.

**Issue**

- The character's hip is set to reach to an effector and the effector is rotated.

- Use the IK mode (Edit Motion Layer panel) to edit the pose of the character. The direction is totally incorrect when you use the Move or Rotate tools to adjust the bones.
**Baking Reach Keys to Pose**

In order to solve the issue, you need to bake the reach keys to the character to complement the changes in the orientation caused by the Reach feature.

1. Select the character.
2. Go to the time frame for setting a new pose key with Edit Motion Layer panel when the character is still under the influence of the Reach key.

3. Open the Edit Motion Layer panel. Click the Bake Reach Key button.

4. Switch to the IK mode and start to adjust the bones.
The Basic Workflow from the Kinect Depth Camera to iClone

iClone offers the most affordable and intuitive motion capturing solution in the industry. Now you can use your body to control virtual actors, in real-time, with motion smoothing optimizations. Speed up your animations and create realistic-looking motions quickly, by literally controlling actors with your own body movements.

**Flow chart for motion data capture**

A. **Microsoft’s Kinect Sensor**: Captures and passes human body motion data to the mocap device plug-in.
   - Make sure that the power supply of the sensor has been plugged in properly.
   - Make sure that the sensor has been plugged in properly.
   - Successfully install your Kinect Sensor on your Windows PC.
   - To purchase a Microsoft Kinect Sensor, please visit: Where to Buy.
   - The sensors compatible with iClone motion-capture are:

   ![Kinect for Xbox 360](image)
   ![Kinect for Xbox One](image)

B. **Mocap Device Plug-ins** (standalone): Receives motion data and passes the data to the mocap device console.

C. **Mocap Device Console** in iClone: Receives motion data and applies it to a virtual character.

Please follow the two main steps in order to connect your Microsoft Kinect Sensor to iClone.
A. Get the Depth Camera Ready

1. Start the Mocap Device Plug-in. For more information on how to install the Mocap Device Plug-in, please refer to the Installing Mocap Device (Kinect for Xbox 360) and Corresponding Plug-in and Installing Mocap Device (Kinect for Xbox One) and Corresponding Plug-in sections.

![Mocap Device Plug-in - Xbox 360 for Kinect for Xbox 360](image1)

![Mocap Device Plug-in - Xbox One for Kinect for Xbox One](image2)

2. Click the Connect buttons to start receiving data from the depth camera.


![Basic H pose](image3)

![Recommended H pose - This ensures the best knee results during motion data capture.](image4)

Note:

- The benefits of H pose:
  - The Device Mocap Plug-ins can determine the best position of body joints for better motion capture.
  - The infrared from the camera should not be blocked by any of your body parts or limbs.

4. Hold the pose and wait until the plug-in finishes the countdown. Now your motions can be converted into motion data and sent to the plug-in.
B. Receiving Data from the Device Mocap Plug-ins

1. Apply and select a character in iClone. It is highly recommended that you Deactivate the Foot Contact feature of the character in order to receive the best foot motions from the Mocap Device Plug-ins.

2. Go to Animation >> Motion and click the Device Mocap button in the Modify panel.
3. Click the **Connect** button so that iClone connects to the plug-in and starts receiving motion data from it.

4. Depending on the installed location of your Microsoft Kinect Sensor you may:
   - **Local**: If the Microsoft Kinect Sensor is installed on your local machine, then choose this radio button.
   - **Network**: If the Microsoft Kinect Sensor is installed on another computer on the network, then choose this radio button, type in the **IP Address** of the computer and then click the **Connect** button again to receive motion data from the plug-in on that computer. It is useful when the other computer is faster than your local computer.

5. From the dummy panel, select the body parts that you intend to capture motions from. Please refer to the Multi-layer Capturing section for more information.

6. Click the **Preview** button, and press the **Space Bar** to preview your real human motions on the virtual character (Shortcut: Space bar).

7. Click the **Record** button and press the **Space Bar** to start recording (Shortcut: Alt + Space bar).

   **Note:**
   - If you are using iClone with the Device Mocap Plug-ins by yourself, then you can use the **Body Command feature** to start, or stop the **Preview**, or **Record** procedure remotely instead of pressing the **Space Bar**.
   - Adjust the **Smoother** slider value so that the captured motion will become smoother and eliminate jittering. However, keep in mind that higher smoother values will require more system resources.
   - Please note that if you move you limbs closely, or overlap them, then this will cause occlusion with your torso, and the hands of the virtual character may penetrate its own body. Please keep your limbs away from your body with enough distance for optimized motion results.
Using the Mocap Device Plug-ins with Mirror Mode

By default, the character’s body parts use the motion input from your body to move. Therefore, when the character is facing you and you move your right hand, the character will also move its right hand, which can sometimes be confusing, especially when you need to interact with the props inside of the scene. For this you can work with the Mirror function.

Mirror = Off
Activate the Mirror box and then you may control the character as if using a mirror.

Mirror = On
Installing Mocap Device and Corresponding Plug-in

You may capture real human motions through the depth camera for characters in iClone, but to capture the best results you need to make sure your device is properly installed.

Currently, the market’s popular depth cam is Microsoft’s Kinect for Xbox 360 and Microsoft’s Kinect for Windows. For more information about the Drivers and Available Devices, please click here and refer to the bottom section on the page.

Installing the Mocap Device - Microsoft’s Kinect for Xbox 360 & Microsoft’s Kinect for Windows

Because of the Microsoft’s Kinect for Xbox 360 and Microsoft’s Kinect for Windows limitations (may be different depending on the brand of the camera), the optimized capturing range of the camera is shown below:

- Side view of the Microsoft’s Kinect for Xbox 360 and Microsoft’s Kinect for Windows

- Top view of the Microsoft’s Kinect for Xbox 360 and Microsoft’s Kinect for Windows
Installing Mocap Device Plug-in - for Xbox 360 and for Windows

The Mocap Device Plug-in is an application that receives the motion data from your Microsoft's Kinect for Xbox 360 or Microsoft's Kinect for Windows and connects it with your iClone. You can get this plug-in from the official Mocap Device Plug-in website.

System Requirements for Mocap Device Plug-in
- Operating System: Windows 8 (64 bits) or above.
- Multimedia-related API: DirectX 11 or above.
- Kinect Sensor: Microsoft's Kinect for Xbox 360 or Kinect for Windows.
- Internet Accessiblity: Must.
- iClone: 6.21 or above.

Installing the Mocap Device Plug-in
1. Execute the install program on the computer where the Microsoft's Kinect (for Xbox 360 or for Windows) depth camera is installed.
   Note:

   - If you have installed Kinect for Xbox 360 onto your pc, then please install the Kinect_Mocap_Plug-in_Xbox_360_110_Enu.exe plug-in.
   - However, if the device installed on your pc is Kinect for Windows, then please install the plug-in named Kinect_Mocap_Plug-in_Windows_120_Enu.exe.

2. If you encounter the message below, then please go to the Microsoft download web site to download and install the .Net Framwork 2.0 (or above) on the computer.

3. Follow the instructions to finish the installation of the Mocap Device Plug-in.
   Note:

   - If the computer where you installed the plug-in and the Microsoft's Kinect depth camera is on an intranet, and you wish to share the device with another computer where iClone is installed, then you need to write down the IP address of the shared computer.

4. If you are prompted with a message for installing the driver for your depth camera, then click Install unless you have installed the driver before.
Installing the Mocap Device and Corresponding Plug-in

The newest Kinect Device after September 2014, is the Microsoft Kinect for Xbox One. You may capture real human motions through the depth camera for characters in iClone, but to capture the best results you need to make sure that your device is properly installed.

For more information about the Drivers and Available Devices, please click [here](#) and refer to the bottom section of the page.

Installing the Mocap Device - Microsoft's Kinect for Xbox One

Due to the Microsoft Kinect for Xbox One limitations (may be different depending on the brand of the camera), the optimized capturing range of the camera is shown below:

- Side view of the Microsoft's Kinect for Xbox One

![Side view diagram](image1)

- Top view of the Microsoft Kinect for Xbox One

![Top view diagram](image2)
Therefore, the best positions for the **Microsoft Kinect for Xbox One** is to place it in front of you, higher than 1.5 meters.

### Installing the Mocap Device Plug-in - Xbox One

The **Mocap Device Plug-in - Xbox One** is an upgraded application from version 1, which enhances certain features and connects it with your iClone. You can get this plug-in from the official [Mocap Device Plug-in - Xbox One website](#).

### System Requirements for Mocap Device Plug-in - Xbox One

- **Operating System**: Windows 8 (64 bits) or above.
- **Multimedia-related API**: DirectX 11 or above.
- **Kinect Sensor**: Microsoft’s Kinect for Xbox One.
- **Adapter Cable**: Kinect Adapter for Windows.
- **Internet Accessibility**: Must.
- **iClone**: 6.21 or above.

#### Installing the Mocap Device Plug-in - Xbox One

1. Execute the install program (`Kinect Mocap Plug-in_Xbox_One_100_Enu.exe`) on the computer where the **Microsoft Kinect for Xbox One** is installed.
2. Follow the instructions to finish the installation of the **Mocap Device Plug-in - Xbox One**.

   **Note:**

   - If the computer where you installed the plug-in and the **Microsoft Kinect for Xbox One** is on an intranet, and you wish to share the device with another computer where **iClone** is installed, then you need to write down the IP address of the shared computer.

3. If you are prompted with a message for installing the driver for your depth camera, then click **Install** unless you have installed the driver before.
Using Mocap Device Plug-in

Please note that the steps in this page is suitable for Kinect for XBox 360 or Kinect for Windows.

1. Start the Mocap Device Plug-in by clicking the icon on the desktop.

2. Click the Connect button to connect the plug-in with your Microsoft's Kinect Sensor, and start receiving motion data from it.

3. Please notice that there are four red icons at the left-top of the preview window. Only when these four icons turn green will the plug-in work properly.
4. Move away from the sensor about 2.5 to 5 meters. Face the camera. When the camera detects you, then you will see a green dummy which indicates that you need to perform an H pose.

Your body turns bluish or purple as soon as the plug-in detects you. The first icon will turn green.

5. After the plug-in calculates the skeleton structure for you, then the second icon turns green.

Your body parts are framed up with a bone structure.

Note:

- If you wish to optimize the control of the virtual character’s legs, then it is highly recommended that you squat a little as the green dummy does, so that the length of the thighs and the calves can be precisely calculated.

- Wrist and Head motions will not be captured as the plug-in only detects forearm and neck movements. However, if your operating system is Microsoft Windows 7 or above, and you have installed the Microsoft’s Kinect Sensor, then the wrist and head motions can be detected and captured.
6. If you wish to change person, then click the **Calibration** button and wait for the **C** icon to turn green.

   **Note:**

   1. If your operating system is **Microsoft Windows 7** or higher and you have installed the **Microsoft’s Kinect Sensor**, then when you click the **Camera Calibration** button, the sensor will auto-level by itself in case it is not positioned properly.

7. When the three icons are green, then the plug-in starts to count down. Please hold your pose.

   ![Hold the pose and wait until the end of the countdown.](image)

8. **After** the count down, the **OK** icon turns green. You may then move your body for the plug-in to capture your motions.

   ![You can now start to move. Your motions will be captured afterwards.](image)

9. **You may then go to** **iClone** and use the **Preview** or **Record** buttons of the **Mocap Device Console** to receive the motion data from this plug-in.

   **Note:** Optimize the Captured Results

   1. If you are using **iClone** with **Device Mocap Plug-in** by yourself, you may use the **Body Command feature** to start or stop the **Preview** or **Record** procedure remotely instead of pressing the **Space Bar**.
   2. If you wish to have the best capture results, then you need to keep your environment or the background as simple and uncluttered as possible. A cluttered environment can cause false detection in the sensor, which generates inappropriate motion data.
   3. **Gentle but sufficient lighting** is highly recommended.
   4. **Because the reflection of the floor may interfere with the sensitivity of the sensor**, please stand on a non-reflective floor or carpet.
   5. Some very dark and black clothes can absorb the infrared signals the Kinect uses to track motions, so try wearing lighter colored clothes.
   6. **Do not let things such as furniture obscure any body parts.**
Optimizing the Screen View when Working with iClone

- If iClone and the Mocap Device Plug-in are installed on the same computer and you wish to use them together, sometimes you may find they hinder each other.

- By clicking the Mini View button on the top-right of the plug-in, you may use the mini view port of the plug-in for better view and control in iClone.

- Double-click on the mini view to restore the plug-in panel.
Using Body Command Feature to Preview or Record

If you do not want to move back and forth between you and your computer for starting previewing or recording, then you may use the **Body Command** feature to trigger these two modes within the Mocap Device Plug-in - Xbox 360. This is very useful when you need to capture your motions without any other people around to help you with controlling the Device Console panel of iClone.

1. Open the **Mocap Device Plug-in** panel and click the **Connect** button.

2. Go to iClone, select a character and open the **Device Console** (Shortcut: Shift + F8) panel. Click the **Connect** button to connect the **Device Console** to the **Mocap Device Plug-in - Xbox 360** and activate the **Body Command** box.

3. Go back to the **Mocap Device Plug-in - Xbox 360** and activate the **Body Command** box.

4. The preview window of the **Mocap Device Plug-in - Xbox 360** will instantly display **Preview** and **Record** hotspots.

5. Follow the standard steps for the **Mocap Device Plug-in** to calibrate your skeleton properly.

6. After the calibration countdown, you will see two hand icons that follow your hands as you move.

- Move the right hand icon to touch the **Preview** hotspot and hold the pose for one second to start the previewing mode.
- Move the left hand icon to touch the **Record** hotspot and hold the pose for one second to start the recording mode.

7. When you want to stop previewing or recording, then you may move both hand icons to touch the marks and hold the pose for one second; the previewing or recording mode will stop.
Using Near Mode

The optimized capture range of the Kinect for Windows camera is shown below:

- Side view of the Default Mode

Therefore, the best position for the Kinect for Windows to be is in front of you at a height of more than 2.5 meters:

However, if you do not have enough space to locate the sensor as shown above and you only want to capture the upper body movements, or you do not want the sensor to be located far away from you, then you can use the Near Mode feature of the plug-in.

- Side view of the Near Mode

This allows you to place the Kinect for Windows beside you where you can touch it. You can move forward closer to the sensor and your personal computer for operating.
Capturing Head Rotation

Because Microsoft’s Kinect for Windows is now able to detect and capture head rotation, you can activate the feature to receive head-rotation data from the sensor to transfer to iClone through the Mocap Device Plug-in.

Please note that if you activate this feature, you will need to trade it off for around 10% ~ 20% of the capture frame rate.

1. Open the Mocap Device Plug-in panel and click the Connect button.

2. Go to iClone, select a character and open the Device Console (Shortcut: Shift + F8) panel. Click the Connect button to connect the Device Console to the Mocap Device Plug-in.

3. Go back to the Mocap Device Plug-in and activate the Head Rotation box.

4. Start to preview or record. Rotate your head and the motion will also be captured to affect the selected character in iClone.

Head rotating left and right  Head rotating up and down  Head tilting left and right
Leveling the Virtual Floor Direction

During the Previewing or Recording process, you may occasionally find the virtual floor in iClone does not seem to align to the horizon properly, which can cause the character to move as if it's on slanted ground, float in the air or sink underground. This is most likely because the Sensor has inadequately detected the real floor's location.

Use the Floor Adjustment feature provided in the Device Mocap Plug-in, and get someone to assist you in leveling the virtual floor direction:

1. Follow the standard workflow or use the Body Command to switch on the Preview mode.
2. The character may move in a slanted direction or float in the air occasionally.

3. At the Floor Adjustment section of the Device Mocap Plug-in, you will see three adjusting sliders.

4. Move around where you are and have your assistant gradually modify the floor adjustment settings by observing the status of the character and dragging the corresponding sliders.

5. After you have obtained the ideal settings for your floor adjustment levels, you may start to record your motions.
Using the Mocap Device Plug-in - Xbox One

1. Start the Mocap Device Plug-in - Xbox One by clicking the icon on the desktop.

2. Click the Connect button to connect the plug-in with your Microsoft Kinect Sensor, and start receiving motion data from it.

3. Please notice that there are two red icons at the top-left of the Preview window. Only when these two icons turn green will the plug-in work properly.

4. Move away from the sensor about 2.5 to 5 meters. Face the camera. When the camera detects you, the upper icon will turn green.

Your body is colored as soon as the plug-in detects you. The first icon will turn green.
5. Then the plug-in calculates the skeleton structure for you.

Your body parts are automatically framed up with a bone structure.

6. Please hold your pose and wait for the end of the countdown.

Hold the pose and wait until the end of the countdown. The two icons turn green and then you are free to move for motion capturing.

Note:

- The countdown will not start if any one of the joint points are red.

- To ensure that the joint points are not red, then make sure you face the camera and your limbs are not concealed by anything. “H” pose is highly recommended for the best detection results.

7. After the countdown, you can move your body for the plug-in to capture your motions.
8. You may then go to iClone and use the Preview or Record buttons of the Mocap Device Console to receive the motion data from the plug-in.

Note: Optimize the captured results

- If you are using iClone with the Device Mocap Plug-in - Xbox One by yourself, then use the Body Command feature to start, or stop, the Preview or Record procedure remotely instead of pressing the Space Bar.
- If you wish to get the best capture results, then you need to keep your environment and background as simple and uncluttered as possible. A cluttered environment can cause false detection in the sensor, which generates inappropriate motion data.
- Soft but sufficient lighting is highly recommended.
- Because the reflection of the floor may interfere with the sensitivity of the sensor, then please stand on a non-reflective floor or carpet.
- Some very dark, or black clothes can absorb the infrared signals that the Kinect uses to track motions, so try wearing lighter colored clothing.
- Do not let things such as furniture obscure any body parts.

Quick Switch Actors during Capturing

If you have multiple actors to perform specific motions for capturing, then simply right-click on one of the other actors that are colored in the preview window to quickly switch among them.

1. Apply a character in iClone and follow the workflow to prepare motion capture.

2. One of the actors can start to perform the motion capture.

The motions performed by the first actor will be passed to the character in iClone.

3. Right-click on the other actor.

4. Now the other actor can be in charge of performing the capture.

The motions performed by the other actor will be passed to the character in iClone.
Optimizing the Screen View when working with iClone

- If iClone and the Mocap Device Plug-in - Xbox One are both running on the same computer and you wish to view them together, then sometimes you may find that they hinder each other.

- By clicking the Mini View button on the top-right of the plug-in, then you may use the mini view port of the plug-in for better view and control in iClone.

- Double-click on the mini viewer to restore the plug-in panel.
Using Body Command Feature to Preview and Record

If you do not want to move back and forth between you and your computer during previewing and recording, then you may use the **Body Command** feature to trigger these two modes within the **Mocap Device Plug-in**. This is very useful when you need to capture your motions without the help of other people controlling the **Device Console** panel of **iClone**.

1. Open the **Mocap Device Plug-in** panel and click the **Connect** button.

2. Go to **iClone**, select a character and open the **Device Console** (Shortcut: Shift + F8) panel. Click the **Connect** button to connect the **Device Console** to the **Mocap Device Plug-in**.

3. Go back to the **Mocap Device Plug-in** and press down the **Body Command** button.

4. Follow the standard steps for the **Mocap Device Plug-in** to properly calibrate your skeleton.

5. After the calibration countdown, you will see two hand icons that follow your hands as you move.

   - Move the right hand icon to touch the **Preview** hotspot, and hold the pose for one second to start the previewing mode.
   - Move the left hand icon to touch the **Record** hotspot, and hold the pose for one second to start the recording mode.

6. When you wish to stop previewing or recording, then you may move both hand icons to touch the  ⏺️ marks and hold the pose for one second; the previewing or recording mode will then stop.
Using Near Mode

The optimized capture range of the Kinect for Windows camera is shown below:

- Side view of the Default Mode

![Side view of the Default Mode](image)

- Therefore, the best position for the Kinect for Windows to be is in front of you at a height of more than 2.5 meters:

![Side view of the Default Mode](image)

However, if you do not have enough space to locate the sensor as shown above and you only want to capture the upper body movements, or you do not want the sensor to be located far away from you, then you can use the Near Mode feature of the plug-in.

![Floor Adjustment](image)

- Side view of the Near Mode

![Side view of the Near Mode](image)

- This allows you to place the Kinect for Windows beside you where you can touch it. You can move forward closer to the sensor and your personal computer for operating.

![Side view of the Near Mode](image)
Capturing Head Rotation

Because the Microsoft Kinect for Xbox One is able to detect and capture head rotation, then you can activate the feature to receive head-rotation data from the sensor to transfer to iClone through the Mocap Device Plug-in.

Please note that if you activate this feature, then you will trade off around 10% ~ 20% of the capture frame rate.

1. Open the Mocap Device Plug-in panel and click the Connect button.

2. Go to iClone, select a character and open the Device Console (Shortcut: Shift + F8) panel. Click the Connect button to connect the Device Console to the Mocap Device Plug-in.

3. Go back to the Mocap Device Plug-in and press down the Head Rotation button.

4. Start to preview or record. Rotate your head and the motion will also be captured, affecting the selected character in iClone.
Leveling the Virtual Floor Direction

During the Preview or Recording process, you may occasionally find that the virtual floor in iClone does not seem to properly align to the horizon, which can cause the character to move as if it's on slanted ground, float in the air, or sink underground. This is most likely because the Sensor has inadequately detected the real floor's location.

Use the Floor Adjustment feature provided in the Device Mocap Plug-in - Xbox One, and get someone to assist you in leveling the virtual floor direction.

1. Follow the standard workflow or use the Body Command to switch on the Preview mode.
2. Sometimes the character might move in a slanted direction, or occasionally float in the air.
3. Click the button on the top of the Device Mocap Plug-in - Xbox One panel.
4. You will see the panel with three adjusting sliders on it.
5. Move around and have your assistant gradually modify the floor adjustment settings by observing the status of the character, and drag the corresponding sliders.

![Front-Back Rotation](image1.png)  
**Front-Back Rotation** = -15.

![Left-Right Rotation](image2.png)  
**Left-Right Rotation** = 25.

![Height](image3.png)  
**Height** = -30

6. Once you have obtained the ideal settings for your floor adjustment levels, then you may start to record your motions.

Adjust the **Front-Back Rotation** slider.

Adjust the **Left-Right Rotation** slider.

Adjust the **Height** slider.
Multi-layer Capturing

After installing the **Mocap Device Plug-in** and getting familiar with it, you can connect your **iClone Character** to real actors and use their own bodies to control the character's motions; users can even record their character motions directly. However, you can also use the multi-layer technique to separately record motions for each body part instead of recording a motion with your entire body. This is especially useful when a character has a start pose and you wish to gradually add motions to body parts for various poses such as a news anchor person gesturing with both hands, or fishing by the lake with legs moving through the water.

1. First start the **Mocap Device Plug-in**. For detailed information on how to use the **Mocap Device Plug-in**, please refer to the **Using Mocap Device Plug-in** section.
2. In **iClone**, apply and select a character.
3. Go to the **Animation >> Motion**, and click the **Device Mocap** button in the **Modify** panel.

![Device Mocap Interface](image)
4. Select one of the body parts for motion-capturing in the dummy pane (body parts highlighted in orange mean that they are able to receive motion input). Please note that you may click the button to deselect all body parts. For more information about the Full Body and Upper Body modes, please refer to The Best Mode for Capturing Upper Body Motions section.

5. Click the Preview button and press the Space bar to preview the motion pattern (Shortcut: Space bar).

6. Click the Record button and press the Space Bar to start recording (Shortcut: Alt + Space bar).

7. Go to the start frame where you recorded the previous motion.
8. Select another body part from the dummy pane.

9. Preview and record again.

10. Repeat the steps until the motions are applied to the character layer by layer. You may produce custom motions by using this method.

Real human motion.

Only the right hand receives the motion data.

Real human motion.

The feet receive the motion data.
The Best Way for Capturing Upper Body Motions

When you want to capture the character’s upper body motions via the Multi-layer Capturing method, you are allowed to use either the Full Body or the Upper Body modes in the Device Console panel. However, the Full Body mode can sometimes produce unexpected results. The Upper Body mode thus is the best mode for capturing upper body motions.

Capturing Upper Body Motions in Different Modes

![Full Body mode](image1.png) ![Upper Body mode](image2.png)

The Full Body mode:

The Upper Body mode:

The benefit of the Upper Body mode is that you are able to sit before your computer; locate your depth camera beside it; and then start capturing your upper body motions instead of moving back and forth between your computer and the ideal position for capturing where the computer is beyond your control.

Capturing with the Default Pose

1. Select a character with its default pose.

2. Open the Device Console panel (Shortcut: Shift + F8). Select only the upper body part of the dummy.
3. Preview or record the upper body motions.
   - If you select the upper body of the dummy in the **Full Body** mode, when you lean or rotate your upper body, then the motion-applied character may exhibit the floating-feet issues as demonstrated below:

   ![Floating feet issue](image1)

   The pelvis rotates along with the angle of the upper body, which causes the feet to float in the air.
   - It is highly recommended that you switch to the **Upper Body** mode, which is also the best mode for only capturing your upper body motions.

   ![Pelvis rotation](image2)

   The angle of the pelvis is constrained so that the feet remain where they are without being driven to move.

### Capturing with a Custom Pose

If you've set a pose for the character, and you want to restrict the captured upper body motions only to the upper body without altering the pose of other body parts, then you must use the **Upper Body** mode of the **Device Console** panel.

1. Select a character and apply a motion clip or set a pose to it.

   ![Custom pose](image3)

2. Open the **Device Console** panel (Shortcut: Shift + F8). Switch to the **Upper Body** mode and select the upper body part of the dummy.

3. Preview or record your upper body motions. You may see the difference when you select the upper body parts in either the **Full Body** or **Upper Body** modes.

   ![Full Body vs. Upper Body](image4)

   The legs are driven to move in the **Full Body** mode when the upper body leans backward.

   The legs are not driven to move in the **Upper Body** mode when the upper body leans backward.
Capturing Motions with Custom Hand Gestures

When you start to capture motions for the character in iClone, you could sometimes find it disturbing with the default stiff and stretching hand gestures as shown in the illustration below:

The default hand gesture.
The hands are stiff while capturing motions.

In order to have the hands with custom gestures while you are capturing motions, please follow the steps below:

1. Select the character and go to the start frame.

2. Open the Content Manager and go to the Animation category >> Template tab >> Animation Template root >> Hands library.
3. Apply the desired hand gesture template for both hands (in this case, the **Relaxed** one).

4. Right click on the character and select the **Remove Object Animation** from the right-click menu. This step ensures the character's hands to be the relaxed one as applied without redundant hand clips on the timeline.

5. Start motion-capturing again. The hands will remain the gesture, which is natural as the character moves.
Rectifying the Twisting Legs in Full Body Mode

In the Full Body mode of motion-capturing method, the legs sometimes twist due to the knees angles being incorrectly interpreted by the depth-camera when you perform certain motions. You may use the Knee rotation constraint feature to avoid this issue.

Rectifying the Twisting Legs in Full Body Mode

1. Select a character.

2. Open the Device Console panel (Shortcut: Shift + F8). Switch to the Full Body mode.
3. Select all body parts of the dummy.
4. Start to preview and move your body to see the captured result. You may sometimes find the character’s legs will twist.

5. Stop previewing and activate the Knee rotation constraint box to lock the knee angles from rolling.

6. Start to preview again. The twisting legs issue should be resolved.

Note:

Please note that when the Knee rotation constraint in activated, your knees’ rotations are filtered out, which may cause some specific leg motions to display incorrectly.
Activating the Foot Rotation in Upper Body Mode

In the Upper Body mode, all the motions from the lower body and legs are filtered out so that you are able to keep the original pose of the character's lower body. However, when the upper body moves or rotates, the captured motions will be more real and natural if we have the foot to rotate along with the upper body motions. This feature is especially suitable for characters with a sitting pose or motion.

Activating the Foot Rotation in the Upper Body Mode

1. Select a character in a seated position.

2. Open the Device Console panel (Shortcut: Shift + F8). Switch to the Upper Body mode.
3. Select all body parts of the dummy.
4. Start to preview and rotate your body to see the captured result. The feet of the character are static because the feet motions are filtered out in this mode.

5. Stop previewing and deactivate the Lock foot rotation box to unlock the feet from rolling.

6. Start to preview again. The feet will begin to rotate along with the upper body motions.
Human Centric Control

The Human Centric Control is designed to match the real world around us. When applying a script-embedded iProp or iAcc (accessory) onto the actor, the actor sets an initial action to immediately interact with the iProp or iAcc. After applying the iProp or iAcc to the actor, the actor will take over all the actions of the iProp or iAcc to allow the actor to control the actions. In iClone there are various default contents in the Content Manager such as beer, remote control, stein, sofa and bed under the Props tab >> iProps library, and plus the wings and boxing gloves under the Avatar tab >> Accessories library.

iAcc to Actor

When an iAcc is dragged onto an actor, the actor inherits all the actions embedded in the boxing gloves.

![Actor with iAcc]

The actor can now perform all the performance of the boxing gloves as well.

Actor to iProp

When an iProp is dragged into the scene, the last-clicked actor controls the performances embedded in the iProp.

![Actor controlling iProp]

Note:

Please refer to the Actor, iProp and iAcc section for more information.
The Actor, iProp and iAcc

Once you have applied any iAcc, which is embedded with human centric scripts to the actor or applied any human centric script-embedded iProp into the scene, the actor can control the actions of the objects or instantly reflect the performance embedded in the objects from the right-click menu. The right-click menu changes depending on what is attached to the actor. Once you have applied an iAcc (accessory) to the actor, you may see the difference in the actor’s right-click menu.

iAcc to Actor
1. Let’s see what happens to the right-click menu before we drag anything to the actor.

Notice in the perform section, the actor only holds fewer motions.
2. Drag an iAcc to the actor.
3. Right-click on the actor again to see the difference.

The actor’s performance has increased by adding the actions embedded in the Boxing Gloves.

Actor to iProp
1. Add a bed to the scene.
2. Click the desired actor for controlling the actions.
3. Right-click on the bed, and select a command for the actor to perform with.
**Baking Constraint Keys to iMotion**

When you use the Collect Clip feature to export the motions of a character, you may also bake the Reach, Look At and Link (in Constraint group) keys into the motion, so that the exported motions will be identical to the original motion settings that you see in iClone.

Furthermore, this feature ensures the accuracy of the exported motions when you want to export them in FBX/BVH formats via the 3DXchange Pipeline.

**Baking Constraint Keys to iMotion**

1. Prepare a character and a prop.
2. Select the character.
3. Apply a motion clip by any method (apply from the library or by body puppeteering) to the character.
4. **Link the character** to the prop and adjust the character to an ideal position.
5. **Set Reach key** to the character.
6. Set **Look at** keys to the character so that it looks at a certain target.

![Character looking at a target](image)

The character looks at the camera

7. Set **motion layer** keys to adjust the character's pose.

![Character adjusting pose](image)

8. Select the prop and set transform keys to the prop via the **Prop Puppeteering** method. Since the character is linked to the prop, the character will move along with the prop.

![Character linked to prop](image)

9. Make sure the character is selected.
10. Check the **Animation >> Motion Setting Options >> Bake Constraint Key** command from the main menu bar.
11. Open the **Timeline** (Shortcut: F3) and **collect an iMotion** from the character.

12. Open another project with a character.

13. Apply the collected motion clip to the character.

The iMotion baked complete with constraint keys.
(The results of Reach, Look-at and Link keys are kept)

The iMotion without constraint keys.

Note:

The **Path** keys will always be baked to the collected iMotion even if the **Bake Constraint Key** option is inactive.
Pro Facial Animation (New for V7.0)

In order to make the character facial animations more expressive, the outdated and inadequate expressions of the past iClone system have been revamped. Whether using Face Puppet Face Key or Face Mocap (version 7.x), all of these tools will use the new, more thorough control system. This system will also be backwards compatible, letting all users enjoy the new control system while keeping the integrity of previously created work.

The new facial control system is explained in the sections below:

- Creating Voice Script
- New Facial Expression System Structure
- Facial Puppeteering
- Face Key Editing
- Facial Timeline
Creating Voice Script

Each character can talk and perform with facial expressions and motions. However, before it has expressions, you need to first add voice script to it.

1. Select a character to add voice.

2. Switch to the Modify panel >> Animation tab >> Motion section >> Facial group and click the Create Script button.

3. Click on either one of the buttons in the coming panel to determine the method for generating a voice script.

   - **Record Voice**: Use this command to directly record a voice to create a voice script for the character.
   - **Text-To-Speech**: Use this command to convert desired text into a voice script for the character.
   - **Wave File**: Use this command to load an audio file (*.wav, *.mp3) as the voice script for the character.
   - **CrazyTalk Script**: Use this command to load a CrazyTalk script file (*.cts, *.clp, *.rTalk) as the voice script for the character.

Note: You may also open the panel by selecting the character and then execute the Animation menu Animation >> Create Script command.

4. The character will start to talk (without any facial expression).
Adding or Modifying Lip Synching Keys

iClone is capable of auto-producing lips shapes as soon as a new voice file is applied to a character (*.wav, *.mp3); this is known as Lip Synching technique. After the keys are generated you may set new Lip Synching keys, or modify the existing keys manually in order to have the most faithful lip shapes for the talking character.

### Adding or Modifying Lip Synching Keys

1. Select a character and apply a voice to it by importing .CTS, Recording, Importing Voice File or using the Text-to-Speech features.
2. Launch timeline (Shortcut: F3).
3. Click the down arrow button of the actor track and show the Viseme track.
4. Press down on the triangle next to the Viseme track. You will then see the Voice and Lips sub tracks.

   ![Timeline with Voice and Lips tracks]

   The wave line may be used as a reference for adding lip-synching keys.

5. In the Lips Track, you may see the auto-generated keys.
6. If you wish to add new keys, then double-click on the empty frame cell found inside the track in order to open the Lips Editor panel.

   ![Lips Editor panel]

7. If you wish to modify existing keys, then double-click on the keys to modify.
8. You may drag the Expressiveness slider in order to designate the strength of the lip shape. Please note that the results can only be seen after you release the slider.

   **Phoneme: Oh**

   ![Expressiveness comparison: 50 vs. 80]
Creating rLTalk (Talking Script) in CrazyTalk

Although one is able to create voice scripts (voices + facial expressions) in iClone for creating exquisite and detailed voice scripts, it is recommended to do so by means of CrazyTalk, especially version 8 or above because Auto Motion feature can quickly generate facial expressions from an audio voice track.

1. Launch CrazyTalk version 8 or above.
2. Create a 3D actor (recommended) and then add voice to it.

Note:
- Please note that the actor will have expressions and motions driven by the voice because of the default Auto Motion.
- Using the feature within CrazyTalk in order to fine-tune the expressions and motions of the actor. Please refer to the CrazyTalk 8 Online Manual for more information.

3. Open the timeline.

4. In the Collect Clip track, drag to make a desired range.

5. Right click within the range and select the Export rLTalk commands for exporting the voice, motions and expressions within this range into *.rLTalk file.
6. Create a character in **iClone**.

7. Apply the talking script file via drag and drop.

**Note:**

**CrazyTalk** provides more tracks than **iClone** for you to adjust individual animation of facial features.

The talking and expression related tracks provided in **iClone** are:

- Motion Clip
- Transform
- Head
- Face
- Eye
- Shoulder

More detailed tracks are provided for fine-tuning in **CrazyTalk 8**:

- The **Motion Clip** track is equal to the **Facial Layer** track in **iClone**.
New Facial Expression System Structure (New for V7.0)

**Morph List Conversion Rules**

The table below shows the facial pose differences between iClone 6 and iClone 7. Please note that the facial poses have been increased from 36 in iClone 6 (left column) to 60 in iClone 7 (right column). The "split" means that the new poses are derived from a basic pose, and the "new" means that they are totally new facial poses.

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<th>Note</th>
<th>Number</th>
<th>New Group</th>
<th>New Note</th>
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<td>Mouth Dimple R</td>
<td>41</td>
</tr>
<tr>
<td>30.Lips Widens</td>
<td>new</td>
<td>42</td>
<td>Mouth</td>
<td>Mouth Puck</td>
<td>42</td>
</tr>
<tr>
<td>31.Lips Puckled</td>
<td>new</td>
<td>43</td>
<td>Mouth</td>
<td>Mouth Puck</td>
<td>43</td>
</tr>
<tr>
<td>32.Lips Puckled</td>
<td>new</td>
<td>44</td>
<td>Mouth</td>
<td>Mouth Bottom Lip Down</td>
<td>44</td>
</tr>
<tr>
<td>33.Lips Puckled Open</td>
<td>new</td>
<td>45</td>
<td>Mouth</td>
<td>Mouth Top Lip Up</td>
<td>45</td>
</tr>
<tr>
<td>34.Lips Puckled Open</td>
<td>new</td>
<td>46</td>
<td>Mouth</td>
<td>Mouth Top Lip Under</td>
<td>46</td>
</tr>
<tr>
<td>35.Lips Puckled Open</td>
<td>new</td>
<td>47</td>
<td>Mouth</td>
<td>Mouth Bottom Lip Under</td>
<td>47</td>
</tr>
<tr>
<td>36.Lips Puckled Open</td>
<td>new</td>
<td>48</td>
<td>Mouth</td>
<td>Mouth Smart Upper L</td>
<td>48</td>
</tr>
<tr>
<td>37.Lips Puckled Open</td>
<td>new</td>
<td>49</td>
<td>Mouth</td>
<td>Mouth Smart Upper R</td>
<td>49</td>
</tr>
<tr>
<td>38.Lips Puckled Open</td>
<td>new</td>
<td>50</td>
<td>Mouth</td>
<td>Mouth Smart Lower L</td>
<td>50</td>
</tr>
<tr>
<td>39.Lips Puckled Open</td>
<td>new</td>
<td>51</td>
<td>Mouth</td>
<td>Mouth Smart Lower R</td>
<td>51</td>
</tr>
<tr>
<td>40.Lips Puckled Open</td>
<td>new</td>
<td>52</td>
<td>Mouth</td>
<td>Mouth Bottom Lip Bite</td>
<td>52</td>
</tr>
<tr>
<td>41.Lips Puckled Open</td>
<td>new</td>
<td>53</td>
<td>Mouth</td>
<td>Mouth Down</td>
<td>53</td>
</tr>
<tr>
<td>42.Lips Puckled Open</td>
<td>new</td>
<td>54</td>
<td>Mouth</td>
<td>Mouth Up</td>
<td>54</td>
</tr>
<tr>
<td>43.Lips Puckled Open</td>
<td>new</td>
<td>55</td>
<td>Mouth</td>
<td>Mouth L</td>
<td>55</td>
</tr>
<tr>
<td>44.Lips Puckled Open</td>
<td>new</td>
<td>56</td>
<td>Mouth</td>
<td>Mouth R</td>
<td>56</td>
</tr>
<tr>
<td>45.Lips Puckled Open</td>
<td>new</td>
<td>57</td>
<td>Mouth</td>
<td>Mouth Lips Jaw Adjust</td>
<td>57</td>
</tr>
<tr>
<td>46.Lips Puckled Open</td>
<td>new</td>
<td>58</td>
<td>Mouth</td>
<td>Mouth Bottom Lip Trans</td>
<td>58</td>
</tr>
<tr>
<td>47.Lips Puckled Open</td>
<td>new</td>
<td>59</td>
<td>Mouth</td>
<td>Mouth Skewer</td>
<td>59</td>
</tr>
<tr>
<td>48.Lips Puckled Open</td>
<td>new</td>
<td>60</td>
<td>Mouth</td>
<td>Mouth Open</td>
<td>60</td>
</tr>
</tbody>
</table>
The animated GIF below cycles through all the 60 new facial poses. Currently characters in Character Creator format have been fully implemented with this new facial system.

Handling of Compatibility

- When a Character Creator (CC) 1 and a Character Creator 2 characters are imported, iClone 7 will perform an automatic conversion by supplementing insufficient expression shapes (morphs).

- Handing of RL Head is the same as that for CC avatar.

- In addition to the CC characters, G5 and Non-standard (Daz or customized) characters will automatically convert to the new system when imported into iClone 7. However, they will not use the new set of facial expressions. Further instructions on how you can use G5 and Non-standard characters via 3DXchange to 3rd party 3D solutions to fill in missing data will be released later on.

Note:

- G5 or Non-standard without the data update will cause old and new data to muddle, and cause the following problems:

<table>
<thead>
<tr>
<th>Character:</th>
<th>CC1 &amp; 2</th>
<th>G5</th>
<th>G6</th>
<th>Non-Standard</th>
<th>Daz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face puppet</td>
<td>Full Face Profiles (IC7)</td>
<td>Improved Facial Animation</td>
<td>Partial Result</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universal Closed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universal Open</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Face Profiles (IC6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solo Feature profiles (IC7)</td>
<td>Improved Facial Animation</td>
<td>Partial Result</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Face key

<table>
<thead>
<tr>
<th>Character:</th>
<th>CC1 &amp; 2</th>
<th>G5</th>
<th>G6</th>
<th>Non-Standard</th>
<th>Daz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscle (IC7)</td>
<td>Improved Facial Animation</td>
<td>Partial Result</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expression (IC7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modify (IC7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- MotionPlus & iTalk

<table>
<thead>
<tr>
<th>Character:</th>
<th>CC1 &amp; 2</th>
<th>G5</th>
<th>G6</th>
<th>Non-Standard</th>
<th>Daz</th>
</tr>
</thead>
<tbody>
<tr>
<td>From IC7</td>
<td>Improved Facial Animation</td>
<td>Partial Result</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>From IC6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Partial result refers to Apply Content (MotionPlus, iTalk) or Profile (Face Puppet, Face key) on certain expressions that will not have certain effect. If you come across this issue, please refer to Morph List Conversion Rules table in the beginning of this page.
• Besides on a CC character, when opening the **Face Key** or **Face Puppet** window on a character with insufficient morph data causes a notification window to pop up.

![Facial System](image)

Under the **Face Key** editor, some sliders are to be disabled.

![Face Key](image)

• When faced with insufficient morph data, the user interface may contained disabled shapes indicated with the 'N / A' display text in the **Face Puppet** panel > **Detail Feature** table.

![Detail Feature](image)

• Once the insufficient data is provided to the morph table, the interface will refresh with the newly enabled content.
Facial Puppeteering (New for V7.0)

The new facial profile has fully implemented with all new facial performances, which is greatly enhancing the expression realism.

Note:

Using G5 or Non-standard (Daz or Custom) characters can be incompatible with the new facial profile due to it missing 24 essential key facial poses. Please refer to the Handling of Compatibility section for more information.

Facial Profile Strength

Use Strength can be used during the Profile selection phase to exaggerate or smooth out the differences in facial expressions.

Solo Feature Profile

Solo Feature has added more variety of dynamic features.
Solo profile has three states:

- **None** - No effect.
- **Active** - The last selected profile will be remembered.
- **Selected** - It shows the profile available. Clicking on it again brings the Solo profile state back to None.

**Detail Morph Table**

Profile Details table will show 60 standard and 24 custom morphs, from here one can change the behavior of the Puppet Tool:

- Contents of the 3DX Expression Custom Data will only show up if it exists. There are 24 possible custom shapes.
- Open up Profile Details by using the hot-key: **Ctrl+F2**

**Confine Face Puppet Area Check**

- Face Puppet range of operation can be determined in two ways: one way is by 3D viewport and the other is by the size of the screen.
- UI location Preference > Control > Confine Face Puppet area to 3D viewport
- When the box is unchecked, the cursor can roam the entire space of the screen and one can define position of the center point for the Puppet cross-hair.
When the box is checked, the cursor is constrained to the dimensions of the 3D viewport, whereas the **Puppet** cross-hair will always reside in the center of the 3D viewport. This is to ensure that the upper and lower performance range is equidistant.

**Face Animation Profile**

- Within the new expression system, there are new levels of morphs directed toward different **Face Puppet** regions which make for more nuanced facial performances.
- By default, there are several new groups of **Profiles** that can be selected.
- Different profiles for different characters have their own settings. We recommend that the selected character and profile should match in order to create more accurate facial performances. The top 3 initiates with **00** are newly enhanced for **CC** male, female and **CC** stylized characters.
  - **Male**
  ![](image1)
  - **Female**
  ![](image2)
  - **Stylized Character**
  ![](image3)
  - **Universal Profile** provides mouth shut and six different mouth expressions, together with the **Strength** slider can be adjusted to fit the performance suitable to the role of the character.
  ![](image4)

*Note:*

- Under **Preview** or **Recording** mode, you can use the ‘Q, W, E, R, T, Y’ hotkeys to perform the commands of the **Full Face Control Profile**.
- Under **Preview** or **Recording** mode, you can left mouse click to make the character perform blinking motions.
Introducing the Puppeteering Panel

1. **Face Animation Profile**
   - Select one of the built-in profiles with a different personality from the list. Each profile contains various expressions.

2. **Full Face Control**
   - Select one of the expressions with pre-defined weight settings for various facial features.

3. **Preview**
   - Click this button and then press the **Space bar** to preview the expressions triggered by your input device (Mouse by default).

4. **Record**
   - Click this button and then press **Space bar** to start recording a motion clip. The recording will be added into the **Avatar/Expression** Track in Timeline.

5. **Head Orientation**
   - Select this to change the rotation of the head.

6. **Head Tilting**
   - Select this to change the tilting of the head.

7. **Clear Selection**
   - Deselect any highlighted features.

8. **Open Profile**
   - Click this button to load profiles.

9. **Save Profile**
   - Click this button to save profiles

10. **Solo Feature Selection**
    - Select to highlight any desired features to change. The changes will be converted into **Avatar/Expression** Track in Timeline.

11. **Blend data on next recording**
    - Activate this checkbox so that the new motions of the selected features are blended into the existing clip after recording.

12. **Advance Puppet Settings**
    - Adjust the weight of a feature in detail when your input device moves (Mouse by default).
Full Face Control Puppeteering

1. Click the **Face Puppet** button under the **Animation** tab of the **Modify Panel**.

2. Pick a desired profile from the **Face Animation Profile** list.

3. Choose a preset in the **Full Face Control** list.

   ![Image of Full Face Control](image)

   **Note:**
   - You may notice that some features in the **Solo Feature Selection** pane are highlighted automatically.

4. Click the **Preview** button and press the **Space bar** to start previewing.

5. Move your mouse to puppeteer your model. Press the **Space bar** again to stop previewing.

6. Click the **Record** button and press the **Space bar** to start recording the motion as puppeteered by your mouse.

7. Once the recording stops, a clip will be added into the timeline **Expression Track** automatically.

![Image of Recording](image)
Solo Feature Selection Puppeteering

Solo feature selection region allows you to select individual / multiple features and create expressions all at once.

1. Click the **Face Puppet** button.

2. Click the **Clear Selection** button to clear any selections that might have been done accidentally.

3. Pick the desired facial features from the **Solo Feature Selection** pane.

   ![Solo Feature Selection Pane]

   **Note:** You may optionally select the **Head Rotation** or **Head Tilting** features to be recorded as well.

4. Click the **Preview** button and press the **Space bar** to start previewing.

5. Move your mouse to puppeteer your model. Press the **Space bar** again to stop previewing.

6. Click the **Record** button and press the **Space bar** to start recording the motion as puppeteered by your mouse.

7. Once the recording stops, a clip will be added into the **Expression Track** automatically.
Recording Blinking
Blinking eyes can easily be recorded as motion clips in the Expression Track.

Mouse Clicking During Recording
When both upper eyelids are selected, a left mouse click will cause the eyes to blink. If you only select one of the upper eyelids, you can have that eye wink.

1. Select any of the features below.
   - Blink Both Eyes
   - Blink Left Eye
   - Blink Right Eye

2. Click the Preview button and press the Space bar to start previewing.
3. The speed of the blinking is determined by how short or long you click the left mouse button.
4. Click the Record button and press the Space bar to start recording and press the mouse button or move your mouse cursor whenever you want the model to blink.
5. The blinking of the eyes will be overlaid or blended into the puppet clip on the Expression track in the timeline once the recording finishes or you have stopped by pressing the space bar.

Dragging for Blinking Speed and Duration
In order for a character to blink his or her eyes slowly you have to move your mouse accordingly. This method can also be used to make the character close the eyes for as long as you want.

1. Select the upper eyelids in the Puppeteering Panel.
2. Click the Preview button and press the Space bar to start previewing.
3. Click the Record button and press the Space bar to start recording at normal speed.
4. Drag in the dummy pane, up or down, to decide the time length for the eyes to blink. You may fully control the eyelids.
**Creating Custom Puppet Profiles**

You can create your own unique puppet profile or modify existing profiles from the Advanced Puppet Settings pane.

**Creating and Saving Custom Profiles**

1. Click the Clear Selection button to deselect all features.
2. Pick the desired features in the Solo Feature Selection pane.
3. Click the Preview button, press the Space bar, and move your input device (mouse by default) to preview the movements of the selected features.
4. If you are satisfied with the result, click the Save Profile button to save your custom profile.
5. Click the Open Profile button to load an existing profile.

**Adjusting Weight**

To customize your own puppet control profile, you may want to adjust the weight of each feature manually.

1. Pick the desired features in the Solo Feature Selection pane.
2. Click the Advanced Puppet Settings button to expand the weight pane.
3. Modify the values in the Weight column of the corresponding feature to specify the weight of the movements triggered by the movement of your input device.
4. Click the Preview button, press the Space bar, and move your input device (mouse by default) to preview the movements of the selected features.
5. Do steps 3 and 4 repeatedly until you obtain satisfying results.
6. Click the Save Profile button to save your custom profile.
Puppeteering Principles for Face Puppet Panel
When using the Face Puppet panel, the mouse cursor directions are mainly Mouse Move Up and Mouse Move Down which can trigger different facial muscles in the same directions.

With a combination of facial muscle animations, you can create thousands of expressions by simply moving your mouse around.

Bilateral Facial Features

A. Forehead
Mouse moves up Sad

B. Both Eyebrows
Mouse moves down Anger

C. Both Eyelids
Mouse moves up Shocked

D. Both Cheeks
Mouse moves down Tired

E. Mouth Shape
Mouse moves up Pouting

F. Jaw Bone
Mouse moves up Lips-biting

Mouse moves up Smiling

Mouse moves up Jaw up

Mouse moves down Upset

Mouse moves down Jaw Down

Mouse moves down Suspicious
Unilateral Facial Features

A. Eyebrow
- Mouse moves up
  - Surprised
- Mouse moves down
  - Indifferent

B. Upper Eyelid
- Mouse moves up
  - Shocked
- Mouse moves down
  - Sleepy

C. Eyeball
- Mouse moves up
  - Eyeball rolling

D. Lower Eyelid
- Suspicious

E. Ala
- Mouse moves up
  - Disgusted
- Mouse moves down
  - Admitting

F. Cheek
- Mouse moves up
  - Smiling
- Mouse moves down
  - Sad

Multiple Facial Features

A. Nose, Forehead, Cheeks and Mouth
- Mouse moves up
  - Calm
- Mouse moves down
  - Threatening
Face Key Editing (New for V7.0)

Muscle Feature Select becomes more comprehensive with intuitive set of positional controls.

Note:
Using G5 or Non-standard (Daz or Custom) characters can be incompatible with the new facial profile due to it missing 24 essential key facial poses. Please refer to the Handling of Compatibility section for more information.

Muscle Symmetrical Selection
The newly added symmetrical selection can drastically speed up the time it takes to modify facial expressions.

Expression
iClone 7 provides a vast array of preset facial expressions for immediate application. The drop-down menu on the top right provides different sets of expression styles.
Modify - Detail Morph Slider Editing

- Modify parameters can be used to add extra detail and accuracy on top of the expressions, whether they are generated from morphs or skin weights.
- For fast access, the modify menu is categorized as **Brow Eye Nose Cheek Mouth**, and **Custom**.

![Modify parameters](image)

- The contents of the **Custom** set is derived from the **3DXchange Expression Custom Data** which can be edited and in which there are a total of 24 available shapes.

![3DXchange Expression Custom Data](image)

Note:

Using **G5** or **Non-standard** (Daz or Custom) characters can be incompatible with the new facial profile due to it missing 24 essential key facial poses. Please refer to the **Handling of Compatibility** section for more information.

Morph - Expressiveness

- The **Expressiveness** can be used to exaggerate or tone down the facial expressions.

![Expressiveness](image)

- The **Reset All** can be used to return to the previously saved expression. Expressions are saved when the **Face Key** dialog window is closed.
Adding Face Keys

You may use face keys to fine tune your animation, layer subtle expressions to your characters; or sometimes you can use face key to enhance the accuracy of lip-sync. Click the **Face Key** button under the **Animation** tab of the Modify Panel to create individual face keys by adjusting the facial muscles. In the **Face Key** panel, you can control up to 19 regions highlighted on the face and add facial expression keys in the Timeline.

1. Select the character and click the **Face Key** button under the **Animation** tab.
2. The **Face Key** panel appears. Highlight one of the features.
3. Move your mouse in the interaction area to create a new facial key.
4. Drag the timeline slider to a new position.
5. Create another expression to blend in with the first key. Now, both keys appear in the Facial Layer track.

You may click the Reset All button to return to the default facial expression before creating another face key.

Note:

If you do not want the avatar to blink during the puppeteering session, you may go to the Attribute tab to disable Auto-Blink.
Adding Face Keys - Layer Editing
After you have created facial expressions for your character you can fine-tune the expression by using the Face Key technique. These keys will be overlaid and blended with any already existing facial expressions.

1. You may first record expressions by using the puppeteering technique.
2. After you have created the clips, open the timeline panel. The clips will be recorded in the Expression track.
3. Focus on the Facial Layer track and move to the frame you want to enhance the expression in.
4. Open up the Face Key panel to create the Facial Layer keys.
5. Click and select the muscles you want to use to create an expression with. Move your mouse in the interaction area and the facial expression will change instantly.

6. Fine-tuning the expression using this method will create a new key in the Facial Layer track.
7. Here is a typical result of fine-tuning a facial feature.

Create any facial expressions from the Puppeteering technique. Then fine-tune them in the Face Key panel if necessary.
Facial Timeline (New for V7.0)
There are structure changes for the new facial system on timeline. Expression timeline track now has three tracks instead of one, separating the layers as the following:

* Muscle: Morph data
* Eyeball: Animation data for the eyes
* Head: The Orientation and Tilting movements of the head.

Note: For iClone 7.X changes to Clip Include Layer Key will also be applied to Character Body Motion (Clip and Layer key). Both functions will also use the same curve editor.

The features that are influenced are described in the following sections.

Clips Including Layer Keys

- Any drawn out block along with Layer key add, move, copy, and paste will be relegated to this clip area.
- Layer keys can be moved independently, greatly enhancing the ease of use. In the past, the Clip and Layer keys must be selected at the same time in order to perform this function.

Note:

Copying and pasting is not supported on other clips besides the clip of origin.
Auto-Extend

- The **Auto-extend** mechanism smartly decides whether to extend the current clip to encompass a new expression key or to create a new clip altogether.
- The **Auto-extend** checkbox is available under **Menu > Animation > Clip Auto Extend**.

Loop

- The **Loop** mechanism can be applied to **Layer key Clip** and **Offset Layer Key** at the same time. This is leaps and bounds more efficient than iClone 6 where user would have to use Clip Loop, and copy and paste Layer keys by hand.
- The **Loop** mechanism works by instancing the current clip and putting the copies right behind the original one by one. One would just need to change the first original clip to change all of the subsequent instances.
  
  **Note:**
  
  Next version of iClone will provide **Loop Clip Layer key**.

Speed

- The **Speed** mechanism can be applied to **Layer key Clip** and **Offset Layer key** at the same time. This is a vast improvement over iClone 6 where the only way to control clip speed is to move the individual keys.
- The **Speed** percentage is displayed right on the clip title bar, facilitating the pulling and shrinking of the clip to alternate the clip speed.
- The **Speed** mechanism dynamically accelerate and delay the clip without changing the Layer keys and frame numbers.
Sample
- Any data created by Face Puppet will be included in the clip. You can use the Record Blending to keep layering and superimposing expressions.

- If you would like to change the contents of the clip, you can convert the clip to three track Layer keys via the clip's new context menu (right mouse click): Sample Expression Clip

- Once a clip is sampled then the user can use Face Keys for detailed editing.

Flatten
- Layer track exclusive keys can be merged with its parent clip by using the new Flatten option under the clip's context menu (right mouse button).

- Once the layer tracks are flattened, you can continue to add Layer keys to adequately conceive the dynamic expressions.
Facial Expression Tracks
Click the down arrow button of the actor track to open the Viseme Expression and Facial Layer tracks on the timeline.

Viseme Track
The Viseme Track stores the lip-sync data of the character that moves the mouth. Go to the Modify panel >> Animation tab and click the Create Script button.
- Click the Record Voice Wave File and TTS buttons to record your voice, to import a wave file or to utilize TTS to create the lip-sync data for the actor.
- Click the CrazyTalk Script button to import a script or motion clip you created from CrazyTalk (This fills both Viseme and Expression tracks)
The Data will be converted into clips in the Viseme Track and can then have its position adjusted to have your avatars speak at different times.

Expression Track
Facial Clips will be produced in the Expression Track when:
- You apply a Facial Animation template from the Content Manager.
- You click the CrazyTalk Script button to import a script or motion clip created from CrazyTalk.
- You have recorded a facial movement in the Face Puppet panel.

Facial Layer Track
The facial deformation keys generated from the Face Key panel are displayed in the Facial Layer Track. This track stores the unique bone-based facial deformation data which gives rich facial details to actors. Please note however that this data cannot be imported back to CrazyTalk.
Using Facial Mocap Plug-in (New for V7.0)

Reallusion partnering with pro capturing Technologies from Faceware, which provides a highly accurate markerless capture using a regular PC Cam and iClone 7 to achieve real-time facial motion capture recording. It will empower indies and studios of all levels to access face mocap tools geared for ease of use and performance results for any project, previz, or production.

Please refer to the Faceware Realtime and Facial Mocap Plugin Online Manual for more information.
Reducing Jumpy Mouth Movements as a Character Talks

After a talking script is applied to the character the mouth starts to move with different lip shapes called **Visemes**. However, the algorithm for generating the visemes is unbiased, sometimes leading to jumpy redundancy. With the **Lip Sync Options** panel, these jumpy issues can be solved.

**Generating Visemes**

1. Apply a G6 character made by **iClone Character Creator**

![Image of a G6 character](image)

Note:

> Even though **Heidi** and **Mason** are G6 character as well, they are not generated from **iClone Character Creator**.

2. Apply an audio file to the character as its voice.
3. Check out the timeline, find the **Viseme** track under the character. You will see a lot of visemes are automatically added into the **Lips** sub track.

![Timeline with Viseme track](image)

4. Play back to view the result, you will find the mouth movements may sometimes be jumpy, which is caused by the intensively clustered visemes.

![Audio waveform](image)
Reducing Lip Keys

In order to reduce the redundant lip keys (Visemes), you can follow the steps below:

1. On the Lips track, right click in the empty space to show the right-click menu.

2. Click on the Reduce Lip Keys command.

3. The redundant lip keys included within the clip in the track will be hidden.

4. Play back and the jumpy issue will be solved.
Smoothing Mouth Movements

No matter if the visemes are generated automatically or manually, the bumpy movements of the mouth can be solved by reducing the redundant lip keys. However, the transition between two keys can be still be exaggerated, which will look overly dramatic and unrealistic.

Generating Visemes

1. Apply a G6 character from iClone Character Creator.

Note:

Please note that even though Heidi and Mason are G6 character as well, they are not generated from iClone Character Creator.

2. Apply an audio file to the character for lip-syncing.
3. Check out the timeline, find the Viseme track under the character. You will see a lot of visemes are automatically added into the Lips sub track.

4. Optimize the visemes by reducing lip keys feature or by manually adding adequate visemes.

5. Play back to view the result, you will find the mouth movements, including the jaw, the lips and the tongue, are too exaggerated.
Smoothing Mouth Movements

1. On the Lip Options track, drag to make a range to include the area for smoothing the transitions.

![Image of Lip Options track]

If you want to smooth the entire voice clip, then skip this step.

2. Right click in the range (or elsewhere in the track if the first step was skipped), select the Lip Sync Options from the right-click menu.

![Image of Lip Sync Options]

3. Choose the Full Mouth radio button and activate the Smooth box in order to enable the setting.

![Lip Sync Options interface]

Set the smooth value and click the Apply button.

4. Play back and adjust the smooth value to have a better mouth movement animation.
**Smoothing Parts**

You can also smooth the movements of mouth parts, including the tongue, the lips and the jaw instead of the overall smoothness.

1. Using the same example above, choose the Parts radio button in the step 3.

2. Adjust the sliders to determine the smooth status for lips, tongue and jaw (in this case, adjust the Jaw slider because it is the one with the most drastic movements).

3. Play back and you will see a big difference for the jaw while the effect on the lips and tongue are quite mild.
Stylizing Mouth Movements

People articulate motions in different ways. By using the Lip Sync Options panel, you can adjust the animation strength for the tongue, lips and jaw.

Generating Visemes
1. Apply a G6 character made by iClone Character Creator

Note:

Please note that even though Heidi and Mason are G6 character as well, they are not generated from iClone Character Creator.

2. Apply an audio file to the character for lip-syncing.
3. Optimize the visemes by reducing lip keys feature of the Lip Sync Options panel or by manually adding adequate visemes.
4. Smooth the transitions between lip keys to mitigate jerky movements.

Stylizing Entire Mouth Movements

After the mouth movements have been optimized by the Smooth feature, you can stylize it with the Strength setting.

1. Make sure the Lip Sync Options panel is still displayed.
2. Choose the Full Mouth radio button and activate the Clip Strength checkbox in order to enable the setting.

Increase the strength value and click the Apply button.
3. Play back and adjust the Clip Strength value accordingly.

The mouth movements become smoother and stronger.

Stylizing Parts of Mouth Movements

In the previous section, you are simply increase the strength of the entire talking clip, however, adjusting the movements of individual mouth part, including the tongue, the lips and the jaw can stylize the mouth movements even more.

1. Using the same example above, choose the Parts radio button in the step 3 and activate the Smooth box.

Maximize the three smooth settings for the strongest result.

2. Activate the Clip Strength box. Adjust the sliders as shown below in order to have the character speaks with closer teeth (less jaw movements), lazy tongue and exaggerated lip movements.

3. Play back and you will see only the lips movements are significantly exaggerated while the motions of the jaw and the tongues are somewhat mild.
User Interface Introduction for Morph Animation and Features (New for V7.0)

To view the new Morph Animation button in iClone 7 via the Modify panel, click on the Prop, iAccessory or iAvatar. Click on the Morph Animation button to startup the Morph Animation user interface.

The Morph Animator panel will pop up.

| A | Mesh List | Mesh List shows the mesh level hierarchy structure. Once a proper mesh is selected, all of its morphs will be listed in section B. This pane will list out all of the morphs available for the select object in panel A. Mesh List. Note: Please note that the Morph data will also include the ones made or edited in Morph Creator. |
| B | Morph List | C | Show Child | Check this box to show all of the morphs available for the entire hierarchy of the selected object. Un-check it to focus on just the morphs available for the currently selected object. |
| D | Default Key | D | Default Key | Clicking on this button to set a keyframe in the timeline at zero for all sliders in the Morph list. |
Morph Contents (New for V7.0)

iClone 7 provides several Morph Contents to let users experience Morph Animation firsthand.

- The water droplets under the laws of gravity.
- The balloonfish blows up.
- The bouncing elastic ball.
Morph Animation Timeline (New for V7.0)

The timeline now has a Morph Track for morph-able contents.

Under the Morph Track, there are Mesh information with their respective morph data. Every single morph has its own animation track for keyframe editing.

By dragging on the morph slider, one can see the morph play right in the viewport and, at the same time, set a key in the timeline.
By clicking on the Default Key, all of the visible morph sliders are reset and keyed at zero.

You can use the Morph Animator interface to create a morph based animation.

Note:

You can delete a Morph Slider in iClone if you want to. However, once a slider is deleted, its animation timeline track is removed as well. Deleting a Morph Slider can be destructive and error-prone. For example, when bringing back Morph Creator > Update Morph will cause errors in animation. Be aware of the possible issues before deleting a Morph Slider. Keep in mind that deleting the Link Slider will also remove various Object related animation tracks.
Creating Custom Morph Sliders with Morph Creator (New for V7.0)

To create custom morph sliders, you can use the Morph Creator by clicking the Morph Creator button in the Modify panel when a morph-able object (Prop, Accessory, and Avatar) is selected.

Use the Morph Creator to create or edit Morph data.

Basic Workflow

1. Use the Content Export feature in Morph Creator to edit morph targets in other 3D tools.
2. Use Morph Creator to import the edited morph shapes and create morph sliders.
3. Use Send to iClone feature to start animating the edited morph targets.

Please also refer to the following sections for more information:

- The User Interface Introduction for Morph Creator
- Importing Contents to Morph Creator
- Creating Morph Sliders
- Editing Morph Sliders
- Sending and Updating Morph Data
The User Interface Introduction for Morph Creator (New for V7.0)

The Morph Creator is divided into four sections. Please refer to the sections below for more information about these sections.

A. Main Menu
B. Toolbars
C. Scene Manager
D. Morph Editor
The Main Menu for Morph Creator (New for V7.0)

**File**

- **New**
  - To create a new file.
- **Open**
  - To open a file for creating morph data.
  - Note: The supported file formats are: *.iAvatar, *.iProp, *.mcRestore
- **Export**
  - To export the current character along with its morph data as an iClone character (*.iAvatar).
- **Import Morph Target**
  - To import a sculpted OBJ or iAvatar file as the target shape for the current character.
- **Export OBJ**
  - To export the entire character or the selected part for further sculpting with 3D tools in OBJ format.
- **Exit**
  - Leave Morph Creator.

**Edit**

- **Select**
  - To select a desired object.
- **Select All**
  - To select all objects.
- **Undo**
  - To undo the last step.
- **Redo**
  - To redo the last undone step.
- **Import Target Setting**
View

Pan  To pan the camera.
Zoom  To zoom in and out of the scene.
Orbit  To rotate the camera in the Orbit mode.
Home  To snap the camera to a 45 degree perspective to the selected object.
Center  This command makes the camera snap to view the selected object in the current project.
Camera View  This item contains a sub-menu for switching the camera to different views - Front (F), Right (S), Top (G), Left (A), Bottom (D), Face (J) or All (K).

Window

Workspace  This item contains a sub-menu for applying preset layouts according to your working conditions.

Tool Bar  This item contains a sub-menu for you to show / hide the Toolbars.

- Standard (Ctrl + 2): This layout brings up the Modify, Visual Settings, Content Manager, Scene Manager panels and all toolbars.
- Save Layout: This command saves the current docking / floating places and visibility states of panels and toolbars as the default layout, and you may instantly load it each time you launch the main program.
- Reset Layout: This command restores all the panels and toolbars to the default docking places with the Standard layout.
Scene Manager
This command show / hide the **Scene Manager** panel to view all the objects included.

Morph Editor
This command show / hide the **Morph Editor** panel to view all the morph data of the selected object.

Help

- **Online Manual**
  - To create a new file.

- **Product Demo**
  - To go to the official web page for demo videos or tutorials.

- **Member**
  - To log-in with the member account.

- **Technical Support**
  - To view the product FAQs and get further assistance.

- **Feedback**
  - To open the official 'Feedback Tracker' page for entering your comments or opinions or bug report directly.

- **Buy All Trial Contents**
  - If you are using any trial content in your current project, watermarks will be overlapped on your preview window.

  To remove the watermarks, you need to buy the trial contents, by clicking the **Buy All Trial Contents**, you will be led to the online shopping cart for purchasing the trial contents.

- **Content Activation**
  - If the watermarks still remain on the preview window after the trial contents have been purchased, select **Content Activation** to authenticate online in order to remove the watermarks.
Reallusion on the Web
To access the home page of Reallusion

iClone Morph Creator on the Web
To access the home page of Morph Creator

- New (Ctrl + N): To create a new file.
- Open (Ctrl + O): To open a file for creating morph data.
  Note:
  The supported file formats are: *.iAvatar, *.iProp, *.mcRestore

- Save (Ctrl + S): To export the current character along with its morph data as an iClone character. (*.iAvatar)
- Export All: To export the entire character for further sculpting with 3D tools in OBJ format.
- Export Selected: To export the selected part for further sculpting with 3D tools in OBJ format.

General
- Undo: To undo the last step.
- Redo: To redo the last undone step.
- Select (Q): To select a desired object.

Modify
- Send / Replace to iClone: Send the entire character to iClone or replace the character selected in iClone.
- Update Morph Data to iClone: Only update the morph data to the character selected in iClone.

Camera
- Home (Center): The Home mode snaps the camera to a 45 degree perspective of the selected objects while the Center mode snaps the camera in current perspective to view the selected objects.
- Zoom (Z): To zoom in and out of the scene.
- Pan (X): To pan the camera.
- Orbit (C): To rotate the camera. Click its down arrow to switch to Orbit or Roll mode.
- To switch the camera to different view, click the down arrow and choose from Front Right Top,
  Left Bottom Back Face or All.
The Tool Bars for Morph Creator (New for V7.0)

Project Tool Bar

- New (Ctrl + N): To create a new file.
- Open (Ctrl + O): To open a file for creating morph data.

Note: The supported file formats are: *.iAvatar, *.iProp, *.mcRestore

- Save (Ctrl + S): To export the current character along with its morph data as an iClone character (*.iAvatar).
- Export All: To export the entire character for further sculpting with 3D tools in OBJ format.
- Export Selected: To export the selected part for further sculpting with 3D tools in OBJ format.

General Tool Bar

- Undo: To undo the last step.
- Redo: To redo the last undone step.
- Select (Q): To select a desired object.

Modify Tool Bar

- Send / Replace to iClone: Send the entire character to iClone or replace the character selected in iClone.
- Update Morph Data to iClone: Only update the morph data to the character selected in iClone.

Camera Tool Bar

- Home (Center): The Home mode snaps the camera to a 45 degree perspective of the selected objects while the Center mode snaps the camera in current perspective to view the selected objects.

- Zoom (Z): To zoom in and out of the scene.
- Pan (X): To pan the camera.
- Orbit (C): To rotate the camera. Click its down arrow to switch to Orbit or Roll mode.
- To switch the camera to different view, click the down arrow and choose from Front Right Top Left Bottom Back Face or All.
The Scene Manager for Morph Creator (New for V7.0)

Here the Content nodes and meshes will be listed. The icon will appear gray when the mesh does not contain any morph data. The opposite is true when the icon appears in white.

1. **Dock / Undock**
   - Double-click on the caption to dock the panel to the docking place, or undock the panel and make it float above the main program.

2. **Search**
   - Type full or partial names of objects in the search field to search for desired objects.

3. **Sort**
   - Click the Name caption, to re-order the object by their alpha-numeric order.

4. **Category Name**
   - Click on the triangle button beside the category name to collapse / expand the category.
   - Click on the category name to expand the category and select all the items under this category.

5. **Object Status Icons**
   - Multi-select object rows in different categories, and you can simultaneously change the following object status items:
     - **Show / Hide**
       - Show or hide the selected object. This status does not affect the export result.
     - **Lock / Unlock**
       - Lock or unlock the selected object. If an object is locked, then it cannot be picked in the Preview window. Please refer to the Locking and Freezing Camera section for more information.
     - **Render State**
       - You may specify the render status for each object to relieve the load on system resources. This status does not affect the export result.
       - The status includes:
         - **Basic Modes**
           - Normal, Smooth, Wireframe and Bounding Mesh

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iClone 7 User Manual · 359
• **Wireframe on Shaded**: This mode displays the surface of the object with wireframe covered. When the wireframe mode seems too difficult to identify the selected meshes due to the high density of the wireframes, then switch to the **Wireframe on Shaded** mode for getting more clues of the selected objects.

• **X-Ray**: Since some objects, such as CC characters, maybe composed of multiple layers (clothes for characters), with this mode you are able to easily observe the relationships between each layers.

---

**Shadow**
- All Shadows
- Cast Only
- Receive Only
- No Shadows

**Realtime Smooth**
- Original
- Smooth

**Object Name**
Double-click on the object name to enter the name-editing mode. You may rename all the items as you wish.

You may decide to turn the shadow effect on/off for each object, cast the object shadows only, or receive shadows from other objects only.

You may turn the **Realtime Smooth** on/off.
The Morph Editor for Morph Creator (New for V7.0)

1. **Send / Replace to iClone**
   - Send the entire content to iClone.

2. **Update Morph to iClone**
   - Update the designated mesh morphs onto the corresponding content inside iClone.

3. **Edit Tools**
   - Edit Tools (from left to right): Add, Replace, Bake, and Delete sliders.
   - The Morph Data of the picked mesh inside the current scene.
   - Morph Data buried in the child nodes of the Mesh will also be classified as being part of the mesh.
   - Pulling on the sliders can alter the morphs on the object inside the viewport.
   - Reset the Morph List slider values to zero.

4. **Morph List**
   - Show all of the morph nodes of the entire mesh hierarchy.
   - When not checked, only the morph data on the picked mesh will appear in the morph list.

5. **Reset**

6. **Show Child Morphs**
Importing Contents to Morph Creator (New for V7.0)

There are three methods to importing contents into Morph Creator.

- In *iClone 7*, pick a content and execute Modify panel > Motion tab > Morph Creator button. The content will be transferred to Morph Creator instantly.

- In *Morph Creator*, press File menu > Open item or click the Open button on the toolbar, selected the desired iAvatar, iProp or mcRestore file for adding morph data.

- You can also drag the content directly into the viewport.
Creating Morph Sliders (New for V7.0)

Exporting Base Meshes as OBJ File
To generate a morph target, you need to first export the meshes from Morph Creator as a base in two methods:

- **Export the entire content as Obj**
  Perform File menu > Export OBJ > Export All and pick the appropriate coordinate space that corresponds with your target tool. Regardless of what is currently select, all mesh in the scene will be exported.

- **Export the designated content as Obj**
  Perform File > Export OBJ > Export Selected and pick the appropriate coordinate space that corresponds with your target tool.

This function will only export the selected mesh in the scene.

Creating Morph Sliders from iAvatar
You can use Character Creator to create sophisticated morph targets. However, there are certain limitations:

- Morph target shapes do not take into account bone transformations. The following visuals illustrates this very problem. When the target shape is added as a morph for the base avatar, the resulting morph is quite different from the target shape as shown above. This is because the morph works on top the existing bone transformations of the base avatar.

- You will notice some visual defects around the eyes in the illustration below. This is because the eyeballs have been moved by bone transformations in the target avatar.
Creating Morph Sliders from Objects with Morph Targets

If you have created a prop along with its morph targets in a 3D tool, then follow the steps below to bring it into iClone.

When you load a content into Morph Creator, a window will pop up a dialog to ask whether or not to embed the custom morph targets. Click on the Yes button to import all of the morphs included with this prop into the Morph Creator.

Creating Morph Sliders from Custom Assets

If you are creating morph targets in a 3D tool, make sure to abide by the following steps to be able to add the morph target inside iClone 7 without a hitch.

1. Create the base model inside your 3D tool (3Ds Max, Maya, etc.) and export it as Obj or Fbx.
2. Import the base model in 3Dxchange and save it as an iClone content.
3. Open the content inside Morph Creator and export it as an Obj file.
4. Back inside your 3D tool, open the exported Obj file and create a morph target. Once the morph target is complete, export it as an Obj file.
5. Use the Morph Creator to add the morph target onto the asset.

Note:
This roundabout process will ensure that the morph targets derived will be compatible with the iClone asset. However, if you are starting with Reallusion contents, then you can start from step 3.
You can also export a morph target directly from a 3D tool of your choice rather than use the OBJ base exported from MC.

However, to get the most compatible morph targets, please apply settings below for your respective software.

*Note: these settings are still being tested, if you come across any issues please let it be known by posting on the forums.

- **3Ds Max**

  ![3Ds Max OBJ Export Options](image)

- **Maya**

  ![Maya Export Selection Options](image)
- **Blender**

![Blender Export OBJ settings](image)

- **Cinema 4D**

![Cinema 4D OBJ Export settings](image)
Importing Morph Target

There are also two methods to import morph Targets (in OBJ or iAvatar format) and the imported targets will be presented in Slider forms. They will be displayed in the Edit Morphs section of the Morph Editor panel:

- Perform File menu > Import Morph Target to add a new morph target to the mesh.

- Click the + button in the Edit Morphs section of the Morph Editor panel and load the morph targets.

Note:

- Adding morphs can only be possible if the target and the object are different in shape. If the two meshes are the same then adding morphs will be skipped.
- Morph targets come in two formats: Obj and iAvatar.

For quickly import multiple OBJ targets, you can first export a few morph targets from a 3D tool situated at coordinate origin of (0,0,0). Then, inside Morph Creator, use Add Morph to quickly import all the morph targets.

Baking Morph Sliders

You can use the existing morph sliders to create a new morph target. The Bake Morph slider allows one to combine different morphs together across multiple meshes. The Link slider can simultaneously sync different slider parameter values. Thus one can conveniently use one slider to simulate the effects of multiple morphs.
1. Click on the **Bake Slider** button to derive a new morph slider.

2. The **Base Slider** panel will display on the screen.

- **Slider Name**: You can give the new slider a custom name by entering in this field.
- **Source Sliders**: This list will display all the morph targets and their mesh sliders that will be involved into this newly baked slider.
- **Delete Source Slider**: There are different situations after baking related to this box:
  a. If the sliders take charge of a same mesh, then a regular morph slider will be created.
b. When these sliders work on different meshes, this function can link different mesh sliders as one morph slider, while keeping the original sliders intact.

c. When the **Delete Source Slider** is activated, then the link function will create a slider set and remove the original morph sliders that is part of this set.

On the top right corner of the link slider, you can see a link icon activated.

Click on the button and then the slider works in conjunction with other sliders will be displayed in the **Link Slider Info** panel.
Editing Morph Sliders (New for V7.0)

Replacing Morph Target Meshes
You can replace a designated morph slider target by clicking the Replace button in the Edit Morphs section of the Morph Editor panel. It can be used to enhance the morph target or change out the target shape.

Deleting Morph Sliders
You can use the Delete button to delete the unused morph sliders.

- It is highly recommend that you use this function when making content, not when it is already being animated.
- Deleting the morph will also remove its slider. Please do not update the morph on objects that already have morph animations, this will create animation errors.
- Deleting a Link Slider will also remove corresponding sliders on other meshes.
Sending and Updating Morph Data (New for V7.0)

Sending Morph Data to iClone
When the entire morph content is sent to iClone 7, if the transmitted morph content is an iAvatar then the iAvatar currently picked in iClone 7 will be replaced. If nothing is selected then the iAvatar along with its morphs will be sent to the scene coordinate origin of (0,0,0).

Updating Morph Data for Specific Mesh
When applying the update, make sure to have a Morph Creator compatible morph content select inside iClone 7. If you discover that the content is different and therefore can not apply Update Morph Data to iClone, then you can update the mesh via the Morph Creator.
Updating Morphs and Link Sliders

Updating the morphs will have the following effects on the Link Slider:

- New **Link Slider** entirely update to **iClone** --> **New Link Slider** will keep the original link behavior.

- New **Link Slider** partially update to **iClone** --> **New Link Slider** will unlink the regular slider.

- Update morph will cause the old **Link Slider** to experience partial data loss --> **Old Link Slider** will unlink the regular slider.

- When the original **Link Slider** uses **Replace Target** to make full or partial updates to **iClone** --> **Link Slider** will preserve the **Link** relations as well as update the corresponding **Morph Targets**.
Spring Effects

In iClone, when a actors or props contain bone or bone-like structure and one of more bones in the structure have been already applied with Spring Effects, then the bones automatically bounce along the main body. You are allowed to turn on/off or adjust the parameters related to the spring effects, but you can not freely apply spring effects to specific bones in iClone.

- Where to Apply Spring Effect
- Spring Settings
- Turning Spring Effects On / Off
Where to Apply Spring Effect

In iClone only the bones of an object can have spring effects. However, you can merely turn on/off or adjust the spring behaviors that have already been applied to an object. If you want to apply spring effects to a specific bone, then you need to do it in iClone 3DXchange, version 5.4 or above.

Before applying spring effects to bones, you need to know how and which bones are available for you to manually apply spring effects to.

Standard Actors (how)

The Standard actors in iClone contain the Reallusion Standard Bone structure in which all bones from the Hip to Face, Finger and Toe are all occupied, which means that you are not allowed to apply spring effects to them. However, there are still some bones that can be given spring effects, and they are the Hair, Breast, Abdominal (G3 actors or above) and Hip Cheek (G5 actors or above) bones.

Non-standard Actors (how)

If you have bone-skinned biped models that are created in any external 3D tools such as Maya or 3DS Max, then everything classified as a kernel bones (from Hip to Head, Forearm, and Toe bones) need to be mapped to the standard bone structure in 3DXchange. The excessive or branch bones, which can be mapped as Extended Bones, are able to be given spring effects.

Non-human Actors (how)

Because the non-human actors are freely created bone-skinned models, every bone can be given spring effects except the root and the bones one level under the root.

Props (how)

The props can be bone-skinned props (from external 3D tools) or merged props (from iClone). Each bone in the structure can be given spring effects except the root and the bones one level under the root.
Spring Settings
When an actor or a prop contains spring effects, you may adjust the spring motion by setting the parameters of the springs.

1. Select the target object (Actor or Prop).
2. Access the Spring section in the Attribute tab of the Modify panel.

3. Select the bone string from the Select Spring drop-down list to adjust its spring effect.
4. Adjust the sliders to change the spring behavior for the bone string.
   - **Mass**: This parameter sets the weight of the group. The higher the value is, the more inertia is generated for the group.

   ![Mass comparison](image1)
   ![Mass comparison](image2)
   - **Strength**: This parameter determines the pulling forces (inner tension) between the nodes in a spring group. The higher the value, the stiffer the group will be.

   ![Strength comparison](image3)
   ![Strength comparison](image4)
   - **Bounciness**: This parameter determines the level of spring that remains after the movement of the entity stops.

   ![Bounciness comparison](image5)
   ![Bounciness comparison](image6)
Turning Spring Effects On/Off

In iClone Spring Effects of characters or props that contain bone-structures can be turned on or off, so that the bones can sometimes auto-animate along with the motions of the characters or props and other times be manually animated by key-frame-editing with IK / FK methods.

Turning Spring Effects On/Off

1. Load a character or a prop with spring effects on specific bones (in this case, the character has been given spring effects on the ears and the tail bones).

2. Apply motions to the character, you can see the spring effect triggers the bones to auto-bounce.

Bones with Auto Spring Effects: The ears and the tail.

3. Make sure the character is selected and go to a specific time frame when you want to turn off the spring effect.

4. In the Spring section of the Modify panel, select the bones for which you want to turn the spring effects off via the Select Spring drop-down list.
5. Press down the Off button.
6. Go to another time frame, click the On button to turn the spring effect on again.
7. Play back to view the result of the different spring effect settings.

Note:
- The Spring keys can be found in the character or prop’s Spring track in the Timeline.
- Please refer to the Spring Track section for more information.

Manually Animating Bones with Spring Effects Off

When the spring effect of a bone string is turned off, you are able to manually adjust the bone via IK or FK methods to create key-frame animation for it.

- **What is IK/FK**
- **IK/FK for Non-human Actor**
  1. Select the character or the prop (with spring effects) and go to the time frame when the spring effect is off.
  2. Launch the Edit Motion Layer (for Actors) or the Edit Animation Layer (for Props) panels.

  - **Standard and Non-Standard Actor Modify panel >> Animation tab >> Edit Motion Layer button >> Edit button.**

  - **Non-Human Actor Modify panel >> Animation tab >> Edit Motion Layer button.**
3. Manually modify the bones via the IK or FK methods within the time during which the spring effects are off.

3. **Prop Modify** panel >> **Animation** tab >> **Edit Animation Layer** button.

![Edit Motion Layer]

IK method.

FK method.

The modification results will be kept in layering keys on the **Motion Layer** (for Actors) or **Animation Layer** (for Props) track.

4. Play back to view the result.
Adjusting Spring Settings for Bones with SPX Files (New for 6.1)

In iClone, the Mass, Strength, and Bounciness values in the Spring section are focus on the entire bone-chain that are spring-activated. However, if you want to adjust the spring settings for each bone in the chain, then follow the steps below (these steps apply to both characters or props):

1. Deploy a bone-skinned and spring-activated object.

2. In the **Modify** panel >> **Edit** tab >> **Spring** section, click the **Save** button.

3. Save the spring settings for each bone as .SPX file.

4. Open the .SPX file in a text editor of your choice. Notice the 3 sections below:

   A. Header of the .SPX will indicate the version of the file (the latest version is 1.2).

   B. A listing of the bones that have been applied with spring definitions.

   C. The settings of the spring parameter on each bone.
5. You may then change the values of the settings for desired bone (in this case, the MaxLength values for the Spring03 and Spring04 are set to be 100.00).

6. Save the edited .SPX file and load it back on the object.

7. Play back to view the differences of the spring effect.

Note:

If you do not want to adjust the settings with a text editor, then you can export the entire object to 3DXchange and do the adjustments by following the directions on the Spring Settings page. Both methods can achieve the same bone spring customizations.
Physics Concepts

IClone Physics is a system where objects inside a project are influenced by gravity and interaction with other objects. You can experience natural properties such as falling, bouncing, flapping and others. Any object assigned with physics properties also recognizes other objects with similar physics settings.

Once you play these physics, objects can automatically generate animations as soon as they interact with other physics objects. Now you do not need to manually produce animations by setting keys or puppeteering, which can sometimes be time-consuming and difficult to achieve a natural feel.

Physics Objects

Currently, physics settings can be applied to Characters, Props and Accessories. Once applied, the objects in these categories will become Physics Characters, Rigid Body or Soft Cloth.

Physics Characters

Once the character is given physics settings, it is able to interact with any other physics objects. The collision animations between the characters and the rigid body or soft clothes will be automatically generated, which can save time as opposed to manually setting keyframes to simulate interaction.

Rigid body

Rigid body dynamics enable you to simulate objects with a high degree of realism such as fall, collide and bounce. All these movements are controlled by physics properties such as mass, elasticity, friction, damping, impulse, collisions, constraints and others. You can even add rigid body physics to any prop or character in order to add another dimension of interactivity between subjects.
Soft Cloth

Soft cloth dynamics focus on realistic physical simulations that deform singular planes. Animations are now incredibly life-like as objects can accurately represent their elastic properties to simulate cloth effects, from a singular plane with different material stiffness such as silk, linen or any other materials that will be affected by air resistance.

**Note:**

Please note that if you want to simulate the physics animations, you must activate the Simulate Rigid and Simulate Soft features by clicking the related buttons on the toolbar:

- Rigid body simulation is turned **On** / **Off**.
- Soft cloth simulation is turned **On** / **Off**.

**Optimization for Physics Simulation**

In order to get the best results for physics animations, pay attention to the items listed below:

- Use a computer with strong processing power (better CPU and GPU chips).
- The shader option strongly affects the frame rate; when setting up physics objects or generating physics animations, it is highly suggested that you switch to the **Quick Mode** option in the Preference >> Real-time Render Options section when simulating physics.
- To simulate in **Realtime** or in **By Frame** modes:
  - **By Frame**: Forces frame-by-frame simulation. This ensures you will get precise simulation results. **Use this mode when simulating soft cloth animation.**
  - **Realtime**: Use simple simulations to ensure proper FPS (Some frames may be dropped). However, since frame-rate drops may occur, simulation results may be incorrect or not 100% precise.
- Normally, the rendering export procedure is based on the **By Frame** mode in order to ensure that soft bodies have the most correctly simulated animations.
- Close the Timeline during simulation; the updating on the user interface slows down calculations, thus influencing the accuracy of simulations.
Dual Physics Engines
iClone contains two physics engines, one is called Bullet and the other is PhysX from NVIDIA. The Bullet engine is used for playing back and simulating the physics result for the projects with physics objects created by iClone 5, and the PhysX engine is used to generate physics animation within iClone 6.

The Comparison of Bullet and PhysX Engines
The comparison table for these two engines are listed in the following table:

<table>
<thead>
<tr>
<th>iClone Version Applicable Targets</th>
<th>Bullet</th>
<th>PhysX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objects Generated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Features Provided</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simulation Accuracy</td>
<td>Medium.</td>
<td>High.</td>
</tr>
</tbody>
</table>

Bullet 5 and 6
- Props
- Accessories
- Rigid Body
- Soft Body
- Soft Cloth
- Merely able to simulate the physics animations of the physics objects in the projects created by iClone 5.

PhysX 6 or later version
- Characters
- Props
- Accessories
- Physics Characters
- Rigid Body
- Soft Cloth
- Capable of simulating the physics animations of the objects in the projects created by iClone 6 or later versions.
- Provide physics settings in order to do further editing for the physics objects (character, props, and accessories).
Switching Physics Engines
In accordance with the projects created by different versions of iClone, you need to switch the modes of the physics engines in order to have accurate simulation results.

Simulating Physics Animations for iClone 5 Projects
1. Create a project with a physics object in iClone 5

2. Load the project into iClone 6
3. By default, the engine will be automatically switched to the Bullet engine mode.
4. To make sure the mode is correctly switched, open the Project Settings panel and move to the Global Physics Settings section.
5. Switch to the Bullet Engine mode in the Simulation group by activating the corresponding radio button.
6. Click on the Play button to simulate the physics animations for the objects in the project.

Note:
- Please note that you can only play to simulate projects of this type, any further editing to the objects are not allowed in iClone 6.
- If you want to do further editing to the physics objects in this type of project, then you need to launch them with iClone 5
Simulating Physics Animations for iClone 6 Projects

1. Create a new project with objects (characters, props, or accessories).
2. By default, the engine will be automatically switch to the PhysX mode.
3. To make sure the mode is correctly switched, you may open the Project Settings panel and move to the Global Physics Settings section.
4. Switch to the PhysX mode in the Simulation group by activating the corresponding radio button.
5. Select one of the objects of which you want to activate the physics settings.
6. In the Modify page, switch to the Physics tab.
7. Activate and edit the physics settings for the selected object via the parameters within this tab.
8. Repeat the same steps until every desired object has been animated with the physics settings.
9. Click on the Play button to simulate the physics animations for the objects in the project.
Physics Settings for Characters
Each iClone standard character contains physics settings. It can realistically interact with other physics objects in your scene. Simply select any body part and resize the graphic reference to match the desired collision area, then go wild with any number of interesting physics interactions.

How Does It Work?
The method for a character to interact with rigid bodies or soft clothes is, by default, to attach different collision shapes (rigid bodies) to each body part. When the character moves, these shapes will thus be in charge of interacting with any other physics objects instead of using the native meshes composing the character.

Setting the Collision Shapes for Characters
Setting the collision properties for character body parts is easy. Simply open the setting panel to activate, deactivate, add, delete or adjust basic parameters for the collision shapes of a character.

1. Apply a standard character. By default, there are already collision shapes attached to it.

Note:
- The character is adjusted to semi-transparent for better observation of the collision shapes.
- The collision shapes can not be seen unless you open the **Character Collision Shape Editor** panel and show them.
- The grey mesh wire frames are the default collision shapes for the character.
- Please note that the collision shapes for **G6** characters are more sophisticated than those attached on the **G3 and G5** characters.
2. Make sure the character is selected and go to **Modify > Attribute** tab. Click on the **Collision Shape** button in the **Avatar** section.

3. Adjust the settings in the **Character Collision Shape Editor** panel.

Note:

Please also refer to the following section for more information about using the **Character Collision Shape Editor** panel:
- **Introducing the Character Collision Shape Editor Panel**
- **Settings for Collision Shapes of Characters**
- **Soft Cloth for Characters**
Introducing the Character Collision Shape Editor Panel

1. **Active Collision Shape**
   - Activate or deactivate physics-enabled collision shapes on your character.

2. **Show Active Shapes**
   - Activate this box to show all collision shapes attached to the body parts of the currently selected character.

3. **Bone-selecting Pane**
   - In this area, you are able to select the bones of specific body parts in order to adjust the collision shape attached to them. Both regular and extended bones can be selected.
   - Use these three buttons to remove, reload or save the current settings of the collision shapes.

   - ![Reset](image) Click this button to remove every collision shapes already attached to the character. If you want to customize collision shapes, you may need to click this button first in order to add new shapes manually.
   
   - ![Load](image) Click this button to open the previously saved settings of the collision shapes, including the parameter values.
   
   - ![Save](image) Click this button to save the current settings of the collision shapes, including the parameter values.

4. **Adjusting Collision Shapes**
   - In this section, you are able to add and delete the collision shapes for selected bones, and set the dimensions of the collision shapes.
   - Please refer to the [Settings for Collision Shapes of Characters](#) section for more information.

5. **Basic Parameter Settings**
   - By activating the **Affect All Shapes**, the current parameter values will be applied to the rest of the collision shapes that are already attached to the character's body parts.
   - Please refer to the sections below for more information about the meanings of the parameters.

   - **Margin**: The Bounding of a Rigid Body
   - **Friction** and **Elasticity**: The Properties of a Rigid Body
Setting Collision Shapes for Characters

According to the various collision results on different characters, you may need to adjust collision shapes in order to provide accurate material interaction with other objects.

Adjusting Existing Collision Shapes

If you want to change the dimensions of the existing collision shapes or transform them, especially for G3 or G5 characters, follow the steps below:

1. Import a character (in this case, the character is a non-standard one).

2. Make sure it is selected and go to Modify >> Attribute tab. Click on the Collision Shape button in the Avatar section to show the Character Collision Shape Editor panel.

![Character Collision Shape Editor](image)
3. On the left dummy pane, select one of the body bones. The collision shape of the bone will show (As you can see the collision shape may not be exactly accurate).

Note:

- With the **Ctrl** key pressed, you are able to select multiple bones to adjust the collision shapes simultaneously.
- Right-clicking on the bone part in the dummy pane will quickly deactivate its collision settings.
- If the collision shape does not fit the meshes of the character, then when the character is interacting with other physics objects, the meshes will penetrate into any other physics objects.

4. Use the object transform tools ( ) to adjust the position, angle and size of the collision shape to match the meshes of the body part.

5. Once you have adjusted the collision shapes for each relevant body part, you will notice a much better physics simulation result.
Adding Collision Shapes for Better Simulation

Because the body parts of a character do not always conform to perfect spherical, capsule, or box shapes, you will need to combine these shapes to cover particular body parts in order to get more accurate simulation.

Basic Transforming
1. Import a character.

2. Make sure it is selected and go to Modify >> Attribute tab. Click on the Collision Shape button in the Avatar section to show the Character Collision Shape Editor panel.

3. At the left dummy pane, select one of the body bones. The collision shape of the bone will show. Notice that it doesn't conform accurately to the shape of the head mesh.

4. Use the same method to transform the existing collision shape.
Adding More Collision Shapes
Because the mesh of the body part can not completely fit into the collision shape, you need to add more shapes to cover the entire mesh.

1. Make sure the body part is selected in the left dummy pane.
2. Click the Add Shape button to add a new collision shape (capsule by default).

Note:
- iClone automatically generates the same shape as the currently selected one.
- Please note that you may change the name of the collision shape by double-clicking on the name in the Select Shape list.
- If you want to delete any collision shapes, then select the target shape in the Select Shape list and click the Delete Shape button to remove it.

3. Transform the newly added shape to a proper position to cover the mesh of the body part.

Note:
- Use the Bound Type drop down list to determine the type of the currently selected shape. The default types are Box, Sphere and Capsule.
  - The Bound Axis drop down list only works when the shape is a Capsule. You may use it to align the long axis to the long side of the body part.

4. Follow the same steps to add as many shapes as you need to cover the body part.
Adding Collision Shapes for Extend Bones

If the character contains meshes skinned to extended bones, you are able to add collision shapes for these extended bones as well. This method is suitable for long ears or tails with spring effects caused by extended bones.

Let's try this on the same character:

1. Make sure the character is selected.

2. Show the Character Collision Shape Editor panel.

3. Click on the Extended Bones button at the bottom left of this panel. The dummy pane will change to a tree view in which all the extended bones the character has will be displayed.
4. Select one of the extended bone in the tree view and activate the **Activate Selected Part** box at the right side of the panel.

![Select bone and activate](image)

A default capsule will be attached to the selected extended bone.

5. Follow the same method shown in the previous section until each extended bone has been given a collision shape.

![Select bone and activate](image)

**Note:**

For more information about the physics parameter settings of each collision shape, please refer to the sections below:

![Physics settings](image)

- **Margin**: The *Bounding of Rigid Body*
- **Friction** and **Elasticity**: *The Properties of a Rigid Body*
Soft Cloth for Characters
Each iClone standard character contains one or more soft cloth objects. These objects can be the hair, cloth, or any sort of accessories. View the Video

Editing the Soft Cloth Objects
By default, the hair and the cloth on the characters are already optimized. However, you may load or edit the Weight Map or adjust the settings in the Property Collision and Wind sections.
1. Apply a standard character, in this case the female character is utilized.

2. Make sure the character is selected and go to the Modify >> Physics tab. Click on the Edit Weight Map button in the PhysX section.
3. The *Edit Weight Map* panel will show.

4. Select the target material from the list to pick the hair or dress of the character.

Note:
- You can also use the eyedropper tool at the top-right corner on this panel and the click on the hair or dress to pick the target material for further editing.
- If you do not select a material in this panel, then the settings in the *Modify >> Physics* tab will not be enabled.
- The *Diffuse* thumbnail will display the diffuse texture map for your material.

5. Adjust the *Weight Map* image.

Note:
- Please refer to the following section for more information about the use of *Weight Map* image.
  - Setting Soft Weight with a *Weight Map*
  - Loading *Weight Map*
  - Editing *Weight Map*
6. Follow the steps in each section to adjust other properties in the **Property Collision** and **Wind Setting** sections.
7. Play back to view the result (the edited skirt changes to a different texture and drapes downward slightly more).
The Rigid Body Simulation

When simulating Rigid Body physics animations, please follow the steps below:

1. Select a prop or an accessory. You are allowed to select multiple objects in order to assign the same physics setting to all of them.

2. Activate their physics characteristics by activating the Active Physics checkbox and choosing the Rigid Body radio button in the Modify >> Physics tab. Please refer to the links below for more information about the parameters in the Modify >> Physics tab.

   - The States of Rigid Body
   - The Properties of Rigid Body
   - The Bounding of Rigid Body

3. The selected object that is assigned physics settings will be surrounded with red wireframes (known as bounding).

4. Turn on Rigid Body Simulation by clicking the corresponding button on the the toolbar.

   - Rigid Body Simulation is on.
   - Rigid Body Simulation is off.

   Please note that if you wish to simulate animations of rigid body objects, then this button must be activated.

5. It is highly suggested that you switch to By Frame mode for each simulation. You may do this by clicking the Time Mode Switch button.

6. Click the Play button (Shortcut: Space bar) to start the simulation. The simulation results of all rigid bodies (Kinematic object is excluded) will be stored in their Animation tracks.

All free-falling objects will continuously drop during simulation unless you have added a physics floor for them to collide with.

7. You can go to the same start frame where you want to begin your physics simulation and continue to playback for a new simulation until you are satisfied with the results.

8. Turn off the Rigid Body Simulation so that next time you click the play button, a new simulation won’t take place. The last animations will be kept unless you turn on the Rigid Body Simulation again.

9. Once the simulation is finished, you may then switch to Realtime mode in order to view the results at regular playback speed.
Rigid Body and Regular Props
Once an object is designated as physics-enabled, it will then recognize and interact with other objects that are also assigned with physics settings.

In the following illustrations, the red props are rigid bodies and the white one is a regular prop.

Note:

* Please note that the Regular Props include props without physics settings or with Bullet physics settings applied in iClone 5.

Rigid Body: The floor, ball and the cone. The ball does not recognize the cube. It penetrates the cube. The ball recognizes the cone. It hits the cone and the cone bounces off.

Regular Prop: The cube.
Baking Animation Clips from Physics Simulations

After a **Rigid Body Simulation**, all the rigid bodies in the current project will have their own physics animation clips which include RT5 (rotation, transformation and scale) data. Since the results are not 100% the same after each simulation, the last simulated result won’t be re-used, a new one will be generated each time.

If you want to keep the ideal result, then you need to turn off the **Rigid Body Simulation** feature once the simulation is done. The animations will thus be "baked" into the rigid body. You may then add one or more of these rigid bodies to the library and reuse them afterwards. If these physics-enabled props already contain baked physics animations, they will create less of a demand on system resources when loaded into your scene.

Set a prop as a rigid body and activate the **Rigid Body Simulation** feature.

1. Select the target prop whose animation you wish to keep after the simulation, and open the **Timeline** (Shortcut: F3). The animation keys will then be baked into a clip form and stored in the **Animation** track of the prop.

   ![Timeline](image1.png)

2. Switch to the **Modify >> Physics** tab.
3. Deactivate the **Activate Physics** box to remove the physics characteristic from the prop.

   ![Modify Physics](image2.png)
4. Click the **Add** button under the **Content Manager**. The prop with its simulated animation will then be added into the library as a new prop.

![Content Manager](image)

5. Drag and drop the new prop into the current project or any other projects. The animation remains while the prop is no longer a physics rigid body, unless you activate the physics settings again.

![Image](image)
Using Rigid Body from the Library

Go to **Set >> Props** in the **Content Manager**. There you will find the **Physics Props** and the **Rigid Body** folders under it in the tree view.

Using the Infinite Plane

In the **Physics Props** folder you will find the **Infinite Plane**, which is a convenient rigid body for creating floors. The characteristics of it are listed below:

- All **Dynamic** and **Frozen** rigid bodies that have been hit, tend to fall towards gravity.

- You may apply any plane-based prop and set it as **Static** rigid body. However, it contains edges and dynamic and frozen rigid bodies will fall off once they make initial contact.
- If the plane-based prop has a very thin surface or thickness, then falling rigid bodies might penetrate it if the animations are too forceful.

- When the physics animation speed is too fast, caused by objects that bounce off or objects that are hit by any **Kinematic** rigid body, then plane penetration may occur.

- The **Infinite Plane** prop is a physics plane without edges, which ensures that there are no dropping or penetration issues.

- The plane, by default, might not appear after you apply it because it is initially set as a dummy. You may go to the **Preference** panel to enable the **Dummy Object** (Ctrl + D) in order to show all the dummies in the project.

- Please note that the local positive Z axis (blue arrow) of the plane shall always face the physics objects. Otherwise the simulated physics animations may be completely off.

- Duplicate and rotate the infinite plane to create an enclosed space. All animations of rigid bodies (**Kinematic** rigid bodies are excluded) will be confined in this space.

**Using the Props in the Rigid Body Category**

In the **Rigid Body** category under the **Physics Props**, you will find many props. They are all **Dynamic** props. You are allowed to apply and reassign their state.
The States of Rigid Body

One physics object can be set to four different states: **Dynamic**, **Kinematic**, **Frozen** and **Static**.

### Dynamic

The characteristics of a dynamic object are:

- Always free-falls in the direction of gravity (by default, down; but you may customize the strength and the orientation of the **gravity**).
- Three **Dynamic** props.
- Bounces off when it hits or is hit by another physics object.
- A dynamic ball.
- Hits and bounces.
- Three intersected dynamic rigid bodies.
- They bounce off as they explode outwards.
- Simulated animations will be stored in the **Animation** track of the object.
- This setting is suitable for free-falling objects.
Static

The characteristics of a static object are:
- Gravity takes no effect on static objects.
- It contains natural physics properties such as friction and bounce. However, it has no mass property and does not react to bouncing objects.
- It stays still in the physics world but provides physics collision effects. Objects like walls or floors are often set to a static state in order to prevent objects from penetrating them or moving them.

Two static blocks.

Motionless when they are hit. They cause the active prop to bounce off.

- It also generates animation clips in the Animation track after simulation.
- This setting is suitable for walls or floors or anything that does not move.

Kinematic

The characteristics of a kinematic object are:
- Gravity takes no effect on kinematic objects.
- It is not affected by other physics objects, but it does affect them.
- This is the only physics object that can have customized animations (from transform keys, animation clips or following path) or be puppeteered by you during the simulation.

A kinematic ball is constrained to a path.

The ball moves along the path to the end. Other rigid bodies are hit and bounced off.

A kinematic block is ready to be puppeteered.

The block is puppeteered to move around and hit other rigid bodies.
You may combine it with other iClone features (attaching, linking) to produce triggering forces for other physics objects.

A kinematic ball is attached to the rear leg. The ball moves as the bull kicks. The tank flies away.

It does not generate any animation clips after simulation.
This setting is suitable for physics objects that you want to control such as setting keys, following paths, or even puppeteering.
The bulldozer is animated by keyframe animation, and assigned a Kinematic rigid body.

Frozen
The characteristics of a frozen object are:

- It stays still until it gets hit by any other physics objects. Once it is hit, it turns into a dynamic rigid body.

The frozen rigid bodies are still during simulation. They fall like dynamic objects once hit.
- The setting keeps the intersected dynamic objects together in their initial state.
- It also generates animation clips in the Animation track after simulation.
- This setting is suitable for physics objects that are still before getting hit.

The glass and the table are composed of many fractures, which are set as Frozen to keep them together in the initial state.
Setting States Keys

Each physics rigid body has four states (please refer to The States of Rigid Body section for more details); you are able to switch states in various time frames so that the rigid body can be controlled, still, or free-falling in accordance with the state keys you have defined.

By using the state-switching method, you no longer need to use a hidden Kinematic rigid body to hit Frozen rigid bodies at certain times to have them fall down; Instead, by switching from a Static to Dynamic state at a desired time frame, the rigid body can drop at any time without contact with an external force.

Please refer to the sections below:

- From Static to Dynamic
- From Dynamic to Static
- From Kinematic to Dynamic
- From Dynamic to Kinematic
- Link/Unlink and State Keys
From Static to Dynamic

1. Select the props that you want to assign with rigid body physics.

2. Set them as Static rigid bodies by selecting the Activate Physics box and pressing down the Static button in the Modify >> Physics tab.

3. Go to the frame where you want some of the rigid bodies to begin falling. Please ensure the desired objects are selected.

   The back stack and the top card are selected.

4. Press down the Dynamic button in the Modify >> Physics tab to switch their state to Dynamic.

5. Go to the start frame of the project and play to simulate the result; every object is still at the beginning of the project.

6. The objects with the changed physics state will fall as soon as the simulation goes to the time frame where you have switched their state.

   Only the cards that have the physics state change will begin to fall at the specified time.

7. After the simulation stops, select one of the objects that has fallen and open timeline (Shortcut: F3). Show the Animation and Rigid State tracks of the object. The falling animation clip should be produced after the Dynamic key.

   The simulated clips on the Animation tracks of the objects with and without State Keys.
From Dynamic to Static

After a simulation has been completed for a Dynamic physics props, you may turn the dynamic objects into a Static state so that it will not be moved as other physics-enabled objects collide with it.

1. Select the props that you want to be rigid bodies.

2. Set them as Dynamic rigid bodies by selecting the Activate Physics box and pressing down the Dynamic button in the Modify >> Physics tab.

3. Play back to simulate the falling animations.

4. Pause at the frame where you want some of the rigid bodies to be static. Please ensure the desired objects are selected at this time.

5. Press down the Static button in the Modify >> Physics tab to switch their state to Static.

6. The objects that change state will now become static. Once other dynamic or kinematic objects hit them, they will remain where they are and cause other objects to bounce off them now.

The rocks (Switched to Static) are still as the car (Dynamic or Kinematic) hits them. If the objects have not been set as Static but remain in a Dynamic state, so when Kinematic or other Dynamic objects hit them, they will bounce away.

The rocks (Dynamic) bounce away as the car (Dynamic or Kinematic) hits them.
From Kinematic to Dynamic

A Kinematic rigid body can be animated with transform keys that are produced manually or through puppet motion. When you combine this characteristic with the Setting State Key feature, the animations of the Kinematic rigid body will generate inertia force as soon as the rigid body turns to be a Dynamic one.

1. Select the prop that you want to be a rigid body.

2. Set it as a Kinematic rigid body by activating the Activate Physics box and pressing down the Kinematic button in the Modify > Physics tab.
3. Open the Prop Puppet panel.
4. Utilize the prop puppet function to move and/or rotate the Kinematic rigid body.
5. Go to the time frame where you want the prop to start falling.
6. Set its physics state to Dynamic.
7. Go to the start frame of the project and play back to simulate. When the rigid body turns to a Dynamic state, the transform keys will form an inertial force, which causes the rigid body to rotate, move and fall.
8. The simulated animation clip will be generated after the Dynamic key.
From Dynamic to Kinematic

Basically, transform or path keys do not have any effect on a **Dynamic** prop because once you play the project, the physics simulation initiates and the prop falls according to the gravity settings regardless of keys. If you intend to manipulate the prop at some specific time after it falls, then you need to switch its state to **Kinematic**.

1. Select the prop that you want to assign rigid body physics to.

2. Set it as a **Dynamic** rigid body by activating the **Activate Physics** box and pressing down the **Dynamic** button in the Modify >> Physics tab.

3. Play to start the simulation.

   The fish falls freely.

4. Pause at the time frame where you want the prop to stop falling.

5. Set its physics state to **Kinematic**.

6. You may then utilize the **Transform Keys** or **Prop Puppeteering Method** to produce key-frame animations.

   The fish is puppeteered and moves away.

7. Open the timeline (Shortcut: F3) and show the **Rigid State** track. The falling animation is only produced when the prop is in the **Dynamic** state.

   The dropping simulation only occurs when the prop is set to a **Dynamic** state.
Link/Unlink and State Keys
With the state-keys-setting feature, one **Dynamic** rigid body is able to be manipulated by setting transform keys or using the **prop puppeteering** method after its state is changed to **Kinematic**.
Also, if you link a **Kinematic** prop to a moving object and switch its state to **Dynamic** at another time, the prop will then be given an initial force by the moving object, which produces an inertial force for the prop.

Throwing a Dynamic Rigid Body with Linkage Feature
If you want to produce an inertia effect on a rigid body by linking it to another moving object, change the state of the rigid body to inherit the force from the moving object.

1. Select a prop.
2. Set it as a **Kinematic** rigid body by activating the **Activate Physics** box and press down the **Kinematic** button in the **Modify >> Physics** tab.
3. Link the kinematic rigid body to a moving object.

![Image of a ball linked to a hand]

The ball is linked to the hand.

4. Go to another time frame where you want it to be thrown out by the inertia effect.

![Image of a person throwing a ball]

5. Change its physics state to **Dynamic**.
6. Play back the project from the first frame to simulate the animation. The force from the moving object will then pass to the physics prop as the physics prop changes to a **Dynamic** rigid body.

![Image of a person throwing a ball]

The baseball (Switched to **Dynamic**) is thrown out.
The Properties of a Rigid Body

The properties of a rigid body influence its physics characteristics including colliding behavior, sliding speed, resistance and bounciness behavior.

Mass

**Mass** influences behaviors when dynamic objects collide. Physics objects with a higher **Mass** value can cause the ones with a lower **Mass** value to bounce off more when they bump into each other. In iClone, a mass value of 1 equals to 100g. Please note that the **Mass** value **DOES NOT** affect the falling speed of physics objects.

### Rigid body to rigid body

Two physics objects bump each other.

The object with lower mass bounces off more.

### Rigid Body to Soft Cloth

A soft cloth (20) moves toward rigid bodies.

The heavier object (100) stays.

The lighter object (1) is pushed away.
Friction

Friction is the roughness of a surface which generates resistant force and causes a change in speed in objects that slide over it.

Two boxes slide down a ramp. (Ramp’s friction = 30)
A higher friction value can cause the sliding physics objects to rotate.

Ramps with different friction values. (Balls’ friction = 30)

The box with higher friction moves slower.

The ramp with friction of 100 causes the ball to roll while the ball on the low-friction slope simply slides down.

Damping

The Damping value in iClone can be taken as air resistance. Each physics object, especially the Dynamic and the Frozen ones, can have individual damping values. The damping produces an opposite-direction force to a physics object’s direction of movement, which slows down the speed of the moving object.

Two dynamic objects with the same settings but with different damping values.
The object with a higher damping value falls slower.

The Damping value affects soft cloths tremendously. You can use this value to make a feather or a cloth slowly fall down.

Feathers (soft cloth) with different damping values.
They fall down at different speeds.
**Elasticity**

Elasticity decides the bouncing force of a rigid body. The higher the value, the more the object bounces off when it collides with other physics objects:

Two rigid bodies with different elasticity values. Since the bouncing behavior involves two colliding objects, the result is a multiplied elastic effect.

The ball hardly bounces because the elasticity of the other object is too low. **Elasticity** is severely affected by speed. The higher the speed of a moving rigid body before colliding, the more it bounces off after collision.

The multiplied, high elasticity values cause the ball to bounce more. Please note that the **Damping** value slows down the speed of a physics object, which decreases the bouncing reaction.

The ball bounces less because the initial speed is slow. The initial speed is high which causes the ball to bounce off more.
The Bounding of Rigid Body

The Bounding Parameters of a physics object is a defined area outside of the object that determines where other physics-enabled objects collide. The bounding shape can be either default or customized. The more complex your bounding mesh is, the more system resources it will require to simulate.

Bounding and Collision

After you assign a bounding type to a rigid body, the range for collision will be defined. The collision does not necessarily happen according to the shape of the rigid body, but to the shape of the bounding mesh instead. The basic bound types are **Box**, **Sphere** and **Capsule**, and the complicated types are **Convex Hull** and **Self Mesh**.

A diamond is assigned with a **Box** bound. The physics balls collide against the bounding shape instead of the skin of the diamond.
Collision Margin

Collision Margin is the reaction range from the surface of a rigid body during collision. The higher the value, the farther away the rigid body will be from other physics object when a collision is initiated. This is useful especially when the sharp edges of colliding objects intersect unintentionally.

Collision Margin $= 0$

The sharp edges of the model penetrate the falling rigid one.

Collision Margin $= 8$

The falling rigid body is deflected thanks to the larger collision margin value.

Collision Margin $= 15$

The falling rigid body is too far away from the other one.

If the Collision Margin is set too high, then the collision interactions with other physics-enabled bodies may look strange.

Note: Please note that the Collision Margin only works between rigid bodies. The Soft Clothes are not influenced by this setting.
Convex Hull and Self Mesh

Convex Hull
- If you select a Convex Hull as the bounding type for a rigid body, then you are actually wrapping the object with a virtual plastic film. Use the film to enclose a colliding range.

A trophy-shaped rigid body apprised with a Convex Hull bound.

The collision happens on the convex hull instead of the concave shape of the body.

Self Mesh
- If you want other physics shapes to collide with the concave area, select the Self Mesh type for the rigid body. iClone will then use the "skin" of the object mesh as it's bounding shape.

The same rigid body with a Self Mesh bounding type.

The collision happens along the actual object's form.

- For specific shapes such as tubes, U-shaped slides or concave bowls, use the Self Mesh setting in order to get correct collision results. Remember to only use it for low polygon mesh objects in order to maintain a decent level of speed and accuracy in your simulations.

This container has been given a bounding mesh that will not allow the ball to fall inside.

The container is set as Self Mesh.

The ball drops into the container.

Note:

For better system performance, when you use the Self Mesh bounding method, scaling the rigid body can cause the bounding offset to be set further away from the true mesh of the rigid body. If this happens, please click on the Rebuild Self Mesh button to re-generate the self mesh again.

The self mesh bounding offsets the rigid body because the rigid body is scaled down.

The Rebuild Self Mesh button is clicked. The bounding mesh is thus re-generated.
Mass Pivot and Rigid Body

Each 3D entity has its own pivot, which is the base for prop-puppeteering, transforming, rotating and scaling. When generating physics animations, your prop also has one more pivot, which is called the Mass Pivot. These two pivots can be located at different positions of your prop, and the Mass Pivot has a strong influence on the physics rotation of any rigid body object.

The Rotation of a Rigid Body

When a rigid body rotates, its bounding mesh determines the angle of collision, bouncing, and friction. It is also affected by the Mass Pivot. It is forced to fall along gravity's direction until the bounding box is frozen via a state change to a static object.

Mass Pivot and Rolling

The position of the mass pivot affects the rolling behavior of all objects in any shape, especially cylinder and capsules. If the mass pivot of an object is in a strange place, the object may never appear to tumble.

1. Apply a cylinder. Rotate it and set it as a Dynamic rigid body.

2. Play to simulate. You will see that the cylinder stands up instead of lying down on the floor.
The real simulation result.
- This is because the mass pivot is at the center of the circle on the dark side of the cylinder, which pulls the cylinder and makes it topple.

3. To fix this issue, you may simply set the mass pivot to the center of the cylinder.

Relocating Mass Pivot - Creating a Balancing Toy

Although the rotation looks awkward when the mass pivot is eccentric, you may utilize it to create a balancing toy. Because the initial mass pivot is located in the bottom or center of the object, it will cause the toy in the following example to fall directly.

1. Select the object.
2. In the Modify >> Physics tab, activate the Activate Physics and choose the Rigid Body radio button to make the object a physics one.
3. Press down the Edit Offset button in the Center of Mass section.
4. Offset the pivot lower than the bottom of the prop by entering values to the X, Y and Z fields.

Note:

Optionally turn on the gizmo mode (Ctrl + Q) if you want to use the gizmo to adjust the position of the mass pivot.

5. Play back to start the simulation.

Deflection formed by gravity's direction and the object's blue axis.

The pivot rectifies the object's orientation and deflection.
Creating Initial Motion
In iClone 5, physics animations are all simulated via reaction with the environment or other physics objects. A dynamic physics object will not contain any animation unless it interacts with another object. However, in iClone 6, you can assign initial motion for any dynamic physics object, giving it an initial force to move or rotate it in any particular direction.

Creating Initial Motion - Direction
To create the initial motion, follow these steps:
1. Create a project and go to the starting frame.

2. Select a target prop.

3. Set it as a dynamic object.

4. In the Initial Force section, enter values to the Move X, Y and Z fields.

Note:
- The axis values are according to the world axis.
• The values shown above indicate that the object will start to move along the X and Z axis with strength 5500.

5. Click on the **Play** button to start simulating the physics animation.

Note:

• Because the initial motion only takes effect in the first frame when the project is played back, the object will eventually fall back down due to gravity and the lack of consistent force on the object.

### Creating Initial Motion - Rotation

To create initial motion towards a specific angle, you need to follow the steps below:

1. Create a project and go to the starting frame.

2. Select a target prop.
3. Set it as a dynamic object.

4. In the Initial Force section, enter values to the Rotate X, Y and Z fields.

Note:
- The axis values are according to the world axis.
- The values shown above indicate that the object will start to rotate around the X axis with a strength value of 2000.

5. Click on the Play button to start simulating the physics animations.
The Basic Workflow of Using Constraint

In iClone's physics system, the **Dynamic** and **Frozen** rigid body objects drop or drops after being hit (respectively) by the effect of the gravity. However, if you want to limit the dropping behavior to a certain range, then the **Constraint** feature can assist you in achieving this purpose.

View the Video

### Setting Constraint to a Physics Object

1. Apply a prop

2. Open the **Modify >> Physics** tab and set it as a **Dynamic** or **Frozen Rigid Body**

3. Click the **Add Constraint** button in the **Constraint** section.

4. The **Add Constraint** panel will show with default constraints templates.

5. Drag the desired template onto the physics prop.

**Note:**
- Please note that the blue line (object's normal line) indicates the direction of the constraint template.
The constraint will be the sub-node of the target object. You may observe the hierarchy via the Scene Manager.

You are free to drag and drop different constraints to a single rigid body.

If you drag and drop a constraint to a regular prop, then the prop will be automatically turned to Dynamic rigid body.

6. The constraint will then hang the rigid body where it is.

The non-constrained rigid body drops to the floor.

The constrained rigid body remain where it is as you play back.

7. Select the constraint and then transform (move or rotate) it to make sure the rigid body will react correctly in accordance with the direction of the constraint.

Move the constraint.

The rigid body generates physics animations according to the new position of the constraint.
8. In the **Constraint** section, you may connect the constraint to the world or another target physics object by clicking the **Pick Target** or **World** buttons. Please refer to the [Setting Connection Relationship](#) section for more information.

9. The **Limits** section will show settings that are related to the current constraint type:
   - Hinge
   - Slider
   - Spring
   - Point to Point
   - Cone Twist
   - Please refer to the [Setting Constraint Limits](#) section for more information.

10. Play back the project, the constrained rigid body will hang there and react when it is hit by other physics objects instead of dropping according to its default setting.
Setting Connection Relationship

After applying a constraint to a rigid body object, you are able to set the constrained rigid body to be connected to a target. If you want the constrained rigid bodies to be affected by another physics object, then pick the object as the Target. If the constrained object must stay where it is, then pick the World as its target.

Pick a Target or Connect to World

Connect to a Moving Target

If the rigid body is about to be affected by another moving physics object, then follow the steps below:

1. Select a prop, set is as Dynamic rigid body.

2. Apply a constraint type to the rigid body (in this case, the Point to Point type is taken). Please refer to the The Basic Workflow of Using Constraint section for more information.

3. Because it will be connected to another target physics object that moves at certain time, select the target one and set it as Kinematic

4. Select the constrained rigid body.
5. Click the **Pick Target** button in the **Constraint** section and then click the target (the **Kinematic** object).

Please note that when you select a constrained rigid body which connects to a target, the target will be framed with green wires instantly.

6. You may now set transform keys or using the **Prop Puppeteering** method to move the target object; which will affect the constrained rigid body at the same time.

**Connect to World - Stay in Original Position**

If the rigid body is about to stay where it is without being brought away be other physics objects, then click the **World** button. The constraint is thus pinned where it is and cause the rigid body to interact with other physics objects according to its assigned constraint type.

The object that is constrained to world will not be brought away but will be hit and bounce off instead.

**Collision between Constrained and Target Objects**

In the last example, you may find that the constrained rigid body go through the target object when it strongly moves, even if the target is a kinematic one.

You may activate the **Parent/Target Collision** box so that the constrained rigid body detect the existence of its target and collides the target when it moves drastically.
Breaking Connection Relationship

When a constrained rigid body takes another physics object as its target, basically the connection between them lasts for the duration of the project. However, the relationship can be broken when the constrained object experiences severe movement or is strongly affected/hit by any other physics object. When you wish for a wall to break apart after being hit by a car, or you drop a glasses on the floor with certain force and you want them to shatter, then you can enable the Breakable feature.

1. Select the constraint (in this case, the point-to-point) of the dynamic rigid body object.

2. Go to the Constraint section in the Modify panel.

3. Activate the Breakable box.

4. Set a value to the Max Force field. A smaller value means the connection can easily be broken by smaller collisions; while a higher value means the connection is more solid, and only under strong collision or intense movement can the connection be broken.

Max Force = 5

The Kinematic object moves slowly, and cannot break the connection but merely pushes the constrained rigid body away.

Max Force = 5

The Kinematic object moves abruptly, and hits and flings the constrained rigid body away.
Setting Constraint Limits
After a constraint is applied to a rigid body, you are able to set limits to the constraint’s position and the angle, which ensures the constrained rigid body can move or roll along within a specified distance or range.

![Constraint Limits](image)

**Move**
You can use the controls in the **Move** section to limit the constraint to move along a specific **Local Axis** within a certain distance range.

- **Lock** Press this button down to stop the constraint from moving along the axis you specified.

  - **Local X** axis is locked. The constraint can not move along this axis.
  - **Local Y** axis is locked. The constraint can not move along this axis.
  - **Local Z** axis is locked. The constraint can not move along this axis.

- **Limit** Press this button down to determine the moving distance along the specific axis.

  - A range is set to the **Local X** axis. The constraint can only move along this axis within this range.
  - A range is set to the **Local Y** axis. The constraint can only move along this axis within this range.
  - A range is set to the **Local Z** axis. The constraint can only move along this axis within this range.

Note:
- The range is determined by an invisible ball with given radius. Therefore, you are not able to set individual range values for different axis.

![Move settings](image)

- **Free** Press this button down and the constraint can infinitely move along the specific axis.

![Free mode](image)

- Because the constraint moves along its Local Axis, when you want to set the limits for the Move, please turn on the Gizmo (Shortcut: Ctrl + Q) and switch to the Local Move (Press W key to toggle) tool for reference, especially after the constraint has been rotated.

![World Move](image) ![Local Move](image)
Rotation

You may use the controls in the Rotation section to limit the constraint to rotate along a specific Local Axis within a certain angular range.

- **Lock**: Press this button down to stop the constraint from rotating along the axis you specified.

The Local X axis is locked. The constraint can not rotate along this axis.

The Local Y axis is locked. The constraint can not rotate along this axis.

The Local Z axis is locked. The constraint can not rotate along this axis.

- **Limit**: Press this button down and enter the Min and Max values to decide the angular range of the rotation by the specific axis.

A range is set to the Local X axis. The constraint can only rotate along this axis within this range.

A range is set to the Local Y axis. The constraint can only rotate along this axis within this range.

A range is set to the Local Z axis. The constraint can only rotate along this axis within this range.

- **Free**: Press this button down and the constrained rigid body can freely rotate along the specified axis.

The Local X axis is set free. The constraint can freely rotate along this axis.

The Local Y axis is set free. The constraint can freely rotate along this axis.

The Local Z axis is set free. The constraint can freely rotate along this axis.

Note:

- Only the Max and Min values of the X axis can be different and individually adjusted. However, the Max and Min values for the Y axis or Z axis must be the same.
The degrees for the X, Y, and Z axis are as shown in below (the value must be between -180 and 180):
Producing Initial Force by Setting Constraint Limits

When you want a complicated physics system to begin moving, you may sometimes need an initial force to trigger the whole system. You normally need to apply one Kinematic object, add transformation keys or puppet it to use it as an initial force, and then hide it.

Furthermore, use the Initial Motion feature may have this effect as well.

Alternatively, you can simply use a constrained Dynamic or Frozen object to achieve the same goal by setting the range of the constraint limits away from the pivot of the rigid body.

Move

In the following example, a Slider constraint is applied to the bus (dynamic object) to create the initial force to hit the cards.

1. Select a prop (in this case, the bus).

2. Set it as a Dynamic rigid body.
3. Set the other objects (in this case, the cards) as Frozen rigid bodies.
4. In the Modify panel, go to the Physics tab and the Constraint section. Click the Add Constraint button.

5. Drag the Slider constraint to the dynamic rigid body object (Please refer to The Basic Workflow of Using Constraint section for more information).

6. Transform the Slider constraint, if necessary, to make sure the bigger arrow head points to the desired direction.

Transform the Slider to make sure the bigger arrow head points to the desired direction.
7. Measure the distance between the object and the first piece of the domino set by counting the **Grid** (Shortcut: Ctrl + G).

8. Set the **Min** and **Max** values of the **Axis X** in the **Limit** section in accordance with the distance you have measured in the last step.

9. Play to simulate. Because the minimum limit range is set away from the pivot of the constraint, it will instantly rush to fit into the range, which produce a moving force.

The bus rushes to the specified sliding range.
Saving Constrained Objects

Even though a constrained object may pick another physics objects as its target, there is not parent-child relationship between them. If you want to save the constrained object and the relation, then you need to integrate them as a entity before save them to the custom library.

1. Apply several parts of a structure. In this case, the body, the neck and the head of the toy dog.

2. Assemble these parts by transforming them.

3. Individually apply constraints (in this case, the Spring constraints) to the head and the neck. Please refer to The Basic Workflow of Using Constraint section for more information.

4. Pick the body as the neck’s target, while pick the neck as the head’s target.

5. Simulate to view the result.

6. Although the parts have connecting relations, the parent-child hierarchy of them does not exist, which means they are at the same level in the Scene Manager.
7. If you select the body and save it to the library, only the body will be saved and the constraint relationships will be broken.

8. To save the entire physics structure, you need to attach all the components to a parent. In this case, the body.

Note:

Always attach the entire physics structure to cause a nested hierarchy of the structure before saving them into the custom library.

9. Save the prop by clicking the Add button under the Content Manager. The entire physics structure can then be saved and re-used from the content library.
Hinge

The Hinge constraint is one of the most commonly used constraint types. Whenever you need to have physics objects to rotate on a certain axis, then you can use this type of constraint to ensure the direction of rotation.

View the Video

1. Apply a prop (in this case, a gear). Transform it to a desired position, size and angle.

2. Duplicate it and relocate the new gear.

3. Set one of them as Dynamic and the other as Kinematic so that you can control the kinematic one to push the other gear. Please refer to The State of Rigid Body section for more information.

4. Because the Dynamic rigid body will fall by default, you need to constraint it to its current location. In the Modify >> Constraint tab, click the Add Constraint button.

The Add Constraint panel displays.
5. Drag and drop the **Hinge** template onto the dynamic rigid body.

6. You may need to transform the constraint so that its indicating arrows match the desired rotating direction of the rigid body.

7. Make sure the constraint is selected.

8. In the **Modify >> Constraint** section, you can connect the constraint to the world or another target physics object by clicking the **Pick Target** or **World** buttons. Please refer to the **Setting Connection Relationship** section for more information.

9. Move to the **Limit** section, you are able to decide the rotation axis by setting the parameters in this section. In this case the **Rotation** is set to **Free**

10. Set transform keys or puppet the kinematic physics object to animate. The dynamic one will then be triggered to move along with it instead of dropping down to the floor.

**Note:**
You may also create a motor by using the **Hinge** constraint instead of using **Kinematic** rigid body that is animated by transform keys or puppeteering method. Please refer to the **Creating Motor with Hinge** section for more information.
Creating Motor with Hinge

In addition to adding transform keys or using puppeteering feature to a kinematic physics object to generate motors as the power for the physics structures you have created in the project, you can also use the Force function provided by the Hinge constraint to achieve the same effect.

1. Apply a prop with base part and rotating part (in this case, the chassis and the propeller of a wind turbine).

2. Set the propeller as a Dynamic rigid body.

3. In the Modify panel >> Physics tab >> Constraint section, click the Add Constraint button.

4. Drag the Hinge Constraint template onto the motor center of the propeller.

5. Make sure the Hinge Constraint is selected.
6. Go to the **Modify >> Limit** section, set the rotation limitation to **Free**.

7. Go to the **Modify >> Force** section. Activate the **Activate** box and then adjust the **Velocity** value to determine the speed of the motor.

8. Play back to simulate the result. You may need to adjust the force value of the **Hinge Constraint** in order to set the optimized rotation speed.
Slider

When you want a rigid body to move along a certain axis in a specific range of distance, you may apply a Slider constraint to the physics objects.

1. Apply a prop (in this case, a drawer). Transform it to a desired position, size and angle.

2. Set the prop as Dynamic.

3. Because the Dynamic rigid body will fall by default, you need to constraint it to its current location. In the Modify panel >> Physics tab >> Constraint section, click the Add Constraint button.

The Add Constraint panel displays.

4. Drag and drop the Slider template onto the dynamic rigid body.

5. Make sure the constraint is selected.

Note:

Optionally transform the constraint to desired position, angle or size so that you may easily observe the constraint.
6. In the **Modify > Constraint** section, you can connect the constraint to the cabinet by clicking the **Pick Target** or **World** buttons. Please refer to the **Setting Connection Relationship** section for more information.

7. In the **Limit** section, you are able to define the distance limits for the X axis. Please refer to the **Setting Constraint Limits** section for more information.

8. Duplicate the drawer. The constraints and the targets are also duplicated.

9. Tilt the cabinet and the drawers will open automatically. But they stop at the specified distance instead of dropping on the floor.
Point to Point
The **Point to Point** constraint locks a rigid body in place while the three rotating angles can be arbitrarily modified.

1. Apply a prop. Transform it to a desired position, size and angle.

2. Set the prop as **Dynamic**.

3. Because the **Dynamic** rigid body will fall by default, you need to constraint it to its current location. In the **Modify** panel >> **Physics** tab >> **Constraint** section, click the **Add Constraint** button.

4. Drag and drop the **PointToPoint Constraint** template onto the dynamic rigid body.

5. **Align the constraint to** the pivot of the rigid body so that it rotates accordingly.

6. Make sure the constraint is selected.
7. In the **Modify >> Constraint** section, you may pin the rigid body to its original position by clicking the **World** button. Please refer to the **Setting Connection Relationship** section for more information.

8. In the **Limit** section, you are able to define the rotating limits for the three axes (in this case, three axes are set **Free**). Please refer to the **Setting Constraint Limits** section for more information.

9. Set transform keys or puppet kinematic objects to hit the dynamic object. It will rotate where it is without bouncing off somewhere.
Enlarge the Rotation Range with Point to Point Constraint

Unlike the Cone Twist constraint that causes the rigid body to rotate in a limited range of the three axes, the Point to Point constraint provides a wider angle for the physics object to rotate.

1. Apply two props.

2. Set one of the props as Dynamic and the other one is Kinematic.

3. Drag and drop a PointToPoint Constraint onto the rotating end of the dynamic rigid body.

4. Make sure the constraint is selected.
5. Go to the Modify >> Constraint section, click the Pick Target button.
6. Pick the Kinematic rigid body as the target of the constraint.
7. In the **Limit** section, you are able to define a large rotating range for the three axes (in this case, three of them are set **Free**). Please refer to the Setting Constraint Limits section for more information.

8. Play to simulate.
Cone Twist
The ConeTwist constraint is most suitable for creating a hanging item that swings in a certain cone shape, such as a bird cage or a wind chime.

1. Apply a prop (in this case, a bird cage). Transform it to a desired position, size and angle.

2. Set the cage as Dynamic and the stand that holds it as Kinematic so that you can control the latter one.

3. Because the Dynamic rigid body will fall by default, you need to constraint it to its current location. In the Modify panel >> Physics tab >> Constraint section, click the Add Constraint button.

4. Drag and drop the ConeTwist Constraint template onto the dynamic rigid body.

5. Make sure the constraint is selected.
6. In the **Modify >> Constraint** section, you may pin the dynamic rigid body to the kinematic one by clicking the **Pick Target** button and then click on the stand. Please refer to the **Setting Connection Relationship** section for more information.

7. In the **Limit** section, you are able to define the limitation cone shape to set the range of animation.

- **A** = Cone Radius (Local Z); 0 ~ 90
- **B** = Cone Radius Y (Local Y); 0 ~ 90
- **Lock Radius Y** Set **Cone Radius Y** = **Cone Radius**

8. Set transform keys or use prop puppeteered motion on the kinematic object to animate it. The dynamic one will then sway along with the kinematic object’s movements.
Spring

The Spring constraint causes the rigid body to bounce along one or more axes, or even bounce along the X axis. It is suitable for creating a shock for a tire, a mechanical scale, or even a swinging door.

Move

1. Apply a prop (in this case, a piece of toast). Transform it to a desired position, size and angle.

2. Set the prop as Dynamic.

3. Because the Dynamic rigid body will fall by default, you need to constraint it to its current location. In the Modify panel >> Physics tab >> Constraint section, click the Add Constraint button.

4. Drag and drop the Spring constraint template onto the dynamic rigid body.
5. Transform the constraint for better observation, and for the arrow to point to the direction so that the rigid body is able to perform the spring-moving animation.

6. Make sure the constraint is selected.
7. In the Modify >> Constraint section, you may pin the rigid body to its original position by clicking the World button. Please refer to the Setting Connection Relationship section for more information.
8. In the Limit section, check the box in the Move section and define the bouncing Range and Rest Point for the spring effect.

9. Duplicate the toast (Shortcut: Ctrl + drag with Left Mouse Button). The physics settings are also duplicated, including the constraint settings.

10. Play to simulate the spring effect. You will see the toasts are bouncing up and down.
Setting Spring Property

In the above example, you may find that the spring effect keeps going, which seems to never decrease and never stop. In the Property section of the same panel, you are able to set the Spring and Damping values to define the strength of the spring effect and how hard the resistance will be to slow down the spring effect.

In the last example, the Spring is set to 500, which causes the strong bouncing behavior. If you decrease the value to 50, then the spring strength is also weaken and more gentle.

Spring 50, Damping: 0.

If you want the decrease the speed for each back and forth, then you can increase the Damping value to increase the air resistance for the movement.

Spring 500, Damping 95.

Note:

If sometimes the spring effect does not seem to stop, it is because the Spring value is too high, and the Damping value is not enough to ease the bouncing in a short time. In this case, you can select the rigid body and go to the Modify >> Physics tab, increase the Damping value for the rigid body.

Spring 500, Constraint Damping 95, Physics Damping 90.
Rotate

In addition to the Move spring effect, you are able to create a spring effect that rotates by the X, Y and Z axes. The X axis is taken as an example in the following steps.

1. Apply a board. Set it as Dynamic rigid body.

2. Because the Dynamic rigid body will fall by default, you need to constraint it to its current location. In the Modify panel >> Physics tab >> Constraint section, click the Add Constraint button.

3. Drag and drop the Spring constraint template onto the hinge part of the dynamic rigid body.

4. Transform the constraint to the hinge of the dynamic rigid body, and make sure the swirl part of the constraint is parallel to the hinge.

5. Make sure the constraint is selected.

6. In the Modify >> Constraint section, you may pin the rigid body to its original position by clicking the World button. Please refer to the Setting Connection Relationship section for more information.
7. In the **Rotation** section of the **Limit** section, activate the axis the constraint is about to rotate (in this case, X) and set the **Range** and **Rest Point** values to define the bouncing range.

8. Set the **Spring Constraint Damping** and **Rigid Body Damping** as described above.

9. Duplicate the board (Shortcut: Ctrl + drag with Right Mouse Button). The physics settings are also duplicated, including the constraint settings.

10. Prepare a kinematic object to pass through it. Simulate the result.
The Combination of Moving And Rotating Spring Effect

The Spring constraint contains both Move and Rotate spring settings. By combining the settings of these two groups, you may create a physics object that is able to bounce and sway with spring effects.

1. Apply a prop and set it as Dynamic rigid body.

2. Apply a Spring constraint to it.

3. Offset the constraint away from the rigid body so that it rotates by the center of the constraint.
4. Because the object is going to bounce up, forward and rotate, set the Limit as described below:

![Limit Settings](image1)

**Spring settings**

The settings for the moving or rotating of the constraint are described as shown below:

- **Move section**: The values for the Move section determine the height for the rigid body to bounce up to.
- **Rotation section**: The light yellow area is for the rotating spring effect by the Local Z axis.

5. Apply a box to hold the object. Set the cover of the box as Frozen rigid body.

![Box with Frozen Cover](image2)

6. Play to simulate.
Duplicating Rigid Bodies with Constraints
Whenever there is hierarchy consisting of rigid bodies, constraints and target rigid body, duplicating it contains three types of situations:

Duplicating Constrained Rigid Body
Given a rigid body already applied with constraint targeting to another physics objects, you are able to duplicate the rigid body with its constraint and the settings of the constraint. It is useful when you want to create a lot of constrained objects with same appearances and are referred to identical target.

Setting the Physics Structure
1. Apply a new prop. Set it as Dynamic rigid body and then apply a constraint (in this case, a Hinge) to it.

   ![The card is applied with a Hinge constraint.](image)

2. Set the parameter values for the physics object and the constraint.
3. Apply another object, set it as a physics object (in this case, a Kinematic).

   ![The cylinder part is set as dynamic physics object.](image)

4. Select the constraint and pick the cylinder as its target (the one with green bounding box is the target).

   ![Please note that the constraint is under the dynamic object (in this case, the card) while the target rigid body (the cylinder) is an individual entity at the same level as the dynamic object's parent.](image)

Note:
**Duplicating the Constraint and Target**

1. Select the constrained physics object only (the card).

2. Make sure the gizmo of object transforming tool is turned on (Ctrl + Q).

3. Duplicate the selected physics object. Please refer to the [Duplicating Props](#) section for more information.

4. Animate the targeted object (the cylinder) to view the physics animation.

Note:

Please note that the duplicated physics objects will have individual constraints with identical target and physics settings.
Duplicating Constraint and Target

In the previous method for duplicating, the rigid body shall not be transformed after be duplicated because the constraint attached on it can be transformed as well, which can cause the entire animation incorrect.

The constrained physics object with the method described in the previous section.

After the duplication, transforming the copied physics object can cause the constraint offset.

In this section, you are able to duplicate physics object, individually transformed the copies without influencing the ideally set constraint.

Setting the Physics Structure

1. Apply two props as shown below.
2. Set the one meant to be still as Kinematic or Static physics object, and the other as Dynamic one.
3. Apply a constraint (in this case, a Hinge) to the Kinematic object.
4. Select the constraint and pick the dynamic rigid body as its target (the one with green bounding box is the target).
5. Turn on the **force of the Hinge** constraint to view the animation of the entire physics structure.

The planet moves around the sun.

Note:

Please note that the constraint is under the kinematic object while the target rigid body is an individual entity at the same level as its parent.

**Duplicating the Constraint and Target**

1. Select both the constraint and its target (the planet).

2. Make sure the gizmo of object transforming tool is turned on (Ctrl + Q).
3. With the Ctrl key pressed, drag the constraint and the target object to duplicate them.

4. Transform the target physics object (without influencing the constraint).

5. Optionally adjust the force value or any other parameters of the new-generated constraint and the target object.

6. Play back to simulate the physics animation.

Note:

Please note that the duplicated constraints will be attached to identical physics object while targeting to individual rigid bodies.
Duplicating the Entire Structure

After you have constructed an ideal physics structure, you may sometimes need to duplicate it instead of re-build a new one from scratch, then you need to figure out the objects for duplicate to make sure the relationships are not broken for the copied one.

This method is suitable for duplicating limbs for creatures or wheels for vehicles.

Building a Physics Structure

1. Create a structure, in this case, there are a body, a tire and a ball that will be used as a dummy joint.

2. Set the body as Static object temporarily. As for the tire and the ball, set them as Dynamic.

3. Apply a Spring constraint to the dummy ball and a Hinge to the wheel.

The tire is applied with a Hinge constraint.

The dummy ball is applied with a Spring constraint.

Note:

- Please note that the Spring is used to simulate the cushion effect while the Hinge generates power for rotating the tire.
- The structure in the Scene Manager will be as shown in the illustration below:
4. Select the **Hinge** constraint and pick the dummy ball as its target.

5. Activating the force of the **Hinge** to rotate the tire.
6. Select the **Spring** constraint and pick the body as its target.

7. Play back to view the simulation result.

**Duplicating Physics Structure**

In stead of building other more sets of almost same structure, you may use duplicating skill to save a lot of time doing so. All you need to do is to adjust some settings for the copies.

1. Select both the tire and the dummy ball.

2. With **Ctrl** key pressed, drag them to another position in the 3D view.
Because the constraints are the sub node for the selected rigid bodies, they will be duplicated as well even though they are not selected.

The target settings for each constraint will be kept.

3. Transform the new set of the structure.

4. Repeat step 2 and 3 until you are satisfied.

Note:

Please note that you may need to rotate the tires for the other side so that they will face to correct direction. However, their Hinge forces must be set to negative one to have them rotate in the same direction as the tires created in the previous steps.

5. Set the dummy balls in the structure as **Dummy** so that they will not be rendered for exporting.

6. Select the body and set its physics state to **Dynamic**. The truck thus will move in a real vehicle manner.
Serial and Multiple Constraints
There are many ways to structure your physics object relations, you will see different methods and their corresponding applications, and also different ways to observe the relationship via color coding and user interfaces.

One to One - Serial Connection
The serial-connection application means that a rigid body is constrained, while it is also a target of other rigid bodies as described in the following illustration:

This method is suitable for creating physics structures with serial elements, such as chains, trains or caterpillar-like structures.

Please refer to the Creating a Series-Connected Chain section for more information.

Many to One
The many-to-one application means that several rigid bodies are constrained, while a single physics object is their mutual target as described in the following illustration:

This method is suitable for creating physics structures with legs, limbs or wheels, such as insects or cars.

Please refer to the Individual Constrained Objects with Single Target section for more information.

One to Many
The one-to-many application means to apply multiple constraints in a single rigid body, while targeting many other individual physics objects as described in the following illustration:

This method is suitable for creating joint physics structures for machines, or when you need to stabilize a physics structure from jittering because of the collisions between each physics object within the structure.

Please refer to the following sections for more information:

- Using Bolts (Intermediate Dummies) with Multiple Constraints
  Note:

Please refer to the Relationships of Rigid Body, Constraint and Target section for more information.
Creating a Series-Connected Chain

A constrained rigid body that targets another physics object can also be a target of other rigid bodies as well. In this situation, you are able to create chain-like rigid body groups and allow each element in the group to animate respectively according to the constraint settings that are applied to it.

In the following example, a cylinder is applied to create the power of rolling, and the chained pieces of the roller blind will pulled and roll up around the cylinder.

1. Apply a cylinder and transform it to an appropriate shape.

2. Set it as Kinematic rigid body. It will be controlled to produce the rolling power of the roller blind.

3. Apply a box and transform it to a long board; move it under the cylinder.

4. Set the board as Dynamic rigid body.

5. Because the Dynamic rigid body will fall by default, you need to constraint it and nail it to the kinematic object. In the Modify panel >> Physics tab >> Constraint section, click the Add Constraint button.

The Add Constraint panel displays.
6. Drag and drop the Hinge template onto the dynamic rigid body.

7. Make sure the constraint is selected.

8. In the Modify >> Constraint section, click the Pick Target button and pick the cylinder so that the board is constrained to the cylinder. Please refer to the Setting Connection Relationship section for more information.

9. Set the Min and Max values of the X Axis in the limit section in accordance with the angle limit for the rotation of the board.

10. Utilize the Multi-Duplicate feature to create several identical boards with identical settings.

Each duplicated board is initially pick the cylinder as the target.
11. Select the second board and change its target from the cylinder to the board right above it.

Each duplicated board should not be constrained with the cylinder as the target.

12. Repeat the last step for each board until its target is the one above it.

13. Set rotation keys or puppet the cylinder to produce a rolling force.

14. Play to simulate.

The roller blind rolls up.
Individual Constrained Objects with Single Target

When you need to create a physics group that has one main component, while other parts connect to it and act with individual physics behavior, then you can follow the steps below.

In the following example, you can create a spider with springing legs.

1. Apply a spider body and legs.

2. Set them as **Dynamic** rigid body. If you play back, then they will initially scatter on the ground. You need to constrain the legs to the body.

3. Go to the first frame.
4. Select one of the legs.
5. Because the **Dynamic** leg will fall by default, you need to constraint it and nail it to the body of the spider.
   
   In the **Modify** panel >> **Physics** tab >> **Constraint** section, click the **Add Constraint** button.

   ![Add Constraint panel](image)

   The **Add Constraint** panel displays:
6. Drag and drop the **Spring** template onto the dynamic leg.

7. Make sure the constraint is selected.

8. In the **Modify >> Constraint** section, click the **Pick Target** button and pick the body so that the leg is constrained to the spider’s body. Please refer to the **Setting Connection Relationship** section for more information.

9. Set the **(Range Rest Point)** values to **(179, 1)**. Please refer to the **Spring** and the **Setting Constraint Limits** sections for more information.

10. Select all the other legs; repeat step 6 to 9 to apply **Spring** constraints to them.

11. Play to simulate.

The spider bounces with spring legs.
Using Bolts (Intermediate Dummies) with Multiple Constraints

In the Constraint System, you can use one-to-one, many-to-one, or one-to-many (as this section described) methods to compose a physics set.

By using one of these methods or mixing them, you are able to produce more complicated physics structures which can consist of multiple of joints.

Here are two approaches you constructing a raising platform. By using the constraints as the joints or by using bolts.

Directly Combining Objects - Using Constraints as Joints

To connect a physics structure, you are able to use the constraints as joints.

1. Apply two props and set them as Dynamic rigid body.

2. Apply a Hinge constraint to the center of the upper bar in the example. Set its target to World so that it will be pinned to where it is. When this rigid body is hit by other physics objects, it will rotate around the local axis of its pivot.

The upper bar rotates when it is hit by other rigid bodies.

3. Apply another Hinge constraint to the left end of the upper bar. Set its target to the lower bar prop. Its weight will drag the upper bar to rotate.

Apply a new constraint to the upper bar, set its target to the lower bar.
4. The upper prop will rotate around its center constraint while the lower one falls.

**Using Bolts (Intermediate Dummies) with Multiple Constraints**

By using rigid bodies applied with multiple constraints as bolts, you can easily integrate other components into a structure, especially the joint parts.

1. Using the structure shown in the illustration below.

2. Apply a primitive prop with few polygons.

3. Apply two free **hinges** at both sides of the prop.

4. Locate the prop to one of the joints between two bars of the structure.

Note:

Please note that the constraints are sized up for better observation.
5. Pick the one of the constraints and pick one of the bar as its target.

6. Select the other Hinge constraint and pick the other bar as the target.

7. Repeat the same steps to create more bolts for the joints of the bars.

8. Apply another two bolts and set them as Kinematic rigid bodies.

9. Apply hinges to these two objects and individually pick the lower two bars as targets.

10. Set keys to the two kinematic rigid bodies so that they move close to each other.

11. Play to simulate.
Relationships of Rigid Body, Constraint and Target

When a rigid body is applied with multiple constraints, you may need to find out all the relationships. iClone provides color identification method to find out the related targets and the directly connected target for the current rigid body that has been applied with more constraints. Furthermore, you are able to use the Constraint Manager to find out the relationships.

View the Video

Identifying by Colors

Constraint

The constraint can have three types of color:

- **Blue**: The constraint in blue is applied to a rigid body without targeting to any other physics object.

![Blue Constraint](image)

- **Red**: The constraint in red is applied to a rigid body, and also targeting to another physics object.

![Red Constraint](image)

- **Grey**: The parent rigid body of the constraint is no longer a rigid body.

![Grey Constraint](image)

Constraint and Rigid Body

After you pick a constraint, the relationships between the constraint and rigid bodies can also be identified by different colors.

- The relationships between the constraint and the rigid bodies will always appear in Bounding Box form.
- **Red Bounding Box**: If a rigid body is framed up with a red bounding box, then it is the rigid body to which the constraint is applied (in this case, the ball).

- **Green Bounding Box**: If a rigid body is framed up with a green bounding box, then it is the target rigid body of the constraint (in this case, the box).

**Identifying by Constraint Manager**

In addition to viewing the colors of the rigid bodies or the constraints on the 3D view, you may also use the Constraint Manager to find out the relationship or even quickly switch to the corresponding Modify panel for further editing.

**Constraint and Constraint Manager**

Take the example in the previous section, you can use Constraint Manager to quickly find out the relationships that are in connection with the selected constraint.

1. Pick the constraint.
2. Click the Constraint Manager button on the tool bar.

Note:

Alternatively, you are able to select the rigid body that the constraint is applied to, and then click the Constraint Manager button in the Modify >> Physics >> Constraint section.
3. The **Constraint Manager** will display.

![Constraint Manager](image)

- **Constraint** This field shows the name of the constraint. You are able to rename it through this field.
- **Parent** This list shows the rigid body that the constraint is applied to.
- **Target** This list shows the target the constraint is connected to. If the constraint does not target to any rigid body, then the list shows **World**.
- You are able to double click on the item in the **Parent** or **Target** lists to quickly switch the **Modify** panel to the settings for the item (rigid body).
- For any constraint, there can be only one item in the **Parent** list and another one in the **Target** list.

### Rigid Body and Constraint Manager

Still take the example, you can use **Constraint Manager** to quickly find out the relationships for the rigid body.

1. Pick the ball.

![Ball](image)

2. Click the **Constraint Manager** button on the tool bar.

![Tool Bar](image)

3. The **Constraint Manager** will display.

![Constraint Manager](image)

- **Prop** This field shows the name of the selected prop. You are able to rename it through this field.
**My Constraint**
This list shows the constraint or constraints that are applied to this prop. If you pick one of the item, then it will be framed up with blue bounding box.

- **Constrained by**
  This list shows the constraint or constraints that are targeting this prop.
  
  The **My Constraint** and **Constrained by** lists are able to contain multiple items (constraint) because a rigid body can be applied with multiple constraints and can also be targeted by multiple constraints.

- You are able to double click on the item in the **My Constraint** or **Constrained by** lists to quickly switch the **Modify** panel to the settings for the item (constraint).

4. Pick the box.

5. The contents in the **Constraint Manager** will change.

- **Prop**
  This field shows the name of the selected prop. You are able to rename it through this field.

- **My Constraint**
  This list shows the constraint or constraints that are applied to this prop.

- **Constrained by**
  This list shows the constraint or constraints that are targeting this prop. If you pick one of the item, then it will be framed up with yellow bounding box.

- The **My Constraint** and **Constrained by** lists are able to contain multiple items (constraint) because a rigid body can be applied with multiple constraints and can also be targeted by multiple constraints.

- You are able to double click on the item in the **My Constraint** or **Constrained by** lists to quickly switch the **Modify** panel to the settings for the item (constraint).
The Soft Cloth Simulation

Please follow the steps below for simulating physics animations of soft clothes.

1. Select a prop or an accessory. You are allowed to select multiple objects to assign the same physics setting at the same time.

2. Activate their physics characteristics by selecting the Active Physics box and choosing the Soft Cloth radio button in the Modify >> Physics tab.

3. If you want to pin the soft cloth, then you need to click the Edit Weight Map button and designate a grayscale image texture to determine the fixed and free areas for your soft cloth.

4. You can use the Preset library to apply a soft-cloth preset instead of setting individual parameters to determine the material of the soft cloth.

Note:
The presets are divided into two categories, Cloth and Hair. The Hair presets are suitable for characters with hair for generating soft hair animations.

The presets in these two groups are actually different combinations of property values in the Property, Collision and Wind Settings sections.

Please refer to the default project to view the soft cloth effects of each preset: C:\Users\Public\Documents\Reallusion\Template\IClone 6 Template\IClone Template\Project\03 Physics Softcloth\Softcloth Presets.iProject

Alternatively, manually adjust the settings in the Property, Collision and Wind Settings sections to create a customized soft cloth.
5. Turn on the **Soft Cloth Simulation** by clicking the corresponding button on the right side of the tool bar.
   - **Soft Cloth Simulation** is on.
   - **Soft Cloth Simulation** is off.

   Please note that if you put soft cloths objects in your project, then you must press down on this button for them to work properly.

6. It is highly suggested that you switch to **By Frame mode** for each simulation by clicking the **Time Mode Switch** button.

7. Click the **Play** button (Shortcut: Space bar) to start the simulation.

   **Note:**
   
   Because the **NVidia PhysX** engine currently does not support **Soft Body** simulation, there is not soft body effects in **iClone 6**, therefore, you are not able to create any bouncable soft 3D entity as you did in **iClone 5**.
Using Soft Cloth Props from the Library

Go to Set >> Props >> Physics Props folder in the Content Manager. There you will find the Cloth Template_Grey, Cloth Template_Pined and Softcloth Props folders under it in the tree view.

Using Cloth with Various Details

In the Cloth Template_Grey folder you will find cloth templates (pinned by Weight Maps) with different dimensions which are convenient for creating cloths with various details. Clothes with higher measurements will show more details when they are used due to the higher vertex count of their meshes.
In the **Softcloth Props** you can find different props that are applied with the **Weight Map** method.

![Softcloth Props](image)

**The Flag**

**The Round Table**

### Using Hanging Cloths

The other templates in the **Cloth Template_Pined** folder are all pinned cloths with visible dummies.

![Cloth Template_Pined](image)

### Structure of Pinned Cloths

The structure of the pinned cloth is shown in the illustration below:

![Structure of Pinned Cloths](image)

1. The entire group is for primary transformations such as locating, rotating or resizing.
   - If you need to transform cloths, then transform the entire group. **DO NOT** transform any of the sub nodes individually.
   - You may **attach the entire group** to any other objects in the scene.

2. The dummies indicate the pinned points of the cloth.
   - You may set transform keys (manually, puppeteering) to the dummies in order to trigger turbulence in the clothes.
   - To show/hide the dummies, use **Ctrl + D** to toggle.

3. True soft cloth.
   - The soft cloth settings shall be applied to this sub node.
Attaching Cloth to another Object

1. Prepare an object (moving or not moving).

2. Apply a cloth from the library.

3. Select the entire cloth group and transform it so that the pinned points are aligned to the connecting points on the object.

4. Right-click on the cloth group and attach the entire group to the target object.
5. Apply texture settings to the true soft cloth of the group.

6. Play back to view results. If you are not satisfied with the results, then select the true soft cloth and adjust the physics settings.
Remove Dummies
The dummies of the hanging clothes can be removed. One cloth template can have more styles, each for different purposes.

1. Apply a cloth template with five dummies.

2. Adjust the transform data of the cloth and attach the entire group to the character’s hand.

3. Remove the four dummies from the corners. Hide the left dummy (Shortcut: Ctrl + D).

4. Simulate and the cloth now turns into a handkerchief with four corners dropping naturally.
Setting Keys to Cloth Dummies

In the last section, you changed the entire cloth group to change the RTS data (Rotate, Transform and Scale). However, you may set keys to dummies that belong to the group in order to produce more subtle wrinkles in the soft cloth. Please note that keys can be set one at a time by puppeteering.

1. Apply one cloth template with numbers on it from the library.

2. Select one or more dummies for setting keys. If you can not see any dummy, use Ctrl + D to show/hide the dummy.

3. Go to another time frame and set transform keys to the selected dummies. You may also use the Prop Puppet panel to setting series of keys.

4. Turn on the Soft Cloth Simulation and play from the first frame to simulate the soft cloth animation.

5. Hide the dummies.

6. Utilize the Attach method as described in the last section, and set animations to the target object. The entire cloth group will move along with it.
Setting Softcloth Weight with a Weight Map

In the Using Soft Cloth from the Library section, you can use the soft cloth templates with arrow dummies to animate softcloths, such as attaching them to other objects, folding them, or expanding them.

However, you can also determine the fixed and soft parts of the soft cloth by editing a special type of texture, the Weight Map.

View the Video

The Basic Concept of Using Weight Maps

The basic usage for this method is to utilize a simple gray scale image. The black part is taken as the fixed area, which means the area does not have any soft cloth effect. The white area, on the other hand, will be completely influenced by the soft cloth settings, including the mass, stiffness, damping...etc.

As for the areas that are covered with gray, they will be partially influenced by the settings in accordance with the level of the grayness.

If you set a plane with soft cloth physics, it will simply just fall to the ground.

A soft cloth is imported into the scene

Simulation result (falls on the ground)

This is because the soft cloth is influenced by the settings in the Property Collision and Wind Settings sections.

Apply a gray scale image as its Weight Map. The result will be as shown in the right cell of the table below.

Only the area covered with white will be influenced by the settings in the three sections listed above.

Note:

Please note that:
(255, 255, 255) = 100% = completely influenced
(0, 0, 0) = 0% = not influenced
As for the areas that are covered with gray, the influences from the three sections will be multiplied according to the gradient levels.

Note:

Please also refer to the following sections for more information:

- Loading Weight Map
- Editing Weight Map
Loading Weight Map
To apply a Weight Map image to a target soft cloth, follow the steps below:

1. Prepare a prop.

   ![Prop Image]

   Note:
   
   This prop can have single material or multiple materials.

2. Make sure the prop is selected.

3. In the Modify panel, switch to the Physics tab. Activate the Activate Physics box and then choose the Soft Cloth radio button.

   ![Modify Panel]

4. Click the Edit Weight Map button.

   ![Edit Weight Map Button]
5. The **Edit Weight Map** panel will show.

6. Select the material from the list to pick the mesh to apply the **Weight Map**

**Note:**
- You can also press down the eyedropper button at the top-right corner on this panel and then click on the prop to pick the target material for further **Weight Map** customization.
- The **Diffuse** thumbnail will display the diffuse in the material you pick. You can utilize it to assure the mesh of the material is the one you want to apply your **Weight Map** to.
7. Double click on the **Edit Weight Map** channel and load a **Grayscale** image to determine the weight of the mesh that will be influenced by the settings described in the previous section.

Alternatively, you can drag and drop an image onto this thumbnail.

Note:

You can find many **Weight Map** templates in the **Material Library**.

The path, by default, is:

C:\Users\Public\Documents\Reallusion\Template\Clone 6 Template\Clone Template\Texture\Weight Map

8. The mesh of this material will thus be given soft cloth settings according to the influences of the gray scale image.
9. Optionally repeat the same steps to any other material with a **Weight Map**.

![Image of Weight Map](image-url)

**Note:**

Please note that a completely black image cannot be loaded. If you don’t want to have a soft cloth effect on the entire prop, simply keep the thumbnail empty.

10. Play back to see the simulation result.

![Image of Simulation Result](image-url)

**Note:**

- Please note that different meshes of different materials can have individual settings for the **Property**, **Collision**, and **Wind Settings** sections.

- If you want to apply the same settings from these three sections to each mesh with a soft cloth, then activate the **Affect All Materials** box besides the **Edit Weight Map** button.
Editing Weight Map

After you have loaded a grayscale image as a Weight Map, you can further edit your weight map by following the steps below:

Basic Editing

The basic editing method is to simply change the Brightness or Contrast value of the Weight Map to adjust the surfaces that are influenced by the soft cloth settings.

1. Prepare a prop.

2. Follow the same steps as described in the Loading Weight Map section to load a white image as a Weight Map to the soft cloth.

3. Play back to see the result.

4. You may use the Brightness and Contrast sliders to do quick and basic editing for the Weight Map texture.
   Note:
   Please note that these sliders can only affect the images that are not totally white.

5. Play back to see the simulation result.
Advanced Editing

1. Prepare a prop. In this case, the prop is a plane with **Diffuse** and **Opacity** maps.

   ![Prop Image]

2. Follow the same steps as described in the [Loading Weight Map](#) section to load a white image as a **Weight Map** to the soft cloth.

   The soft cloth will fall onto the ground instantly

   **Note:**

   You may use the **Brightness** and **Contrast** sliders to do quick and basic editing for the **Weight Map** texture as described in the previous section.

   ![Brightness and Contrast Sliders]

3. In the **Edit Weight Map** panel, select either the **Diffuse** or **Opacity** channel.

   ![Edit Weight Map Panel]
4. Click the **Launch** button. The selected image in the channel will be passed and open with your favorite image editor (in this case, the opacity image is used for reference).

![Image](image1.jpg)

Please notice that the marked in circle area on the **Weight Map** shall be paint in black in order to be pined.

![Image](image2.jpg)

Note:

The buttons in the middle of the panel are:

1. Load a grayscale image as a **Weight Map** texture.
2. Save the current **Weight Map** texture to a directory in **JPG, BMP, GIF, PNG** and **TGA** formats.
3. Delete the current **Weight Map** texture.
4. Launch the current **Weight Map** texture in the image editor for further editing.
5. Launch the UV layout image in the image editor for reference.

5. Go back to the **Edit Weight Map** panel in iClone, click on the **Edit Weight Map** channel. Click the **Launch** button to open it in the image editor. It is completely white by default.

![Image](image3.jpg)

Note:

You maybe need to resize these images in order to make them the same size.
6. Use the **Diffuse** or **Opacity** images as a reference. Paint on the **Weight Map** image with grayscale color.

7. Save the image in the image editor. The editing result will be automatically sent back to **iClone** and update the **Weight Map** data for the soft cloth.

8. Play back to view the simulation result. The black points hold the prop in the air instead of letting it fall on the ground.

Note:
The soft cloth is pinned according to the black area in the grayscale image.
Displaying Desired Material for Applying Weight Map (New for 6.2)

After an object is applied with soft cloth properties, especially the one with compound materials, the materials, either with weight map or not, will be listed in the Edit Weight Map panel.

Moreover, if an object is not only with compound materials but also composed of multiple meshes, the meshes without being applied with any physics settings will be listed in the Edit Weight Map panel as well, which makes it difficult to find out the desired material for applying or editing weight map from the material list.

By working with 3DXchange 6.2 or above version, you can filter out the materials that are needless and leave the desired material for applying or editing weight maps.

Preparing Object with Soft Cloth Settings

1. Prepare a prop (in this case, the tent is composed of multiple meshes and materials).

2. Set it as **Soft Cloth physics** object.
3. Play back to see the result (because there is no any **Weight Map** applied to any material of this object, there is no **Soft Cloth** effect.

Filtering out Unnecessary Material via 3DXchange

In the previous section, the object is soft cloth. As you open the Edit Weight Map panel, you can see the materials that the object has are completely listed within the Select Material list.

However, some of the materials are redundant for applying the **Soft Cloth** effect. In order to filter out them from being listed in the pane, use **3DXchange**

1. Select the object and click the **Edit in 3DXchange** in the Modify panel >> Edit tab >> 3DXchange section.
2. Find out the target mesh by using the **Pick** tool within the **Material** section to pick.

3. In **3DXchange**, click the **Edit Gray Map** button in the **Gray Map** section.

4. **3DXchange** will display the **Gray Map Material** panel.

5. Deactivate the boxes of the materials next to the meshes that are not to be applied with soft cloth effect and click the **OK** button.

6. Export the object to **iClone**.

7. In **iClone**, apply the object to the scene.

8. Set the object as **Soft Cloth** physics object again.
9. Open the **Edit Weight Map** panel. As you see there are only the item that you have activated in 3DXchange.

10. As for this case, apply a gray map to the object as shown in the illustration below:

11. Play back to view the result.
Solver Frequency

The **Solver Frequency** decides how many times the soft cloth status is calculated within two time frames. The higher the value, the more animation details appear before the soft cloth rests again, and the harder the soft cloth is.

Because **Solver Frequency** is related to the **Collision Margin**, you can also refer to the **Collision Margin** section for more information.

![Flag Animation](image)

**Stretch** = 90
**Bending** = 2
**Solver Frequency** = 150
(Fewer animation details - silk)

**Note:**

Please note that if you use **Real-time** mode to simulate soft cloth animation, then details will be displayed in accordance to **FPS** hence the value of the **Solver Frequency** will be less effective.
**Drag**
The Drag setting is effective for singular surfaces; and they only have an obvious effect when the surface moves. The component of force parallel to the oncoming flow is called Drag, it will essentially pull the soft cloth towards the opposite direction of the initial move.

![Diagram of moving and dragging directions](image)

You may then mix-up this setting with a Wind force to produce a turbulent and extended soft cloth.

![Soft cloth extended](image)

The soft cloth is influenced by Drag and Wind force.
Stretch, Elasticity and Tether Limit

The **Stretch**, **Elasticity** and **Tether Limit** decide the softness of a soft cloth. The **Stretch** affects the entire soft cloth, the **Elasticity** focuses on the reflexive properties for the cloth, and the **Tether Limit** determines the level of stretching the soft cloth will exhibit.

**Stretch**

**Stretch**

The **Stretch** determines how hard the cloth will be during collision. The higher the value, the harder the soft cloth is. The illustrations below show the status of two soft cloth props with different **Stretch** values when they hit the floor.

![Stretch = 100](image1)

![Stretch = 10](image2)

**Stretch and Object Meshes**

Although **Stretch** decides the appearance of the soft cloth when it collides, the mesh also plays a big influence. For soft cloth objects, the mesh structure sometimes significantly affects the physics behavior.

![Planes with different mesh structures](image3)

When collision happens, the skin of the soft cloth starts to bend on the edges of adjacent faces. Therefore the more faces your object has, the smoother and more natural your cloth reaction will be. However, keep in mind that high-poly objects take up more system resources and take longer to calculate in terms of physics reactions.

![Object with low number of faces](image4)

![Collision result](image5)

Object with a higher number of faces.

![Collision result](image6)
**Elasticity**

The *Elasticity* setting is the level of stretching between two vertexes of a soft cloth. When this value is lower, there will be less stretching when one side of the vertex is subject to a physics force. Therefore, a lower value is more suitable for sturdy materials such as cotton or demin.

![Elasticity Setting](image)

- **Elasticity = 1 (low stretching ability)**
  - The soft cloth looks as stiff as cotton.

- **Elasticity = 100 (high stretching ability)**
  - The soft cloth looks as elastic as lycra.

**Tether Limit**

The *Tether Limit* determines the anticipated final size of the soft cloth after it rests from any animations, such as moving or stretching.

![Tether Limit Setting](image)

- **Tether Limit = 1 (100%)**
  - The soft cloth keeps the size of 100% when it rests.

- **Tether Limit = 0.80 (80%)**
  - The soft cloth shrinks to size of 80% when it rests.

- **Tether Limit = 2 (200%)**
  - The soft cloth stretches to size of 200% when it rests.
Bending

Bending determines the angle between two triangle faces of a soft cloth.

The lower the value, the smaller the angle is - which diminishes the intensity of the soft cloth. You may use this value to decide how a cloth bends when it contacts a surface.

---

**Bending** = 0 (strong tension)
The soft cloth is firmer.

**Bending** = 60
The soft cloth is softer.

---

**Bending** = 100 (no tension)
The soft cloth is much softer.
**Inertia**
The *Inertia* setting is the resistance of any physical object to any change in its state of motion, including changes to its speed and direction. In other words, objects at rest will remain as such.

By setting different *Inertia* values, you can create soft cloth that will continue moving in a certain direction until another force causes it to change.

Here is a soft cloth *(pinned by two corners)* that stops abruptly at a certain time.

Set various inertia values to determine if you want the un-pinned part of the cloth to keep moving in different levels when the entire cloth stops.

**Inertia = 0**
The soft cloth does not go beyond the stop position.

**Inertia = 10**
The soft cloth goes slightly beyond the stop position.

**Inertia = 20**
The soft cloth goes well beyond the stop position.
Collision Margin

In the Solver Frequency section, you read that the Solver Frequency determines various animation details of a soft body. Most of these calculations are done when the collision happens. The collision margin settings help to determine the reaction of various soft bodies when they collide with other physics-enabled objects.

Soft vs. Rigid Collision & Self Collision

These settings must be enabled if you want a specific soft cloth to interact with other rigid bodies or with itself. Otherwise the soft cloth will penetrate all rigid bodies or its own mesh when it is animating.

When these settings are on, more system resources will be consumed; therefore, disable them when soft clothes are isolated from all other rigid bodies.

Soft vs. Rigid Collision = Off
The soft cloth goes through the rigid body

Soft vs. Rigid Collision = On

Self Collision = Off
The soft cloth goes through itself

Self Collision = On
Collision Margin

Collision Margin is the reaction range from the surface of a soft cloth during collision. The higher the value, the farther away from other objects the collision will take place. This is useful especially when the sharp edges of the target object (mostly rigid bodies) go through the soft cloth.

- **Collision Margin** = 10
  - The edges of the rigid body penetrate the soft cloth.

- **Collision Margin** = 20
  - The soft cloth moves slightly away from the surface of the rigid body.

- **Collision Margin** = 99
  - The soft cloth is too far away from the rigid body.

If the Collision Margin is set too high, then the collision simulation will take place too far away from the target object, causing unnatural results.
Wind Settings for Soft Cloth
In iClone's physics system, each soft cloth can be assigned individual external forces and wind effects by setting Force and Wind directions and strength.

**Force**

The Force settings draw the soft cloth to a given direction while neglecting the global gravity of the project. It is a constant force which may or may not cause wrinkling due to the non-uniform qualities like those exhibited in wind.

1. Create a project with a soft cloth pinned in the air.
2. Make sure the cloth is selected and go to the Modify panel.
3. In the Wind Settings section, set the X, Y, and Z values in the Force group (in this case, the \([X, Y, Z] = [0, -500, 500]\)).
4. Play back to simulate the soft cloth animation.

The soft cloth will have a uniform reaction according to the direction of the force assigned.

Note:

- The higher the values are, the stronger the initial force will be.
- The X, Y and Z directions follow the world axis.

Wind

Unlike the Force setting, the Wind will produce intermittent 'gusts' which simulate the reaction of soft cloth in the wind.

Note:

Please note that the use of the X, Y and Z axes is the same as described in the previous section.

Gust Frequency

The value of the Gust Frequency determines the number of occurrences of wind gusts in a certain period of time. A higher value dictates that gusts of wind will happen more often and vice versa.

Gust Frequency = 1.0

Gust Frequency = 50.0
**Strength**

The Strength of the wind for the soft cloth is a range; each gust of wind is generated at a random strength within the range defined by these two sliders.

1. **General Strength**: This triangle determines the maximum strength of the basic wind forces. This level also dictates the idle performance of Soft Cloth assets.

2. **Gust Strength**: This triangle determines the maximum strength of wind gusts.

The strength range falls at the weak side (left end) of the slider to generate breeze.

The strength range falls at the strong side (right end) of the slider to generate strong wind.

The strength range spans the weak and strong sides (left to right ends) of the slider to generate intermittent gusts of wind.
Global Physics Settings

The **Global Physics Settings** determine the physics engine you are about to utilize. These settings will determine which engine is used to simulate physics animations within iClone. The gravity direction and the stability for simulations can also be adjusted in this panel.

![Global Physics Settings panel](image)

**Simulation**
- **PhysX Engine**
- **Bullet Engine**

**Rigid Body**
- Show Collision Bounding Color
- Continuous Collision Detection

**Soft Cloth**
- Bake Animation
- Soft vs Soft Collision
  
  **Margin:** 2.00

**Gravity:**
- X: 0.0
- Y: 0.0
- Z: -0.8

**World Scale:**
- Value: 5
Simulation Section
In this section, you are free to switch to either one of two types of physics simulation engines. The global behaviors for the rigid body and soft cloth simulations can be set in this section as well.

Rigid Body Global Settings

Show Collision Bounding Color
Activate or deactivate this box to show or hide the physics bounding boxes of rigid bodies in the scene. This is useful when you want to perform further adjustments without being obstructed by the bounding boxes for the rigid bodies, such as texture or animation editing.

Continuous Collision Detection
When the rigid bodies in a scene move very quickly, they can often penetrate each other, especially when there are numerous rigid bodies involved in the animations. Activating this box will diminish the chance of penetrative issues. However, it can also greatly increase the load on system resources.

Soft Cloth Global Settings

Bake Animation
If you deactivate this box, then the animations of the soft cloth will not be kept after simulation. Activate it in order to keep the simulated result as a clip in the Soft Cloth track of your soft cloth prop.

Soft vs. Soft Collision
This setting determines if the soft clothes in the scene collide with each other or not. Activate to achieve the best simulated result to reduce penetration issues. However, keep in mind that this will increase the load on system resources.
Setting Simulating Environments
Because Gravity plays a major role in influencing physics results, it is important to set the gravity direction before simulation.

1. Go to the Gravity section in this panel.
2. Set the gravity direction by typing values in the Gravity fields. By default, the (X, Y, Z) equal to (0, 0, -9.8), which are the gravity values of the earth in iClone.
3. Drag the World Scale slider in accordance with the size of your 3D world.
   - A larger world scale value will increase the animation speed, which speeds up the slow default motion physics; and vice versa. Remember that you must adjust the value according to the size of your 3D world. If you want to create sharper and faster physics animations, then you may increase the value to 6 or 7.

3D World of Common Size

<table>
<thead>
<tr>
<th>World Scale</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Normal</td>
</tr>
<tr>
<td>8</td>
<td>Accelerated</td>
</tr>
</tbody>
</table>

- If you create tiny physics objects, then every physics animation will increase in speed in a default world scale where you can hardly see these objects. For this, please decrease the world scale to decelerate the global simulation speed.

Physics Object Size < (0.1, 0.1, 0.1)

<table>
<thead>
<tr>
<th>World Scale</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Too fast</td>
</tr>
<tr>
<td>2</td>
<td>Normal</td>
</tr>
</tbody>
</table>

- If you create massive physics objects, such as a world with giants, then every physics animation will process slowly. Please increase the world scale to accelerate the global simulation speed.

Physics Object Size > (1000, 1000, 1000)

<table>
<thead>
<tr>
<th>World Scale</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Too slow</td>
</tr>
<tr>
<td>10</td>
<td>Normal</td>
</tr>
</tbody>
</table>

Once you adjust the physics world settings, then you may start to simulate the animations for the physics objects including Rigid Body and Soft Cloth.
- The Rigid Body Simulation
- The Soft Cloth Simulation
Actor - Look At
Instead of manually adjusting the head of an actor to look at a moving target, you may use this time saving feature.

Look At
1. Select the desired actor.
2. Switch to the Attribute tab in the Modify panel. In the Look At section, click the Pick Target button.
3. In the 3D viewer, click on a target.

Note:
- You can have the actor Look At the target object over a certain period of time and then have it stop looking outside that time range.
- You may optionally select the sub node of the target by clicking on the button and select a desired node in the tree view.

Look At the Camera
If you want the actor to Look At a camera all the time, simply click the Look at Camera button. The actor rotates her head and looks at the camera all the time even if the camera moves away.

Weight and Convergence
You may drag the Look at Weight slider to adjust the rotation weight of the eyes or the head.

To adjust the Eye Convergence, drag the slider to the Inward or Outward side.
**Camera - Look At**

It is hard to keep the camera stable while aiming at an object in a scene. Thus, **iClone** introduces the **Look At** feature for the camera to achieve this goal in several simple steps.

1. Select the desired camera in the **Scene Manager**.
2. Go to the **Modify** panel >> **Look At** section, click the **Pick Target** button.
3. In the 3D viewer, click on a target.
4. Move the target object away to see the result.

![Image of camera looking at a target](image)

The camera is driven to rotate and follow the moving car.

Example: A lady walks down the street with the camera following her.

![Example images of camera following a lady](image)

Note:

You may have the camera **Look At** the target object over a fixed period of time and use **Set Free** outside the time range to stop looking at the object.
Spotlight - Look At

When you want to shine a spotlight on a target object, you may use the Look At feature.

1. Click the Create >> Light >> Spotlight command on the menu bar to add a spotlight.
2. Select the Spotlight in the Scene Manger to invoke the light modify panel.
3. Go to the Look At section and click the Pick Target button.
4. In the 3D viewer, click on a target.
5. Move the target object to see the result.

The spotlight rotates and follows the moving actor.

Note:

You may also have the spotlight Look At the target object over a certain period of time, and have it be Set Free outside the time range.
Utilizing Path

Most of the things around us are moving smoothly along a curve. By using this feature we can build a path for any object to follow without creating lots of transform keys. In iClone you can make almost anything to follow a path, including props, characters, lights, cameras and etc.

Please follow the topics below to learn more about paths:

- Creating New Path
  - Converting Animation Keys to Path
  - Projecting to Terrain
- Editing Path
  - Prop Picking Path
  - Character Picking Path
- Setting Position Keys on Path
  - Adjusting Speed Variation on Path
  - Layering Path Transition Keys to Transformation
  - Following Control Points
  - Following Path and Terrain
- Jumping from Path to Path
- Camera on Path and Look At Target

Note:

Path will not be rendered when you export the video.
Creating New Path
You can create any shape of path you wish either for characters or props.

Creating Paths on the Grid
When you are creating a path on the grid, the path pointers will snap to the grid as you go.
1. Press Ctrl+G to toggle visibility of the grid.
2. Click the Create >> Create Path command from the main menu bar.

First Control Point
You can click to position the control point and pull to extend the next control point.
3. You may right-click or press ESC to exit.
4. Now, we are done creating the path. We can now modify the color by selecting the button besides the Edit Path button.

These path colors will serve as ID color to identify which path a prop or character is currently attached to in the timeline.

Drawing on Terrain
When creating paths on terrain, the control points follow the height and angle of the terrain. Whereas the grid only remains on a flat surface.

First Point
Second Point
Third Point
As you can see, the points snap right onto the surface's height once the pointer is positioned.
**Drawing in the Sky**
When creating paths in the sky, you create the path from the angle of the camera to the distance of 50m away from the camera.

Note:

- Please do not create path both in the sky and on the terrain, you might get an unexpected result.

In order to get the best result, we suggest you to create a path on the terrain first, and then flip the path to place it in the sky.
Converting Animation Keys to Path
Here you will learn how to convert random position keys that you set for a prop into a path.

1. Add a prop into the scene and set some position keys for the prop.

2. Open up the Timeline and select all the Transform keys of the ball.

3. Right-click on one of the keys and select Convert Position to Path from the right menu.

4. A path will be created for the selected prop.

Note:
- Once you have converted the prop’s position keys to a path, they do not have a link relationship. A link relation will only be established when you use Pick Path either in the avatar’s or prop’s modify panel.
- When you convert a camera’s position keys to a path, the camera will only follow the control points from point to point and may not follow the curve of the path accurately.
Projecting to Terrain

After creating a path on the Terrain, you may use **Project to Terrain** to make the path attach closely and follow the shape of the Terrain.

**Before Projecting to Terrain**

Setting **Precision** to terrain allows you to enhance the preciseness between the path and terrain surface.

**After Projecting to Terrain**

**Tangent Type**

When setting the tangent type of the path, you can define whether you want to have the path curved or straight/linear between point to point.

**Linear**

**Smooth**

Note:

When you have both **Project to Terrain** and **Follow Terrain** enabled, **Follow Terrain** would be the layer that the prop will be following.
**Editing Path**

By using the **Edit Path** function it is possible to enhance and modify a path to create any imaginable shape or fine-tune its positioning in the scene.

1. Create any shapes for the object to follow.
2. Select the path and click the **Edit Path** button to go into path editing mode.
3. Right-click on the path to **Add** or **Delete Control Points**.
4. Press the **Ctrl** key to select multiple points for deletion.
5. You can also use the **Selection** tool to select multiple control points at once.
6. While a control point is selected you can use the **Move** and **Rotation** tools to set its transform data.

**Note:**
- If you do not have the **Edit Path** Button enabled, you can only control the entire path instead of the control points.
Prop Picking Path

Props can pick a target path after a path is created in the scene. This simple technique allows you to save time by creating key frame by key frame.

1. Create a path and add a prop to the scene.

2. Select the prop and click the Pick Path button in the prop's modify panel.

3. Select the path for the prop to attach to.

4. The path name in here represents the path that the prop is currently attached to.

Note:

A link relationship between paths and props and characters will only be established when you use Pick Path. When you direct the character to a certain position using the Move command, a link will not be created.
Character Picking Path
Characters can either walk on a path by using Pick Path or by commanding them to walk directly on a target path.

Character
There are two ways to enable your characters to walk on a path you have designed. You may simply direct them to walk on a target path using the behavior mode in right menu.

1. Create a path for your character to walk on.
2. Add a character into the scene.
3. Right-click on the character and select Move > Walk_Forward.

4. Pick the path you have just created. The character will walk to and then right along the path.

Note:
- When using this command on a path you have frozen, the character will not follow and walk on the path.
- A link relationship between paths and props and characters will only be established when you use Pick Path.
- When you direct the character to a certain position using the Move command, a link will not be created.
- A character will always walk to the beginning or the end of a path when you pick a path for the character to walk on.
Setting Position Keys on Path

Position keys allow you to set a prop's position at certain frames in the Timeline.

Position Value

After you have created a path for the prop to follow, the value on the path is always from 1 to 100.

When moving from A to B, you will get a positive number, but when the prop is moving from B to A, the value reverses to a negative value.

Infinite Loop

You can create a continuous loop by setting the value to 200 to make the prop follow the path twice, 300 for three times and so on.

1. In this example, we have picked the I path for the prop to follow.

2. Drag the timeline slider to a new frame and enter a new value in the position field.

3. After setting position keys of the prop, open the Path sub-track of the Constraint track in the Timeline panel.
4. Notice the keys in the path track; these **Position** keys are set for attaching on the I path.

![Path Track Example](image)

5. Drag to a new frame and click the **Pick Path** button in prop modify panel.
6. Select the C path and repeat step 2 to 4.

![Prop Attaching Example](image)

7. Another set of keys are added in the path track.

![Path Track Example](image)

**Position Keys and Timeline**

Assigning a different color to each path will help you identify the path that the prop is currently attached to in the 3D viewer.

**Release Constraint**

Releasing constraint from path allows you to release the attached connection from the path to the prop or actor.

1. Select the prop.
2. During the session of attaching to the path, you may drag to a frame and press the **Release** button to detach.
3. When you have detached the prop from the path, the Path Track in the timeline changes instantly to reflect that the constraint relationship has disappeared.

![Path Track Example](image)
Transition Keys
In case position and releasing keys cause the actor or prop to act abruptly, these two kind of keys contain transition durations. You may then adjust the duration so that the positioning time can be prolonged or shortened.

Note:

**Transition Keys** will only appear when the Path or Release keys are selected.

- **A** - Position key and Release key.
- **B** - Transition Start key and Transition End key.

If the durations are prolonged, then the positioning or releasing motions will be slower.

On the contrary, the motion will be quick and sudden.
Adjusting Speed Variation on Path
You can set position keys on different control points for the prop to approach. You can even set variations in speed for the prop while moving on a path. This can be used to simulate something moving very fast and then very slow or when something is very slow and then enters high speed. There are few examples, such as when a person is walking uphill or when a car suddenly goes downhill.

Drag/Pull Position Keys
When you have selected the position keys for picking path on a target control point, you can then see the keys under the target prop’s Constraint / Path track in the timeline.

- Since there are several keys set for picking path, you can then drag and pull these keys to set the speed for it to get to the destination in the limit time of frames.

![](image)

- Now adjust the key to frame 100. You may now see the bus runs even faster to get to the destination in these frames.

![](image)

Transition Curve between Position Keys
You can even set a variation in speed between position keys in the timeline.

1. Please refer to Transition Methods in Tracks for more information on Transition Curve.
2. Once you have selected a curve, the behavior affects the keys you have just set with the previous position key.
Layering Path Transition Keys to Transformation (New for 6.03)

Using the new Path transition key, you can control the speed at which the object will return to its starting position after being released from the path.

Path Transition Start Key

1. Create a new project and start off on the first frame of the timeline.

*The object’s transformation will be saved into the key on the start frame.*

2. Draw a path.

3. Follow the steps described in the Setting Position Keys section to have the flying object start and stop moving along the path on a certain time frame (not on the first frame).

The data of the animation on the timeline:
A. The initial position data of the object.

B. The object starts to move along the path from the first control point arrow (in this case, the first one).

C. The object starts to gradually move to the first point of the path because of the layered transition start key, even though there is no other keys on the Transform track.

D. The object stays on the designated control point arrow (in this case, the last one) of the path after this stop key.
Transition Stop Key to Release Key

In the previous section, the flying object stays where it is after the last path key. However, by using the transition stop key after the release key, you are able to move the object to its initial position at the first frame.

1. Go to the frame where you want the object to resume its initial location (in this case, one frame after the final path key).

2. Click the Release button to release the object from the path.

A release key will be added into this time frame.

3. The object will gradually move back to where it was at the start time frame.

Note:

- Click on the release key to show the transition stop key.
- With the layered Transition Stop key, the object gradually retrieves its starting position (at the first frame), causing the object to move back.
- Control the speed at which the object returns to its starting position by dragging the transition stop key around.
Following Control Points
Every control point has its own arrow pointer. These points refer to the direction that the prop or the character will be facing when it reaches the control point.

Control Points Direction
If you have all the Control Points facing one direction, you may get the following result.

Turning Control Points
By modifying every control point you can make a prop turn on a selected path. You may enable the Edit Path button to select the control points and turn its direction.

1. Create a path and have the path in selection.
2. Go to the path's modify panel and enable the Edit Path button.
3. Select the pointer and use the Rotation tool to turn its direction.
4. Add a prop into the scene and click the Pick Path button to select the path.

5. Enable Follow Path in Prop's modify panel.

6. The prop now follows the direction of the control points.
Jumping from Path to Path

In iClone, you can create multiple paths in a scene for the props or characters to jump to and from.

1. Create your first path.

2. You may click the **Edit Path** button to position the **Control Points**.

3. Now, create another path in the sky.

4. Add a prop into the scene.

5. Go to the **Path** section in the Prop's modify panel and click **Pick Path**.
Keying Path to Path

1. Select the first path’s starting point and the prop snaps right onto the target pointer.

2. Drag the **Timeline Slider** to a preferred frame. Adjust the value in the **Position** field to set the prop’s position and add a position key on the selected frame.

3. Drag to a new frame in the **Timeline** and click the **Pick Path** button and select a control point on the second path.

4. Drag the **Timeline Slider** to a new frame again. Adjust the value in the **Position** field and make the prop move to the last control point on the pink path.

5. The prop moves smoothly between path to path.
Camera on Path and Look At Target
After viewing this tutorial you will be able to make more complex use of paths and their combination with other objects.

Camera on Path
Now, we will be creating a path for the camera to move on.
1. Add a camera from the Camera List. Alternatively, you may access the Create >> Add Camera command from the main menu bar.
2. Select the camera and pick a path to attach the camera to the path.
3. Drag the timeline slider to a new frame and set position value to 100.
4. Now the camera runs smoothly from the start to the end.

Look At Target
Since we have set a path for the camera to move on, we can now direct the camera to look at a specific object.
1. Add and place an object in the scene.
2. Select the camera and click Look At in the modify panel.
3. Pick the object to look at.
4. Now the camera runs smoothly on the path while looking directly at the object.

Camera on Path
Looking through the Camera
Note:
You may also apply this to the character and the light system.
**Link and Attach**

In iClone, the **Link** function is now enhanced. You are allowed to link your object to another one at a specific point of time and then unlink it at another time.

The **Attach** method allows you to combine objects into one piece while the individual sub nodes are still available for modifying.

Basically, the **Link** never changes the **Hierarchy Structure** of the current project while **Attach** does change the structure unless you detach a combined object.

- The Comparison of Link and Attach
  - Link
  - Attach

![Initial structure](image1.png) ![After Link (Structure remains)](image2.png) ![After Attach (Structure changed)](image3.png)
# The Comparison of Linking and Attaching

This chapter provides a comparison table for **Linking** and **Attaching**.

## Linking

### When to Use
- Passing an object from one parent node to another at a specific time.
- Changing a camera's view to another actor's or object's view.
- Having a light follow another moving object.

### Same Behaviors
- The child node follows the parent's transform data - R / T (not optional)
- The child can still be transformed after linking.
- Picking the bone nodes directly is possible.

### Picking Parent/Child
- Single click to pick the parent or the child.
- When the parent is not selected, right-clicking on the child node will turn on its right-click menu.

### Generating Keys in Timeline
- Available.

### Saving Relations in Project
- Available.

### Multiple Objects
- Supported.
- Parent-child relation is broken.
- Only parent is saved.

### Auto Align Position to Parent
- Not Available.
- **Align Position to Parent** option in the Link to Sub-Node dialog must be activated manually.

### Prop to Actor
- The prop remains a prop.
- Multiple levels available.
- Recursive linking is forbidden.

### Levels
- No change.

### Hierarchy in Scene Manager
- Double-click to pick the child and use the Right-click Menu.

## Attaching

### Creating a merged object and adding it into the **Custom** library of Props
- Adding an actor with accessories into the **Custom** library of Actor
- Converting a model with an iProp Helper to become a custom iProp. Please refer to **Creating Animation Helper** and **Prop Animation with Helper** sections for more information about Helper.

### When to Use
- The child node follows the parent's transform data - R / T / S (optional)
- The child can still be transformed after attaching.
- Picking the bone nodes directly is possible.
- Single click on the parent or the child to pick the grouped object.
- Double click to pick the child.
- When the parent is not selected, right-clicking on the child node will turn on its right-click menu.
- Not Available.

### Generating Keys in Timeline
- Available.

### Saving Relations in Library
- Supported.
- Parent-child relation is saved.

### Auto Align Position to Parent
- Not Available.
- **Align Position to Parent** option in the **Attach to Sub-Node** dialog must be activated manually.
- The prop converts to an accessory.

### Prop to Actor
- Multiple levels available.
- Merging parent and child into a new object allows the attachment of more children.
- Changes.
- Child is moved under the parent node.

### Levels
- Double-click to pick the child and use the Right-click Menu.
**Link**

**Link** is a very convenient function for you to simultaneously move or rotate one or more objects, such as an actor, accessories or props, without adjusting them one by one. You do this by linking them to a specific parent object.

The linking relationship can be set as a key, therefore, you may set a link key at one time and set an unlink key at another. By using this concept, you may have the object specified to be transformed during different time frames.

We will use props to describe the linking process.

**Link**

1. Drag and drop the desired prop(s) into current project.
2. Click on the prop to pick it.

![](image1)

Drag and drop the crate

3. Scroll to the **Linkage** section and click **Pick Parent** button.
4. Navigate on the 3D viewer and click on the target object. The prop may be still at the wrong position.

![](image2)

Pick the lifter of the forklift as the parent of the crate

5. Adjust the position of the prop for better placement if necessary then click the button and check the correct sub-node is selected in the **Link to Sub-Node** panel, select the **Position** option and click **OK**. The prop then will be forced to align to its parent.

![](image3)

The crater is aligned to the lifter

6. Move the parent object to test the result.

**Note:**

- The **Link** relationship can not be stored along with the parent if you add the parent into the **Content Manager**/**Custom** library. It can only be saved in the project.
- If you wish to keep the relationships between the parent and the child, the **Attach** method is highly recommended.
Change Link Parent
You may link your object in one frame to a target and then link to another target at another frame. The transform data of the object will then be driven by different parents in different frames. Following the example above, we will now describe this feature in more detail.

1. Go to the desired frame when the prop will be linked to another parent.

   ![Image 1]

   Go to the frame for changing the linking parent

2. Click the Pick Parent button again.

3. Click on the desired parent on the 3D viewer. Now the parent is changed.

   ![Image 2]

   The crater is now linked to the train.

4. Move the new parent object. The transform data of the prop will now be controlled by the new parent.

   ![Image 3]

   The train moves away with the crate.
Attach

Attach is more similar to the traditional Merge function used in previous versions of iClone. However, Attach allows you to modify each node individually in the attached objects. You may then add the combined object into your custom library without destroying the relationship.

We will use a prop to describe the attaching process.

Basic Attach

1. Pick the prop you wish to have become the child in the attaching relationship.
2. Go to the Attribute tab of the Modify panel and scroll to the Attach section, click the Pick Parent button. Alternatively, you may right-click on it and select Attach in the Right-click Menu.
3. Navigate in the 3D viewer and click on the target object.
4. a. If you are using any Manipulating Tools, clicking once on the parent node will pick the whole group; and click on the child to pick it.
   b. If you are using any Camera Tools, double-click to pick the whole group. You may only use the Scene Manager to pick the child node.
5. You may optionally click to pop up the Attach to Sub-Node panel and select the Position option to have the child aligned to the parent instead of adjusting it manually.
6. Click the button in the bottom of the Content Manager to save the merged object into the library while the attaching relationship is kept as well.

Note:

- Please notice that all the props attached to an actor will be converted into accessories. You may modify their parameters in the Modify panel.
- The Attach relationship can not be set as keys throughout the current project. Please use the Link method for this purpose.
**Inherit Move, Rotate, Scale**

You may choose to have the child inherit the **Move**, **Rotate** and/or **Scale** data from the parent object. They are checked by default.

In the following example, the rear tire is already attached to the frame and inherits the move, rotate and scale data of it.

The front tire will now be attached to the frame while the **Move/ Rotate/ Scale** boxes are **unchecked** for demonstration purposes.

1. **Attach the front tire to the frame with**
   - **Move**: **Unchecked**
   - **Rotate**: **Checked**
   - **Scale**: **Checked**
2. Move the frame away
3. Attach the front tire to the frame with
   - **Move**: **Checked**
   - **Rotate**: **Unchecked**
   - **Scale**: **Checked**
4. Rotate the frame
5. Attach the front tire to the frame with
   - **Move**: **Checked**
   - **Rotate**: **Checked**
   - **Scale**: **Unchecked**
6. Scale the frame
Timeline

Basically, you can create animation with iClone by applying templates from the Content Manager. However, if you intend to fine-tune or edit the animation, then you have to use the Timeline panel. All animation relevant data can be found in this panel.

- **Timeline Operation - Basic**
  - Open Tracks for Selected Items
  - Open Same Type Tracks

- **Timeline Operation - Advanced**
  - Data Types in Timeline (New for v7.1)
  - Selecting Data in Timeline
  - Copy / Cut / Paste for Data on Timeline (New for v7.1)
  - Using Dope Sheet Track

- **Project Level Tracks**
  - Inserting and Deleting Frames
  - Adding Flags
  - Transition Curves in Tracks (New for v7.1)

- **Clip Editing**
  - Auto Extending Clips (New for v7.1)
  - Time Warp for Motion Clips
  - Visibility and Non-Uniform Size of Clip Frame Cells (New for v7.1)
  - Removing Motions of Body Parts
  - Creating Clips
  - Using Align Features to Remove Sliding
  - Speed, Loop and Blending
  - Clips and Keys (New for v7.1)
  - Motion Layer and Clips - Rest Pose Keys
  - Transform and Clips - Reset to Zero
  - Sampling and Flattening Keys (New for v7.1)
  - Reversing Clips
  - Modifying and Fixing Motions

- **Clip Preparing**
  - Reset Motion Pivot
  - Align Actor Motion
  - Reset Motion Root
  - Aligning Motions to Actor Orientation (New for v7.1)
  - Merging Clips (New for v7.1)
  - Creating Transition Clips (New for v7.1)
# Timeline Operation - Basic

## Basic Timeline Operation

1. **Dock / Undock**
   - Double-click on the caption to dock the panel to the docking place, or undock the panel and make it float above the main program.

2. **Display Sub-Tracks**
   - Click this triangle button to show selected sub-tracks.

3. **Sub Track**
   - This track shows the sub tracks when their grouped buttons are pressed down.
   - Single-click on the sub track name to select the object to which it belongs to.
   - Double-click on the sub track name to select all the data in the track.
   - Click the **Cross** icon beside the sub track name to collapse the track.

4. **Main Track**
   - This track shows the project or an object's name.
   - Click the arrow button to select sub track items in the drop-down list, you wish to show / hide on the Timeline.
   - Single-click on the name to select the object.

5. **Track Menu list**
   - Click the drop-down list and select the items, you wish to show / hide on the Timeline.

6. **Object Related Tracks**
   - When you pick an object in the 3D viewer with this button activated, the Timeline will only display the tracks of the picked object.

7. **Open Same Track Types**
   - When you pick an object in the 3D viewer with this button activated, the Timeline will display the similar tracks that belong to other objects, which are related to the picked object.

8. **Previous and Next Key**
   - Click these two buttons to snap the play head back to the previous or next key, or the start-frame clip.
   - The key or clip will be automatically selected.

9. **Clip Editing Tools**
   - Click this button to show the clip editing drop-down list.
     - **Cut**: Click the button to cut the target key, or clip, and add into the clipboard.
     - **Copy**: Click on the button, or use hotkey Ctrl + C on selected keys or clips to copy (single or multiple keys).
     - **Paste**: Click on the button, or use hotkey Ctrl + V to paste to the target frame (single or multiple keys).
     - **Delete**: Click on the button or press **Delete** key to delete highlighted keys or clips.
     - **Click the Sound button to show a panel to modify the clips on the Sound track.**
     - **Click the Lips Editor button to show a panel to add or modify lip-synched keys on the Lips track.**

10. **Audio Editing Tools**
    - **Click this button to use the tools in the drop-down list to zoom in / out the timeline.**
      - Click the **Zoom In** button, or use hotkey "+" (or Alt + Rolling the mouse wheel) to increase the time (cell) unit size.
      - Click the **Zoom Out** button, or use hotkey "-" (or Alt + Rolling the mouse wheel) to decrease the time (cell) unit size.
      - Click the **Fit to Window** button to view the entire timeline items within the timeline window space.
      - Click the **Actual Size** button to show the time unit represented as 60 frames per second.
12 Play and Stop
- Click the **Play / Pause** button, or press the space bar to play the project; click again to pause playback.
- Click the **Stop** button, or press the **,” (comma)** key to stop playing.

13 Current Frame
This field shows the current frame number when you click on the target frame in the timeline. You may also type in the frame number to jump to the target frame. This allows you to go to any precise target location. This is especially convenient for animation with clear timing control.

14 Play Head
Drag to move to the desired time frame.

15 Playback / Render Range
Drag the two flags to decide the range for playing back or rendering.

16 Play Bar Show / Hide
Click this button to show or hide the **play bar**.
Open Tracks for Selected Items
You may open the tracks for selected items in the Timeline panel for further editing.

Open Track for Selected Object
Follow the steps to quickly access the tracks of the picked object and switch tracks between objects on the timeline.
1. Prepare a project with multiple objects.

2. Toggle the Object Related Track button on the Timeline toolbar.

3. Select the object you want to modify (in this case, the ball).

Note:
Please note that you can swap the order of step 2 and 3.

4. The tracks of the selected object will show on the Timeline. You may then adjust the data in the tracks of the selected object.

5. Click on another object in the scene.
6. The timeline will instantly show to the tracks of the currently picked object for your editing.

Open Multiple Tracks at the Same Time
Follow the steps to show tracks of more than one object on the timeline.

1. Toggle the Object Related Track button on the toolbar.
2. Hold down the Ctrl key and select the objects you want to modify (the actor, prop and camera in this example) to show their tracks at the same time.
   Perform this step before step 1 and you will also have the same result.

3. The tracks of all the selected objects will show on the panel. You may then do further editing to them.

Note:
- If you want to synchronize the track visibility of objects on the timeline, you can toggle the Open Same Track Types button on the toolbar to show / hide tracks of objects at the same time.
Open Same Track Types
When you want to modify the objects that have data on similar tracks, you can toggle the visibility of the tracks at the same time. Please note that the tracks must belong to objects under the same group in the Track Menu List, such as the Actor, Prop, Accessory Light and Camera groups.
This function is especially useful for you when creating a conversation scene with multiple characters.

1. Prepare a project with multiple objects (in this case, two characters).

2. Select both of the characters.
3. In the Timeline panel, press down the Object Related Track button to show the tracks of the objects you have selected.

4. Press down the Open Same Track Types button on the toolbar.
5. Click the down arrow button on one of the character's base tracks and activate the boxes of the sub-tracks you want to show / hide (in this case, the Viseme track).

Note:
You are able to swap the order of step 3 and 4.
6. The Viseme tracks of the two actors are instantly displayed because the Open Same Track Types button is pressed down.

7. You may then add data to the objects. For this example, the conversation voice clips for both characters.

8. Keep adding or editing data within these tracks until you are satisfied with the result.

Note:

Make sure the Open Same Track Types button is pressed down (in green) when you want to synchronize the track visibility of objects. The button will be toggled off if you edit a track not belonging to the last-selected object (the base object).
Timeline Operation - Advanced

Advanced Timeline Operation

1. Add key
   - Double-click on the timeline cell area to add keys or press this button.
   - Keys can also be automatically added when users alter key information in the Modify Panel.
   - The Add Key button only works for the Transform Motion Layer Facial Layer Visible HDR, IBL, and Effect sub tracks, and all other sub tracks for cameras and lights (Constraint sub tracks are excluded).

2. Break
   - Break works for Clip type data in all tracks / groups.
   - Click the button, or use hotkey Ctrl + B to split the selected clip at a current frame into two new clips.

3. Motion Modifier
   - Click this button to launch the Motion Modifier panel.

4. Loop
   - The Loop button works to Clip data in all tracks / groups.
   - Click this button and drag the clip's right edge rightward to repeat the clip.

5. Speed
   - The Speed button works to Clip data in all tracks / groups.
   - Click this button and drag the clip's right edge rightward / leftward to decelerate / accelerate the speed.

6. Insert Frame
   - Click this button to insert a designated number of frames into the current time frame in order to increase the length of the project.
   - You may also use this feature to insert frames for individual objects without affecting the length of the project.

7. Delete Frame
   - Click this button to delete a series of selected frames in order to decrease the length of the project.
   - You may also delete data, within a range, of any object in the current scene without affecting the length of the project.

8. Add Flag
   - Click this button to add flag marks to specific time frames on the Project track. This allows you to easily hop between events.
   - You may quickly jump to the frame by using the Tab, and Shift + Tab keys.
Data Types in Timeline

There are nine types of data in the Timeline panel - Key Clip Hollow Key Target-switching On / Off Lip-Synching Keys Voice Wave Transition Keys and Representative Keys.

1. Timeline Pointer
   Drag the pointer on the Timeline frame meter for a quick frame review.

2. Key
   - **Animation Key** stores RTS (Rotation, Transformation, Scale) data for all objects in the iClone 3D space, including camera, lighting, actors, props, and accessories. Users can use keys on the timeline to control a prop's location, rotation and size change, as for actors, cameras and lighting, only location and rotation can be controlled.
   - **Parameter Key** stores settings of specific objects such as Color, Range, Beam, Falloff of Lights and Lens, and Focal of Cameras. The parameter values between keys are automatically interpolated.

3. Clip
   - **Animation Clip** stores motion / animation clip segments of animation data corresponding to animated objects, such as moving / performing / operating of actors / iProps, LiveProps, merged props, and hand gestures. Animation Clips can handle more complicated motion behaviors, such as skin-bone animation and morph animation.
   A clip may be accelerated / decelerated, looped or blended into another clip. Please refer to the Speed, Loop and Blending Section for more information.

4. Target-switching
   - **Target-switching** data stores the targeting relationship between one object and its target. The target can be changed or even dissolved at any time frame. Features such as Look at Link to for actors, cameras, lights or props (Link to only) are under this category.

5. On/Off
   - The On/Off data on the Visible track stores only one object status. You may make the object visible (on) at one frame, and invisible (off) at another.
   - The On/Off data can also control the emitter of the particle effect to start / stop sending particles.

6. Lip-Synching Key (Actor Only)
   - The Lip-Synching Key decides lip shapes in certain times as the actor speaks. It may be automatically generated by assigning a voice to a character, or by manually setting one with the Lips Editor panel.

7. Voice Wave (Actor Only)
   - The Voice Wave shows the waveform of the character's voice. It is automatically generated in order to add lip synching keys at specific times.

8. Transition Key
   - The Transition Key decides when the reaching action of an actor or following path behavior of an object starts and when it ends. This type of key may be dragged so that you decide the reaching, path-following or releasing speed, it shows only when you select the data on the Reach (Target / Release keys) or Path (Position keys), and Spring On / Off data tracks.

9. Representative Key
   - The Representative Key on the Dope Sheet track implies that it contains one or more keys within its sub tracks. Once you change an object's data, you will then be able to add or modify the data in its sub tracks, which will also add or modify a Representative key.

10. Solid and Hollow Keys
    - **Hollow Key** represents partially keyed frame in the track, meaning not all axis of the element has a key.
    - **Solid Key** represents a completely keyed frame.
    Usually Hollow Keys will appear most when Edit Motion Layer or Sample Clip is applied. This is because iClone 7 performs optimization on all the keys when these commands are executed to make the motion keys more concise. You need to use the Curve Editor plug-in in order to adjust the Hollow Keys.

Selecting Data in Timeline

Single-Track Data Selection
- **Select single key / clip**: Single-click on the target key / clip, the selected key / clip will be highlighted in green.
- **Tab Key**: Press Tab to jump to the next key / clip, then Shift + Tab to jump to the previous key / clip.
- **Select All keys / clips**: Double-click on the target track name.
- **Multiple keys / clips selection**
  - Drag the cursor in a specific track to highlight the keys / clips covered under.
  - Use Ctrl + LBM (Left Button Mouse) to select multiple keys / clips.
  - Use Shift + LBM to select the adjacent keys / clips.
- **Copy Keys or Clips**: Use Ctrl + drag keys, or clips, to duplicate them.

Note:
After the data is selected, you may delete, copy and paste it; besides, moving ( ) it is also available.

Multi-Track Data Selection
In iClone, you are allowed to select data stored in different tracks. It is convenient to edit data at one time instead of editing separately in different tracks.
- In iClone 6, you can even use Box Selection:
  Use Ctrl + drag a rectangle across different tracks to select multiple keys / clips that belong to different objects.

Note:
- The multi-selection across multiple objects can only be done in PRO version.
- Please refer to the Timeline Shortcuts section for more information.
Copy / Cut / Paste for Timeline Data (New for v7.1)

Transform Keys
- Copied and Cut keys can be pasted on the same or a different clip. This applies to Clips, Transform Keys and Layer Keys.
- Copy and Paste features can be applied to transform track in the same asset.

The copied transform keys can be pasted onto similar asset types.

Motion / Animation Layer Keys
- Even though the Layer Key tracks are numerous, they are still of the same type. Therefore, you are allowed to copy and paste the layer keys into another clip.
- If the source and target assets contain identical structure, then the layer keys can be pasted from within a clip of the source object into another clip of the target object.

**Symmetrically Copy and Paste**
You can copy one side of the character's poses to the opposite side, which saves the efforts on walk or run loop editing.

1. Apply a character and set poses in certain time.
2. Go to another time frame when the character does another pose (in this case, left jab punch).

3. Copy the layer key on the **LArm** track.

4. Go to another time frame for setting an opposite pose.
5. Right click on the **RArm** track and select the **Paste Symmetrically** from the right-click menu.

The result will be as shown below.
6. Repeat the same steps to copy layer key (step 2) and paste to the opposite limb (current frame).

You can then get an opposite pose by simply copying and pasting keys. The opposite pose (right jab punch) is thus done.

7. Optionally adjust the pose for the spine.
Saving Clips (New for v7.1)

There are several ways to saving clips with slightly different procedures. In the following example, the motion is created with the integration of Motion Clip, Motion Layer Keys and Constraint Keys (Look At the Reach).
Directly Saving Motion Clip

There are two quick methods to saving motion clips.

- **Saving from Right-click Menu** You can save the motion clip into iMotion or rlMotion formats directly from the right-click menu.

- **Collecting Motion Clip** You can also set a range in the Collect Clip track, right click within the range and save the motion into a clip file.

However, these methods save only the motion clip and its encased motion layer keys.

Therefore, after you apply the motion to another character, the motion will be totally different.
Baking Constraint Keys before Saving Clip

In order to include the Reach effect into the saved motion clip, do the following steps:

1. Right click on the motion clip.
2. Execute the Bake Reach Key command.

The motion influenced by the keys in the Reach Tracks will be baked into the motion clips.

3. Save the clip as described two methods in the previous section (Directly Save Clip or Collect Clip).

However, this method, although keeps the reach-key results, will not keep the Look-at keys.
Activating Baking Constraint Keys

The final method can be applied to save motion clips with constraint keys, including the reach and look-at keys.

1. Access the Animation menu >> Motion Setting Options and activate the Bake Constraint Key command.

2. Save the clip as described two methods in the beginning section: Directly Save Clip or Collect Clip) of this page. The motions caused by the Constraint Keys, including the Reach and Look-at ones, will be baked into the motion clip when you export it.

Apply the motion clip file to another character and you will find that the motion is identical as in the original project.

Note:

You can also use the Collect Clip method to creating MotionPlus file for baking the constraint keys.
Using Dope Sheet Track

The Dope Sheet track is a very unique track. You can not set keys in it nor can you add any clips to it. However, you can directly perform key editing on the master track without having trouble clicking on every individual track to find the specific keys you created, which makes observation and editing much easier.

What is Dope Sheet Track?

The dope sheet track is actually a track that displays keys representing all the other keys within the other tracks of the same object.

![A character's dope sheet track and dope sheet keys.](image)

![These keys represent the data in different tracks.](image)

Note:

- If the data type is a clip, then its dope sheet key only points to its starting frame.
- Please note that only Terrains don’t have dope sheets due to the fact that you can’t set any keys on them.

Benefits of Using the Dope Sheet Track

- **For Observation**  It is easier for you to identify the data, keys, switch or clips, that an object currently has, and the timing for the data, without opening tracks that occupy a lot of the screen.
- **Quick Editing for Single Object**  By using the keys in a dope sheet track, you can easily and quickly select and edit the data in different tracks. There is no need to edit the data track by track.

![Editing the dope sheet key (in this case, moving).](image)

![The data that is represented by the dope sheet key will be edited as well.](image)

- **Quick Editing for Multiple Objects**  The best and most powerful usage of the dope sheet is that you may simultaneously edit different dope sheet keys of different objects.

![Edit the dope sheet keys (in this case, to delete the dope sheet keys that are spanning different objects & tracks).](image)

![The data that is represented by the dope sheet keys will be edited as well.](image)
Project Level Tracks

The **Timeline** in iClone contains a **Project** main track which includes sub tracks related to the project such as the **Project** track for deleting frames or setting flags to frames, **Switcher** for switching cameras in different time, **Sound** for adding background music or sound effects, **HDR** for producing animations with high dynamic range rendering effects, and **IBL Strength** and **IBL Transform** for generating animated image base lighting effects.

You may enable the **Project** main track by clicking the **Track List** button.

If you apply **Effects**, such as **NPR** or **Lens Blur**, then you will also see related group buttons added under the **Project** main track.
Inserting and Deleting Frames

iClone provides features for inserting and deleting frames. The purpose and characteristics of these features are:

- You are allowed to add more time to the current project or trim parts of the project.
- If you use these two features between keys and switches, then you will be changing the transition and duration in-between.

**Inserting Frames** and **Deleting Frames** can be applied to:

- The entire project.
- Please refer to the links below for more information.
  - Inserting Frames
  - Deleting Frames
Inserting Frames
iClone provides an Insert Frames feature so that all the keys and clips of objects, after the insertion timeframe, can be moved once instead of dragging them one by one.

Insert Frames for the Entire Project
By using the Insert Frames feature, you may add more time to the beginning of the original project. Keys of every object will be affected and shifted to later frames. This is useful if you want to add more animations in front of a story.
* Please note that this method increases the total length of the project.
1. Open a project with animations in different objects. Start from the first frame.
2. Open the Timeline (F3).
3. Click the Insert Frames button on the tool bar. Enter a frame number before the start frame.
4. Click the OK button and the specified number of frames will be added before the start frame. The initial animations will then be postponed and the total length of the project will be increased.
Deleting Frames
After having produced key frame animations (key-by-key), sometimes you need to decrease the duration of the transition between two keys. Instead of dragging the keys one by one on the timeline, iClone provides the **Delete Frame** feature to quickly do this.

* Please note that any data (clips, keys) in the deleted frames will be completely gone once you use the **Delete Frame** command.

Delete Frames for the Entire Project

The **Delete Frame** feature may not only delete a specified number of frames, but also the data inside the frames for all objects in the project. You may also use this feature to advance all the animations in the project.

1. Here’s a project in which objects are all animated by clips and keys.

2. Press F3 to open the timeline. Click the **Track List** button and select **Project** from the menu.

3. Focus on the **Project** sub track.

4. Drag in the track to make a range for deletion.
You may drag each side of the range to modify the length for deleting.

5. Click the **Delete Option** button.
   You will then be prompted to choose the deletion method.

   ![Delete Option](image)

   - **Delete Data**: Deletes only the clips and keys within this range.
   - **Delete Frame**: Deletes keys as well as the frames within the range to shorten the length of the project.

6. If you **Delete Data**, the data within the range will be removed. The data after the range will stay where it is.

7. If you **Delete a Frame**, the data and frames within the range will be removed and the data after the range will be advanced.

Note:

Only the clips whose start frame falls within the range will be removed.
Adding Flags
When you need to jump to a specific time frame in your project, you may sometimes need to add flags in order to easily hop between events.

Adding Flags
1. Open the Timeline (F3).
2. Click the Track List button and select Project to show the project track.
3. Click on the target frame in the Project sub track.
4. Click the Add Flag button on the tool bar.
5. Give the flag a name and put down a description for the flag. Click Apply to insert a new flag into this frame.
6. You may click on another time frame in this track and repeat Step 4 to 5 without closing the panel to add more flags.

Jump between Flags
There are two methods that you may use to jump between flags:
- Press the Tab key to jump to the next flag.
- Press Shift + Tab keys to jump to the previous flag.
Transition Curves in Tracks (New for v7.1)

In iClone you are able to set keys or add clips into different tracks. Interpolations can be customized between different curves so that the transition speeds between two adjacent keys, or clips, imitate the physical characteristics of how the object would move in the real world.

Set the Transition Curve

1. In the target track of the timeline, set two keys (take the Transform track as an example).
2. Right-click on the later one. Select an item from the Transition Curve entry in the menu.

The transition curve will then be generated between these two keys only.
The **Curve** options have increased from 6 to 16 also accessible via the context menu, however, in the form an independent window. Each **Transition Type** can be previewed in the viewport simply by selecting it in the floating window, making it more intuitive and convenient.

**Transition Curve Panel and Four Basic Curve Types**

<table>
<thead>
<tr>
<th>Acceleration</th>
<th>Deceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smooth</td>
<td>Pause and Move</td>
</tr>
</tbody>
</table>

**Note:** You can drag the **Strength** slider for the four basic presets to dramatize the results.

**Second Row of Curve Presets**

- Gain momentum before Move
- Gain momentum and Damp
- Damping
- Stutter Start

**Third Row of Curve Presets**

- End in a Bounce
- Elastic Start and Sudden End
- Stuttering Start and End
- Sudden Start with Elastic end

**Fourth Row of Curve Presets**

- Elastic Start and End
- Linear
- Step
- Sudden Start with Elastic end

**Note:**

The transition type of the last preset, named **Default**, is determined by the setting in the **Default Key Tangent** section of the **Preference** panel.

![Preference Panel](image)
Auto Extending Clips (New for v7.1)

In order to ensure that a layer key is added inside a clip, a new Auto Extend feature is added to the Timeline toolbar.

A key can be created by double clicking on a portion of the Timeline that does not contain a clip.

- **Auto Extend = ON** the key will be joined with the clip to its left.
- **Auto Extend = OFF** the key will just be integrated into an independent Motion Clip.

Auto Extend, Loop, Speed and Time Warp for Clips

If a clip has Loop, Speed and / or Time Warp applied, then different scenarios will occur when Auto Extend is enabled.

**Loop with Auto Extend Enabled**

When a posterior key is created, the Source Clip and looped instance clips will combine into one whole extended clip.

**Speed / Time Warp with Auto Extend Enabled**

If the speed of the clip and the Timeline do not match, then the clip will be re-sampled according to the speed of the Timeline and extend toward the newly applied key.
**Time Warp for Motion Clips**

By default, the playback speed of motion and animation clips of characters and iProps are linear. However, you are allowed to alter the clip with dynamic speeds, which means that the speed of the motion changes within the clip.

1. Apply a motion clip to a character. By default, the motion will be set to **Linear** mode.
2. Open the **Timeline** (Shortcut Key: F3) to show the character's **Motion** track.
3. Right-click on the motion clip and select any warping method from the **Time Warp** entry.
4. Play back to view results.
   - **Ease In** - Acceleration
   - **Ease Out** - Deceleration
   - **Ease In & Out**
   - **Ease Out & In**
Dramatizing Transition Methods
If you need more dramatic motions, then you may use the Custom feature, provided in the pop-up menu, to adjust the progression of the transition curves.

1. Right-click on the motion clip. Select Time Warp >> Custom.

2. Select a curve type from the Time Warp drop-down list.

3. Drag the slider to increase or decrease the variation of the curve. Note: When you decrease the variation curve to the left-most side, the curve will be similar to the linear curve.

Less dramatic More dramatic Dramatized motion (Ease In)
Visibility and Non-Uniform Size of Clip Frame Cells (New for v7.1)

The frame cell of the layer keys tracks under a clip will become invisible or non-uniform when the clip is applied with certain features, such as **Loop**, **Speed**, or **Time Warp**.

**Visibility**

**Loop** will create **Instance Clips** behind the **Source Clip** which are identical to the source clip. In order to make changes to the instanced clips, you must change the source clip itself.

**Non-Uniform Size of Cells**

Pushing and pulling on the edges of the clip will change the speed of the motion from fast to slow. The grid of the clip will narrow or expand accordingly to provide a visual cue for the changes in the speed.

Applying **Time Warp** in **iClone 6** will re-sample the keys of the clip, causing the keys to either be lost or moved, making the original motion unrecoverable. Contrast this with **iClone 7**, where **Time Warp** will not tamper with the original keys, thus protecting the fidelity of the original motion clip.
The speed of the clip will now be displayed behind the name of the clip in the form of a percentage value.
Removing Motions of Body Parts

iClone provides a lot of built-in motion templates for characters. However, sometimes you maybe need to make small adjustments to specific body parts from motion templates to generate a new custom motion. To do this, you may employ the Remove Motion feature to remove certain body part motions and add Motion Layer keys.

Removing Body Part Motions from a Motion Clip

1. Apply any one motion template from the Animation tab >> Motion library to a character.

2. Open Timeline (Shortcut: F3). Open the Motion track of the actor. You will see that the motion clip is stored inside the track.

3. Right-click on the clip, select Remove Motion and pick the body part from which you wish to remove motions.

4. You may repeat the same steps to remove motions from other body parts.

5. Play back and the motion of the body part will be removed from the original motion clip.

Adding Motion Layer Keys to Produce New Motion

After motions of body parts are removed, you may then use the Edit Motion Layer panel to set new poses in body parts to generate new motions.

1. Go to the Modify panel >> Animation tab, click the Edit Motion Layer button.

2. Modify body parts where motions have been removed.

3. Play back to review the newly generated motion.

Note:
- If you only set motion layer keys, then you will get an offset motion instead of an absolute pose. Use Remove Motion on an existing motion clip before setting motion layer keys, and the body parts whose motions were removed will have an absolute pose.
Clearing Clips

**iClone** provides several methods to clear multiple clips for objects.

### Clear Clips of a Specific Object

1. Right-click on the target object whose clips you want to remove.
2. Select **Remove Object Animation** from the pop-up menu.

### Clear All Clips in a Single Track

1. Select an object whose specific track you want to clear.
2. Press **F3** to show the **Timeline** and turn on the target track.
3. Double-click on the title of the track to select all the clips in it. Press the **Delete** button.

All the clips in the track will be removed.

### Reset All

1. Please make sure that you really intend to remove all the motion / animation clips.
2. Click the **Animation >> Reset Whole Scene** command on the menu bar.

All the motion / animation clips of **All Objects** will be removed.
Using Align Features to Remove Sliding

Sliding issues happen from time to time when you assign motions to a character by either applying motions from the Template library (*.iMotion) or puppeteering motions via the Motion Puppet tool. Sometimes, the transition between two motion clips can also create a sliding issue.

iClone provides two features, Align and Align Whole Clip, to help you solve this problem.

Body Parts Frequently Generate Sliding

These are the sliding issues that you may experience when applying character motion:

- Foot Sliding.
- Pivot Sliding.
- Hand Sliding.

Aligning the Whole Clip

1. Apply any one motion template (kicking in this example) from the Animation tab >> Motion library to an actor so that the character leaves its original position. You may also optionally right-click on the character and have the character move away with the Move command.

2. You may then see the left foot of the character slides after it finishes kicking and the right foot steps back to the ground.

3. Open the Timeline (Shortcut: F3), then the Motion track of the actor. You will see that the motion clip is stored inside the track.

4. Right-click on the clip where the foot-sliding starts, select the Break command to split the motion into two clips. The later clip section now contains the foot-sliding issue.
5. Right-click anywhere on the second clip, then select the **Align Whole Clip** command and pick one of the options from the sub-menu. In this case, the **Left Leg**, which aligns the entire character body to the left leg for the duration of the clip.

6. The position of the foot will be aligned based on its position at the start of its respective clip.
Aligning to the Previous Clip
In addition to aligning the whole clip, you’re also able to align a body part in that clip to the final pose of the previous clip.

1. Have the actor to move to a desired position by right-clicking on it and using the Move command. A moving clip will be added into the Motion track.

2. Go to a latter time frame after the walking finishes and apply any one motion template (kicking in this example) from the Animation tab >> Motion library to an actor.

3. You will see a sliding transition for both feet between these two clips.

4. Right-click anywhere on the latter clip, select the Align command and pick one of the options from its sub-menu. In this case, the Right Leg.

5. The right leg position in the entire later clip is aligned to the ending pose of the previous clip in order to remove the sliding issue between these two clips.
**Speed, Loop and Blending**

In iClone, you may change the speed and loop status of any clip in any track of the timeline (Facial animation, Sound FX and Music tracks excluded). Intervals between clips will automatically generate a blending effect. Adjusting the length of speed, loop and blending is possible.

**Speed**
1. On the timeline, select any track in which a clip exists.
2. Pick the clip.
3. Click the Speed button on the timeline.
4. Drag the end (right edge) of the clip to change its speed. The longer the clip is, the slower it is and vice versa. Move your cursor to the end of the clip, it will change into a double-headed arrow.
   Squeeze the clip to accelerate the action.
   Stretch the clip to decelerate the action.

**Loop**
1. On the timeline, select any track in which a clip exists.
2. Pick the clip.
3. Click the Loop button.
4. Drag the end (right edge) of the clip to change its loop time. The clip then shows in a series of connective rectangles, each rectangle representing one loop. Move your cursor to the end of the clip, it will change into a double-headed arrow.
   Move your cursor right to loop the clip.

**Blending**
Each clip possesses two blending parts, one at the head and the other at the end. The head blending part can be adjusted while the end blending part cannot. When there is no previous clip to connect to, the blending part of a clip will blend with the idle motion.

Follow the steps below to have two motions blend with each other:
1. Have two clips applied into the Motion track (Idle and Run motions).
2. Pick the latter clip. The blending part will be shown before the clip. (Empty rectangle).
3. You may decide the start frame of the blending effect by dragging the left edge of it.
Clips and Keys (New for v7.1)

Prior to iClone 7.1, the clips and the keys, especially layer keys, are two different types of data; they do not have direct relationship except that the layer keys can affect the result of the clip.

However, after iClone 7.1, the layer keys are encased in the motion / animation clips. These two types of data thus have connections as described in this page.

Movements for Clips and Keys

- **Synchronously Moving**
  When the clip is dragged to move, the encased layer keys will be moved along with it.

- **Limited Key Movements**
  A clip’s layer key can not be moved outside the range of the clip.
Hollow and Solid Layer Keys

Hollow Keys represent partially keyed frames in the track, meaning not all axis of the element has a key. On the flip side, Solid Keys represent completely keyed frames.

Usually, Hollow Keys will appear mostly when Sampling Clip is applied (seldom, Edit Motion Layer). This is because iClone 7 performs optimization on all the keys when these commands are executed to make the motion keys more concise. Please note that you need to use the Curve Editor in order to adjust in details for hollow keys.

Gesture Layer Clip

The hand gesture tracks for both hands are also sub-track for Motion track. Each motion clip thus can has its own hand gesture layer clips. The gesture layer clips will behave identically as the layer keys and will both be encased inside the clip as well.

Gestures only replaces the Motion Clip’s gesture layer, other Motion Layer keys will only superimpose onto the performance of the gesture clip.
**Sampling Gesture Data**
When **Sample** is activated, the gesture data will be extracted from the motion and the hand gesture clips and then be blended into corresponding tracks of the **Motion Layer** tracks (LFingers and RFingers).

**Flattening Gesture Data**
When **Flatten** is activated, the gesture data from the LFingers RFingers (under Motion Layer track), LHand and RHand (under Gesture track) tracks will be merged into the motion clip.
Setting Default Keys and Resetting Motion Layer Keys
In the Edit Motion Layer panel, there are two buttons under the dummy pane. They can be used for retrieving poses, but they can also have different results for individual purposes.

What is the Default Pose in iClone?
Our definition of a Default Pose in iClone indicates the default personality reflecting the nature of the character. You can see it as the Default Pose when first loading the character. It is also the initial pose for the idle motion loop of a character’s persona (e.g., the first frame for idle motion); usually it is used to connect all motion loops.

The Default Pose of the embedded G5 (generation 5) male - Chuck.

The Default Pose of the embedded G5 (generation 5) female - Gwynn.

Note: Please note that the Default Pose is different from the T pose or Y pose (as shown in the illustration below) that other traditional 3D editing tools usually use. If you want to use these poses, then you can find them in the Motion >> 00_Pose library under the Animation tab of the Content Manager.
Setting Default Keys (Reset Pose Key)

When you use the **Edit Motion Layer** panel to modify the pose of the character, you may find it hard to initialize the character to its original pose. By clicking the **Default** button, you can add a motion layer key that rectifies all the offsets and has the character stand straight in the default pose. In addition to that, if you click the **Animation >> Reset Whole Scene** command from the main menu bar or right-click on the character and select **Remove Object Animation**, then the character will stay in the current pose. Use the **Default** feature so that you can have the character stand back to the default pose again.

1. Select a character with a motion or any pose.

2. Click the **Animation >> Remove Object Animation** command from the main menu bar, or right-click on the character, then select **Remove Object Animation** from the right-click menu.

3. The character’s default pose will be replaced by the current pose.

4. Click the **Default** button in the **Edit Motion Layer** panel.

5. You can click this button at any time frame to retrieve the default pose. A motion layer key will be automatically added into the **Motion layer** track and its sub-tracks.
Resetting Motion Layer Keys

This feature is designed especially for the Motion Layer track. Press the button to add a pose key to counteract the Motion Layer effect of the previous key.

When you are modifying the pose via the Edit Motion Layer panel and are not satisfied with the results, then you may also click this button to neutralize the data in the key and start all over again.

1. Select a character that already has an applied motion.

2. Go to the desired frame, set one Motion Layer key to tune the bone offsets for the Perform motion.

3. If you are not satisfied with the result then you may want to reset all the offsets:
   - Delete this key and add a new key again.
   - Click the Reset button in the Edit Motion Layer panel.

4. Go to another frame. Click the Reset button again. The transition motion between the keys will auto-generate.

The Reset button actually adds a motion layer key that gives the priority back to the underlying motion clip.
Transform and Clips - Reset to Zero

This feature is designed especially for the Transform track. Click the Reset (Zero Out) button in the object attribute tab >> Transform section to add a transform key to neutralize the Transform effect of the previous keys. The transform data of the prop when it is modeled is retrieved and reset as the zero key.

The Reset to Zero feature is used to resume the move course of an actor/iProp after you add transform keys to it.

Meanwhile, when you are modifying the transform data and you are not satisfied with the result, you may also click this button to neutralize the data in the key and start all over again.

Reset to Zero - Regular Props

1. Apply one regular prop and open its Transform track. The current transform data is added into the first frame in the track.

2. Go to desired frame, add one key by moving, rotating or scaling the object.

3. If you are not satisfied with the result and you want to reset the data, you may either:
   - Delete this key and add a new key again.
   - Click the Reset (Zero Out) button. Adjust the transform again in the same frame.

4. Go to another frame later than the key added in step 3. Click the Reset (Zero Out) button. iClone will then add a neutral key to cancel the effect of previous keys.
Reset to Zero - iProps

In this section, we mix up the motion/animation (in the Animation track) with the keys (in the Transform track) and introduce the result as a new Reset (Zero Out) key is added.

1. In the timeline, apply a motion clip to the Animation track and open the Transform track.
2. Go to the desired frame, and set one Transform key to tune the transform data which effects the motion.

- The original moving path of the iProp.
- Moving animation is saved in the Animation track.

3. If you are not satisfied with the result and you want to reset the data, you may either:
   - Delete this key and add a new key again.
   - Click the Reset (Zero Out) button.
   Adjust the transform again in the same frame.

4. Go to another frame. Click the Reset (Zero Out) button. iClone will then add a neutral key to cancel the effect of all the previous keys in the track.

- When the car moves to the location as shown in the illustration, press the Reset (Zero Out) button.
- A new Reset (Zero Out) key neutralizing the prior effect is then added.
- The path back to the original one.

Formula: Transform in Move Clip and Transform Data

The transform values in the Modify Panel can be described by the following formula:

\[
\text{Transform by Move Clip (Animation Track)} + \text{Transform Key (Transform Track)} = \text{Transform Values (Modify Panel)}.
\]

Initial Position

Set a Transform Key

Use the Move Command to move the iProp. The Transform Data is modified following the formula above.
Sampling and Flattening Keys (New for v7.1)

A Motion or Animation is the combination of the Motion Clip and the Layer Keys. In order to edit the contents of the Motion or Animation clips or merge the layer keys with the motion clip, you must use the Sample and Flatten commands.

Note:
The clips for character is always referred to as Motion Clip while the ones for props or accessories is referred to as Animation Clip.

Sampling Keys from Motion or Animation Clip
The Sample feature is used to expose the contents of a motion or animation clip as Layer Keys.

1. Right click on the target motion clip you want to sample.
2. Select the Sample Motion Clip >> Sample All Parts to turn the keys of the clip into layer keys.

Note:
The item in the right-click menu changes in accordance with the object selected:
- Standard CC Character Sample Motion Clip >> Sample All Parts
- Non-standard character Sample Motion Clip
- Prop and Accessory Sample Animation Clip

3. Alternatively, if you want to sample just parts of a CC character, use Sample Motion Clip >> Sample Selected Parts instead to open the sampling dialog box.
4. Inside the dialog box, select the parts wanted and press the **Sample** button to finish sampling.
Flattening Layer Keys into Clip

The Flatten feature merges all of the Layer Keys into the motion clip.

Basic Flatten Feature

1. Right click on the target motion clip you want to sample.
2. Select the Flatten Motion Clip >> Flatten All to merge all of the layer keys into the motion clip.

Note:
The item in the right-click menu changes in accordance with the object selected.
- Standard CC Character Flatten Motion Clip >> Flatten All Parts
- Non-standard character Flatten Motion Clip
- Prop and Accessory Flatten Animation Clip

3. Alternatively, if you want to flatten just parts of a CC character, use Flatten Motion Clip >> Flatten Selected Parts instead to open the flattening dialog box.
4. Inside the dialog box, select the parts wanted and press the Flatten button to finish flattening.
Advanced Flatten Feature

If the frame cells in a motion or animation clip is not uniform because it has been applied with Speed or Time Warp changes, you can also use the advanced flatten feature to optimize the layer keys and re-size the cells to match the timeline units.

Note:

This feature only applies to iClone standard characters.

1. Prepare a clip whose speed or time warp is changed.

2. Right click on the clip and choose Flatten Motion Clip >> Flatten And Keep All Keys

3. The keys will be re-calculate and optimized instead of merged into the clip. Meanwhile, the cells will match the timeline units again.
Reversing Clips

1. In the **Motion** track of the **Timeline**, import a prepared motion/animation clip by selecting **Import** in the right-click menu (right-click on the track).

2. Import the same motion clip right after it.

3. Play the project from the start frame. You see the actor pops back to the ground when the play head reaches the 2nd clip.

4. Right click on the 2nd clip and select **Reverse** in the menu.

5. Play the project. You see the actor lies back to the ground in a reversing method of the original motion clip.
Modifying and Fixing Motions

After the actor's animation track contains a motion clip, you are able to modify the clips with the Motion Modifier panel. The slider controls in the panel allow you to easily modify any motions your character may already have. You can freely adjust different body part movements with different slider controls. Use this feature to fix any posture issues or alter the overall look.

Note:

Limitations: If the movements in a motion clip are too dramatic, such as big turning or heavy transformation, then it is not recommended to use the Motion Modifier for further adjustments.

Open Motion Modifier

1. Apply a motion to an existing actor.
2. Launch the Timeline (Keyboard Shortcut: F3), open the Motion track of the actor.
3. In the Motion track, you can see the motion clip added in step 1.
4. Right-click on the clip and select the Modify command from the right-click menu. Alternatively, you may click the Actor Motion Modify button on the Timeline.
5. Adjust the motion clip with the **Motion Modifier** panel.

### Base Pose and Exaggerations

The **Base Pose** is used as reference when you want to alter the entire strength of the motion. After the base pose is determined, you are able to increase or decrease the exaggerations of the motion clip for the upper and lower body.

- **Default Pose**: For most of the motion clips, especially motions that do not change much throughout the entire clip, click this button to use the default pose as the base reference for modification.

- **Auto Generate**: For the motions that change a lot from time to time in clips, click this button for auto-calculating the average pose of the clip as a base reference.

- **Load**: You are allowed to load an iMotion to use the first pose of it as a base reference.
Creating New Look for Motions

Use the Motion Modifier, you are able to create a motion with new looks based on an existing one.

1. Load an actor.

2. Apply a motion to the actor.

Human walking motion.

3. In order to create a cohesive motion suitable to the character's personality, open the Motion Modifier as described above.

4. Click the Stand Mode or Move Mode buttons in the Part Modify section (in this case, the Move Mode is pressed).

5. Click the Preview button and press the Space bar to start previewing (Shortcut: Spacebar).

6. Drag the sliders in the Part Modify section.

7. Click the OK button and the entire clip will be converted into an altered one.

Fixing Slant or Stiff Issues

With the sliders, you can also correct slant and stiffness issues when a G5 character is given G3 motions or vice versa.

1. Apply a G5 actor.

2. Apply a G3 motion to the actor. The actor's neck and shoulders seem very stiff and the body is slanted backward.

3. Open the Motion Modifier panel and switch to the Pose Correction mode.

4. Adjust the Hip Back/Forward and Head Back/Forward sliders to loosen the neck, shoulders and rectify the actor's center of mass.
Reset Motion Pivot

You may notice that sometimes the actor moves away as we apply an animation to it. You may want to modify this motion and make it a custom one to be used later as Perform Walk and Operate motions. To achieve this goal, it is better to have the whole motion to happen in the same position. You may then utilize this feature to prevent from setting the pose back to the same location manually frame after frame.

Prepare Custom Motion

1. Pick one actor to apply a motion to.
2. Open the actor’s Motion track. Apply a motion that moves the actor away. You may optionally modify the motion via the Motion Layer track.
3. Right click on the clip and select the Reset Pivot command from the right-click menu. The whole motion then happens at the same position.
4. Drag in the actor main track to mark a range to include all the motion in the Motion track.
5. Right click in the range and save it to your desired directory.

Note:
- You may optionally create a loop motion for Persona file to refer to.
- If your actor is not at the origin as you apply it into iClone you may add a transform key to set the actor to the origin.
- Please refer to Reset Motion Root for more information.
**Align Actor Motion**

As you are combining motions for the actor, you may find it hard to locate the actor to start a motion at the same location as the one at the end of the previous motion. iClone provides a feature, **Align Actor Motion** to auto align the actor pivot, and let the next motion start from the ending location of the previous motion.
Actor Root? Motion Root?
Before we start to describe the Align Actor Motion feature, we need to understand what Actor Root and Motion Root are.

**Actor Root**
It is also known as the BoneRoot or the Pivot of the character, which determines the actor's actual location, i.e., the value of the transformation data (Move, Rotate).
Actor Root changes only when transformation is being applied. The data is kept on the Transform track.

**Motion Root**
It is also known as the LowerTorso node in the actor's bone hierarchy. All applied motion clips affect the transformation change of this node, thus you might see kick or dance motion. However, the Actor Root remains in the original position.
All motion clips, either from the Content Manager or from the Import feature, are kept on the Motion track.

**Problem**
When you apply motions to an actor the Motion Root will sometimes be moved away from the Actor Root. The Motion Root aligns back where the Actor Root in order to blend with the Perform, Move, and Operate motions. Therefore, a motion composed of several motion clips will always have annoying back-to-the-origin situation at the interval among clips.

**Purpose of Align Actor Motion**
The purpose for the Align Actor Motion is always having the Actor Root align with the Motion Root to ensure the connectivity between motions.
Please refer to the **Connective Motions without Back to Origin** section for more information.
Connective Motions without Back to Origin
In the Reset Motion Pivot section, you can generate custom motion clips AT THE ORIGIN. However, if the motion does not happen at the origin when it is generated, you may encounter situations where your actor is dragged back to the origin when you apply the Move, Perform, and Operate motions.

Generate Motion away from the Origin
1. Move the actor away from the origin.
2. Create a motion (note that the motion happens away from the origin).
3. Collect the motion and save it to a folder.

Align Actor Motion
1. Select an actor in the project.
2. Make sure the Animation >> Motion Setting Options >> Align Actor Motion command is checked on the menu bar.
3. Apply the created motion by clicking the Import command in the right-click menu of the Motion track.
4. Go to another frame later than the clip added in step 3. Command the actor to move to another location. The actor will remain where it is after the motion finishes instead of going back to the origin to align with the actor root. With the Align Actor Motion checked, you may add as many Move motions for the actor without caring about the back-to-origin issue.

The Actor Root moves with the Motion Root
The other Move motions (from the right-click menu) will start at the new location.
Reset Motion Root

In the Reset Motion Pivot section, you can generate custom motion clips AT THE ORIGIN. However, if the motion does not happen at the origin when it is generated, you may encounter situations where your actor offsets when you apply that motion. This is often the case when you import a motion from other BVH sources in which the motion might not start from the 0, 0, 0 root location.

Generate Motion away from the Origin

1. Move the actor away from the origin.
2. Create a motion (note that the motion happens away from the origin).
3. Collect the motion and save it to a folder.

Reset Motion Root

Apply the motion just created to any actor with or without checking the Animation >> Motion Setting Options >> Reset Motion Root command to view the difference.

1. Select an actor in the project.
2. Command the actor to move to another location.
3. Apply the created motion by clicking the Import command in the right-click menu of the Motion track.

Reset Motion Root: OFF

Reset Motion Root: ON
Aligning Motions to Actor Orientation (New for v7.1)
The default actor's motions are to face forward. However, some motions, such as dancing or wondering, or some motions that are generated by motion captur, can occasionally change the facing direction of the character, which could result in a disconnected angle of the motion when subsequent motion is applied. In the following illustration, the first motion is the character dancing and rotating, the second one is to catwalk. The character abruptly turns to the front for the catwalk motion.

This is due to the fact that the character's pivot does not rotate as it turns. The second animation will be applied based on the pivot orientation.

Aligning Motions to Actor Orientation
1. Make sure there are no motions applied to the character.
2. Access the Animation menu >> Motion Setting Options and check the Align to Actor Orientation.

3. Apply the same motions again with same time. The angle of the character will be continuous even though the character turns by the motion clip.

The pivot turns along with the character's orientation.
Merging Clips (New for v7.1)

*Merge Clip* function can be used to join together disparate motion clips of the same track for characters or animation clips of props and accessories.

1. Apply different clips to a character, prop or accessory.
2. Pick the adjoining clips to the left and right (this function does not work for interspersed selections).
3. Right click on either one of the clips and execute the *Merge Clips* command from the right-click context menu.
Creating Transition Clips (New for v7.1)

Prior to iClone 7.02, the transition motion or animation between two clips is determined by a transition range ahead of the later clip.

![Transition Clip Example](image)

is limited to linear type with disappointing results. In this case, the legs move through the front table during the transition.

Creating Transition Clips

By creating a transition clip between two adjacent clips, you are able to apply different time warps, layer keys, reach keys or even use the curve editor for further editing.

1. Apply two clips and select the latter one.
2. Drag the transition range of the clip to overlap the other one as shown in the first illustration.
3. Right click on the latter clip and perform the Create Transition Clip command from the right-click context menu.

A new transition clip will then be created.

Basic Editing for Transition Clip

4. Use the Time Warp feature to change the pace of the clip.

![Transition Clip Editing](image)

Note:

You can change the strength of the applied template to dramatize the result.

Playback to view the results.
Advanced Editing for Transition Clip

By using the Sampling / Flattening and Edit Motion Layer or Edit Animation Layer (for prop and accessory) features, you can fine tune the clip to improve the animation.

5. Flatten the clip to keep the cell of the same size.

6. Sample the clip to extract the certain body parts into layer keys.

7. You can then use the Edit Motion Layer or Edit Animation Layer (for prop and accessory) panels to modify the layer keys.

Playback to view the results.
Transform Track

You can find this track grouped in the sub-track set of **Actor Props Camera** and **Light**. In the **Transform Track**, you may set keys in different frames. **iClone** will generate the transition animations automatically. Each key in the track stores the **Move**, **Rotate**, and **Scale** data of the target object in the current frame.

**Move**

Start Frame: 0
Move Key Added: (-100, 500, 0)

End Frame: 300
Move Key Added: (0, 0, 0)

Start play back and the box will move automatically from (-100, 500, 0) to (0, 0, 0) within the frame range.

**Rotate**

Start Frame: 0
Rotate Key Added: (0, 0, 0)

End Frame: 300
Rotate Key Added: (0, 90, 0)

Start play back and the box will rotate automatically from (0, 0, 0) to (0, 90, 0) within the frame range.

**Scale**

Start Frame: 0
Scale Key Added: (100, 100, 100)

End Frame: 300
Scale Key Added: (50, 50, 10)

Start play back and the box will scale automatically from (100, 100, 100) to (50, 50, 10) within the frame range.
Visible Track
By setting keys in the Visible track, you may show/hide selected objects temporarily in specific frames. Basically, every object is Visible by default, that is, the key for each object in the start frame of the project is On.

1. Select the actor and go to the desired frame for hiding.

2. Click the Visible/Invisible button on the tool bar. The eye button icon will then close and the object will be hidden.

3. A key will then be added into the Visible track instantly.

4. Go to another frame and click the Visible/Invisible button again to show the object. The actor shows and a key is added into the Visible track automatically.
Hands Track
Unfold the actor track and click its down arrow button to show the two Hand tracks. One is for storing the motion of the Left hand and the other is for the Right hand. Refer to the Speed, Loop and Blending section for more information about the interactions between clips.

1. Pick an actor and go to the desired frame for changing hand motions.
2. Access the Animation >> Apply Gesture Options on the menu bar and select one of the three commands (Left Hand, Right Hand or Both) in accordance with the hand(s) you want to add motions to.
3. Double-click on a template from the Animation tab >> Hands library. The motion will be added instantly.

Note:
The blending effect between two hand motion clips will be generated automatically.

A: Apply to Both Hands  B: Right Hand Only  C: Left Hand Only
Producing a Custom Pose or a Key-frame Motion

Key-frame animation is a traditional method for creating motions for a character. It involves setting different keys at different time frames and creating a transition between them. The interpolation between two keys, which is also called "transition", will also be auto-produced. It is time consuming and the animation may need to be fine-tuned, repeatedly.

Producing a Custom Pose

1. Select a character.

2. Click the Edit Motion Layer button under the Animation tab of the Modify panel.

3. Set a motion key by editing the effector points in the dummy pane. Please refer to the Using the Edit Motion Layer Panel section for more information.

Producing a Key-frame Motion

When you are familiar with the usage of setting one motion layer key in a certain time frame, then you can go to another time frame to set more motion layer keys, which can produce so-called key-frame motions. The transition between two keys will be auto-generated by iClone.

1. Set a pose in a time frame.
2. Go to another time frame and set again another motion layer key.

![Motion Layer tracks](image)

Setting another motion layer key.

3. The in-between animation is automatically generated.

![Key-frame animation](image)

Key-frame animation is auto-generated.

4. You are able to right-click on the keys in the Motion Layer main track and select a transition curve to vary the transition speed between two adjacent motion layer keys.

![Transition Curve Presets](image)

The Ease In curve is applied.

5. Optionally, you may right-click on the later key in the sub-track under the Motion Layer main track, and select a transition curve to vary the transition speed between two adjacent keys. This is very useful if you want each body part to move in a non-synchronized way.
Layering Motion Keys to Existing Motions

Once you apply a motion clip to an actor, then you may want to fine tune the offset (position) for each bone. This can be done via the Edit Motion Layer feature. The pose with the edited bones will be kept as a key in the Motion Layer track, and its effect will remain throughout the clip unless another key is set. The transition between the two motion layer keys will then auto-generate.

Making an Absolute Motion Layer Key

An absolute motion layer key is for setting a motion layer key that takes charge in the angle of a specific bone, and ignores the effects of the underlying motion.

In iClone 5, setting absolute keys has been replaced with a combination of 1. Removing Motions of Body Parts and 2. Adding Motion Layer Keys by the Edit Motion Layer panel.

Making a Relative Motion Layer Key

If you want to set a relative motion key, also known as a relative key, so that the effect of the key blends into the underlying motion, then follow the steps below:

1. Select a character that already has an applied motion.

2. Click the Edit Motion Layer button under the Motion tab of the Modify panel.

3. Move to the specific time where you want to overlay the offset key in the clip.

4. Select and adjust the effector points you wish to edit with the tools. The key will automatically be added into the Motion Layer track and be blended in the pose of the motion in the Motion track. Please refer to the Using the Edit Motion Layer Panel section for more information.

Adding a motion layer key for offsetting bones. The motion layer keys affect the motion clip.
Facial Expression Tracks
Click the down arrow button of the actor track to open the Viseme Expression and Facial Layer tracks on the timeline.

Viseme Track
The Viseme Track stores the lip-sync data of the character that moves the mouth. Go to the Modify panel >> Animation tab and click the Create Script button.
- Click the Record Voice Wave File and TTS buttons to record your voice, to import a wave file or to utilize TTS to create the lip-sync data for the actor.
- Click the CrazyTalk Script button to import a script or motion clip you created from CrazyTalk (This fills both Viseme and Expression tracks)
The Data will be converted into clips in the Viseme Track and can then have its position adjusted to have your avatars speak at different times.

Expression Track
Facial Clips will be produced in the Expression Track when:
- You apply a Facial Animation template from the Content Manager
- You click the CrazyTalk Script button to import a script or motion clip created from CrazyTalk
- You have recorded a facial movement in the Face Puppet panel.

Facial Layer Track
The facial deformation keys generated from the Face Key panel are displayed in the Facial Layer Track. This track stores the unique bone-based facial deformation data which gives rich facial details to actors. Please note however that this data cannot be imported back to CrazyTalk.
What is MotionPlus?
MotionPlus is a new format that includes all motion data in one file. It is easy to reuse for different characters in iClone.

The Benefits of MotionPlus
The benefits of using MotionPlus are listed below:

- **One File for All**: Instead of separately saving a character's facial expressions, body motions, constraint results, visibility, sound, accessories and accessory data into different custom libraries for further reuse, you are able to use MotionPlus to include every item listed above in order to build a single custom library with all-inclusive motion data.

- **Reuse in iClone**: The MotionPlus format is suitable for standard and non-standard iClone characters. Therefore it's easier than ever to copy complete animation data from one character to another. Even though the characters may have different bone structures or attached accessories, MotionPlus can still be used, and will apply relevant motion data to any identical parts the characters both have.

- **Build Persona Right-click Menu**: A character's persona can not only trigger body motion as before, but also the character's facial expressions and more other data as mentioned above. Simply use the perform command in the right-click menu and the character can perform complete animations.

- **Minimum Files for Export**: If you want to export characters with their motions, expressions and accessories to external 3D tools, then you do not need to separately export them into different FBX files and combine them later on in 3D tools like you used to do. Simply use the MotionPlus format to include all and the number of files required for export can thus be minimized.

Data Included in MotionPlus
MotionPlus is a new format used for combining different motion or animation types into a single iClone character. It can include the body motions, facial animations, constraint keys, spring stages or even the accessories' data. Please refer to the table below:

<table>
<thead>
<tr>
<th>Character's Data in iClone</th>
<th>Includable by MotionPlus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motion</strong></td>
<td></td>
</tr>
<tr>
<td>Body Motions</td>
<td>Motion Clip</td>
</tr>
<tr>
<td></td>
<td>Right Hand Clips</td>
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<tr>
<td></td>
<td>Left Hand Clips</td>
</tr>
<tr>
<td></td>
<td>Motion Layer Keys</td>
</tr>
<tr>
<td>Constraint Keys</td>
<td>Look At</td>
</tr>
<tr>
<td></td>
<td>HIK (HumanIK) Reach &amp; Foot Contact</td>
</tr>
<tr>
<td></td>
<td>Path</td>
</tr>
<tr>
<td></td>
<td>Link</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Facial Animations</td>
<td></td>
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<td>Voice Clips</td>
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<tr>
<td>Sound</td>
<td></td>
</tr>
<tr>
<td>Visible</td>
<td></td>
</tr>
<tr>
<td>Spring State</td>
<td></td>
</tr>
<tr>
<td>Accessory Data</td>
<td></td>
</tr>
<tr>
<td>Animations</td>
<td></td>
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<tr>
<td>Sound</td>
<td></td>
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<td>Visible</td>
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<tr>
<td>Spring State</td>
<td></td>
</tr>
</tbody>
</table>

Please refer to the links below for more information:

Reusing MotionPlus Data for iClone Characters

- Baking Constraint Results - Path, HumanIK, Link, LookAt
- Body Motion and Facial Expressions
- Accessory Animation and Spring Effects
- Splitting Motion Groups for Timeline Editing
- Filtering Out Separate Motions from a MotionPlus File
Baking Constraint Results - Path, HumanIK, Link, LookAt

Unlike iMotions which can only be used for exchanging body motions between characters, MotionPlus format can include more data, such as **Constraint Keys** for exchanging. The **Look At**, **Reach**, **Link** and following **Path** animations can be passed to any standard or non-standard character by using a single MotionPlus file.

**Constraint - Look At and Path**

1. In iClone, apply a character.

2. Create body motion for the character.

3. Have the character walk along a path.

4. Make the character to **Look at** a target.

This character’s motion is composed of body motion (motion layer keys if necessary), path keys and look at features.
5. Open the **Collect Clip** track of the character and make a range.

6. Right click within the range the select the **Add MotionPlus to Library** from the menu.

7. Activate the **Motion** and **Bake Constraint Key** boxes. Save these items into one single **MotionPlus** file.
8. Apply another character into iClone. This character can be either in this project or another new one.

9. Drag and drop the saved MotionPlus file onto the new character.

10. You may see that the included motions, as well as the constraint results are applied to the new character, even though the looking target and the path are removed.

Note:

Please note that the original constraint keys or switches will **NOT** be kept in the MotionPlus file; only the constraint results will be baked and flattened into the file.

**Constraint - HIK (HumanIK) Link and Reach**

The iClone standard and non-standard characters use an identical bone structure, a structure that is HumanIK compatible; this feature allows the character's head and limbs to animate according to IK (inverse kinematic) standards.
1. In iClone, apply a character and a prop then link the character to the prop.

2. Apply an animation to the character.

3. Use the Prop Puppeteering feature to animate the prop. The character will move along because of the linkage.

4. Make the character to Reach both hands to targets (the targets can optionally be given individual animations).

5. Open the Collect Clip track of the character and select a range.

This character's motion is composed of body motion (motion layer keys if necessary), link and reach keys.
6. Right click within the range then select the Add MotionPlus to Library from the menu.

7. Activate the Motion and Bake Constraint Key boxes. Save these items into one single MotionPlus file.

Note:

Please note that the HumanIK enables the character to have foot and hand contact behavior. The delicate step-on-ground results can be baked as well when you create a MotionPlus file.
8. Apply another character into iClone. This character can be either in this project or another new one.

9. Drag and drop the saved MotionPlus file onto the new character.

10. You may see that the included motions, as well as the constraint results are applied to the new character, even though the reaching target and the linking target are removed.

Note:

Please note that the original constraint keys or switches will NOT be kept in the MotionPlus file; only the constraint results will be baked and flattened into the file.
Body Motion and Facial Expressions
With **MotionPlus** files, you can not only pass motion and constraint results to other characters, but also the facial expressions, so that you may create a group of people performing the same motions and expressions, such as a choir or a team of cheerleaders.

**Exchanging Body Motions and Facial Expressions**

1. In **iClone**, apply a character.

2. Create body motions (composed of motion clips, hands clips, and motion layer keys) for the character.

3. Apply a voice for the character to make it talk or sing.

4. Apply facial expressions to the character (with **CrazyTalk** scripts or **Facial Puppeteering** feature).
5. Drag in the actor’s main track to make a range.

6. Right click within the range the select the **Add MotionPlus to Library** from the menu.

7. Activate the **Motion** and **Facial Animation** boxes. Save these items into one single **MotionPlus** file.
8. Apply other characters into iClone. They can be either in this or another new project.

9. Drag and drop the saved MotionPlus file onto the new characters.

10. You may see that the included motions, as well as the facial expressions are applied to the new characters.
Splitting Motion Groups for Timeline Editing
To make it easier for users, iClone binds some data, such as motion clips, keys or switches, together as a group so that in addition to basic editing such as copy and paste, when you drag, loop, accelerate, decelerate, break or delete one of them, the other motion data will also adjust.

However, if you need to individually modify these clips in detail, such as particular keys or switches, then you need to perform the Split feature to ungroup them before you can make further adjustments.

Ways to Generate Grouped Data

- **Character Performs by Attached Accessory**
  After a character has intelligent accessories attached, it acquires new abilities that come along with the accessories. When you command the character to do these motions, iClone automatically groups up the body motions and the accessory animations.
  1. Apply a wing accessory to a standard character.

  ![Character with wings](image)

  2. Right click on the character and select the **Move >> Fly Backward** command from the right-click menu, and click on the ground to set the destination.
  3. The character generates a body motion as it’s flying. At the same time, the wings also generate flapping animations. These two kind of data are automatically grouped in the **Timeline**.

  ![Timeline with character and wings](image)

  4. If you edit the clip (such as looping it), the other clips in the group will react to the manipulation simultaneously.

- **Character Operates an iProp**
  Whenever a character is commanded to operate an iProp, a group of the body motions and the iProp animations will automatically be generated.
  1. Select a character.

  ![Character and iProp](image)

  2. Right click on an **iProp** and select one of the **Operate** commands from the right-click menu to have the character interact with the iProp.
3. When the operation is done, a group containing body motions, iprop animations and even link key data will automatically be generated.

4. Edit one of the components in the group (such as dragging). The other clips in the group will react to the manipulation simultaneously.

- **Character Applied with MotionPlus**

  When you have a character with accessories attached that are identical to another character, then you may exchange animation data between them via the MotionPlus format. After a character is applied with a MotionPlus file, the data that comes from the file will be automatically grouped together.

  1. Create a character and attach an accessory, then animate both of them in any way.

  2. Drag to make a range on the actor’s main track and right-click to generate a MotionPlus file. Select the data that you want to include in the file (if you are not sure what shall be activated, then activate them all).
3. Create another character with an identical attached accessory in the same structure.

4. Apply the new character with the generated MotionPlus file.

5. Edit one of the components in the group (such as decelerate). The other clips in the group will react to the manipulation simultaneously.

Drag the right edges of one of the clips to decelerate the entire group.
Splitting the Groups for Editing Individual Data

In addition to modifying the data group by group, you are able to break a group into pieces so that you are able to individually edit the data inside of it. A talking-walking character with an animated accessory applied with MotionPlus is taken as an example in this section.

1. After an animated character and accessory is applied with MotionPlus, the data from the file will be grouped in the Timeline as shown.

2. Right click on any clip-type data in this group and select the Split command from the right-click menu.
3. The data in the group can be edited independently after the **Split** command.
Filtering Out Separate Motions from a MotionPlus File

MotionPlus files contain actor and accessory-related animations. When you want to re-use them, you can reuse and combine animations to a group of actors, or choose to separate and apply different parts of the animation.

Merging Data from Different MotionPlus File

1. Here we have two actors; one is sitting and talking.

   ![Sitting Actor](image1.png)

   The other one is running but mute.

   ![Running Actor](image2.png)

2. Export the first actor’s entire motion range (body motions, voices and facial expressions) as a MotionPlus file. Please refer to the Body Motion and Facial Expressions section for more information.

   Note:
   - It is highly recommended that you utilize the Collect Clip method to generate MotionPlus files instead of clicking the Add button in the Content Manager, because if you do so, the actor-related motions from the entire project will be added into the library with lots of redundant and unnecessary data inside of it.
   - The Collect Clip method ensures that you extract the precise range of the actor’s motions and facial expressions.

3. Select the second actor (in this case, the chimpanzee).

4. Click the File >> Merge MotionPlus command from the main menu bar. Select the MotionPlus file exported in the previous step.
5. You will be prompted with the filter dialogue box below. Activate the Facial Animation box to ensure that only the voice, lip-synching keys, and the facial expressions in the MotionPlus are extracted and applied to the actor.

![Motion Plus Options](image)

Note:

If you right-click on the Motion track and click Import from the menu to load the desired MotionPlus file, then you will not see this filter panel because the Import feature is meant to replace the currently applied motions and facial expressions.

6. You will see that only the first actor's facial animations are applied to the actor while the original body motions are kept.

![Image of animated chimp](image)

Note:

You must Split the target motion group of the actor before proceeding with merging the partial motions from any MotionPlus file. If you don’t do this, any data in tracks you didn’t select will be replaced with empty data.
Including Visibility in a Perform Command (New for 6.1)

The MotionPlus format also supports the visibility states of characters and the accessories that are attached to the character. By passing MotionPlus with visibility states to 3DXchange, you are able to add more perform commands for the character to show or hide at certain time, or to evoke different accessories in different scenarios.

Character’s Visibility States in Perform Command

Preparing Data in iClone

1. In iClone, apply a character. Right click on it to see the items in the Perform list.

2. Optionally apply motions to the character.

3. Turn the visibility of the character on and off at different times by clicking the Visibility On/Off buttons in the Actor >> Avatar >> Modify Panel >> Display section.

4. This character will appear and disappear at different times.

5. Repeat the steps at other time frames to create a flash/hide effect for the character.
Sending Data from iClone to 3DXchange

1. In iClone, select the character and click the Edit in 3DXchange button in the Modify Panel. The character will be sent to 3DXchange instantly.
2. Open the Collect Clip track of the character and make a range for the first part (flashing show).

3. Right click within the range the select the Add MotionPlus to 3DXchange from the menu.

4. Repeat the same steps to the range with the visibility modifications to create another MotionPlus file for flashing/hiding the character.

5. Go to 3DXchange, in the Motion Library you will see two more items appended to the end of the original ones that the character has by default.
6. Add these **MotionPlus** clips into the **Perform Editor**. This step ensures these two clips are appended to the **Perform** list in the right-click menu of the character.

   ![Perform Editor](image)

   (Optional) Double click on the **Clip** cell of the clip to rename them.

7. Export (Ctrl + E) the character to iClone. Make sure you include both the character and the **MotionPlus** clips.

   ![Export Settings](image)
Using New Perform Commands

1. Back to iClone.
2. Apply the new character that you just exported and right click on it.
3. You will find the new commands listed in the Perform entry.

4. Utilize the new commands to create show and hide effect for the character.

Accessory Visibility States via Perform Command

Because the MotionPlus format also support the visibility of accessories, you can have the character to wear different accessories in various scenarios by using the Perform commands.

Preparing Data in iClone

1. In iClone, apply a character. Attach various accessories to the character.

2. Apply different motions to the character.

3. Hide unwanted accessories for a series of motions by pressing down the On / Off buttons in the Actor >> Accessory >> Modify Panel >> Display section.
The unwanted accessories for the specific series of motions are hidden.

4. Go to the time frame where the other series of motions starts.
5. Reversely hide accessories for this series of motions.

Sending Data from iClone to 3DXchange

1. In iClone, select the character and click the Edit in 3DXchange button in the Modify Panel. The character will be sent to 3DXchange instantly.
2. Open the Collect Clip track of the character, the accessories and then make a range for the first series of motions (because the accessories are numerous, only one or two accessories are shown in the illustration below).
3. Right click within the range the select the Add MotionPlus to 3DXchange from the menu.

Note:
- You may choose the Add MotionPlus to Library command in the menu. However, you need to manually load the MotionPlus file into 3DXchange later on if you choose to do so.
- If you decide to save the MotionPlus file to a destination folder, then remember to activate the Accessory Data >> Visible boxes in the MotionPlus Option panel.
4. Repeat the same steps to the range for the other series of motions with different accessories shown.

5. Go to **3DXchange** in the **Motion Library**, you will see two more items appended to the end of the original ones that the character has by default.

6. Add these **MotionPlus** clips into the **Perform Editor**. This step ensures these two clips are appended to the **Perform** list in the right-click menu of the character.

(Optional) Double click on the **Clip** cell of the clip to rename them.
7. Export (Ctrl + E) the character to iClone. Make sure you include both the character and the MotionPlus clips.

Using New Perform Commands
1. Back to iClone
2. Apply the new character that you just exported and right click on it.
3. You will find the new commands listed in the Perform entry.
4. Utilize the new commands to have the character change accessories according to different scenarios.
Performing with Sound Effects
No matter how good your motions or expressions are, without sound effects, the dramatic feeling decreases drastically. In MotionPlus files, the sound effects can also be included so that the perform commands trigger the character to act with sounds.

Expressions with Sounds in Perform Command
In addition to the basic phonemes, real humans produce different sounds with their mouths and lips. To deal with the shortage of more advanced phonemes in iClone, you can include sounds into a character’s perform commands so that it is able to produce more sounds than the basic phonemes of speech.

Preparing Data in iClone
1. In iClone, apply a character.
2. Generate head motions and facial expressions (either by facial puppeteering or expression templates) to the character (in this case, the character is hit in the head and gets dizzy afterward).
3. Go to the desired time frame you wish to add the sound effect at to match it up with the facial expressions.
4. Select the character and go to File menu >> Import
5. Use the browser to load a prepared sound (in this case, the bird-chirping sound for the dizzy face).
6. Repeat those same steps at a different time frame to add as many sound effects as you can for the rest of the facial expressions.
Sending Data from iClone to 3DXchange

1. In iClone, select the character and click the **Edit in 3DXchange** button in the **Modify Panel**. The character will be sent to **3DXchange** instantly.
2. Open the **Collect Clip** track of the character and make a range for the entire animation.

3. Right click within the range and select the **Add MotionPlus to 3DXchange** from the menu.

Note:

- You may choose the **Add MotionPlus to Library** command in the menu. However, you need to manually load the **MotionPlus** file into 3DXchange later on if you choose to do so.
- If you determine to save the **MotionPlus** file to a destination folder, then remember to activate the **Sound** box in the **MotionPlus Option** panel.
4. Go to 3DXchange in the Motion Library, you will see one more item added to the end of the original default ones.

5. Add the MotionPlus clip into the Perform Editor. This step ensures the clip is appended to the Perform list in the right-click menu of the character.

(Optional) Double click on the Clip cell of the clip to rename it.
6. Export (Ctrl + E) the character to iClone. Make sure you include both the character and the MotionPlus clip.

Using New Perform Commands

1. Back to iClone
2. Apply the new character that has just been exported and right click on it.
3. You will find the new commands listed in the Perform entry.
4. Utilize the new command to create an animation with sound effects.
Accessory Animations with Sounds in a Perform Command

Accessories are also able to given sound. The sound can be included into MotionPlus files as well. Thus, when the character performs specific motions with the accessories, the sound effect enhances the feeling of using them.

Preparing Data in iClone

1. In iClone, apply a character. Attach an accessory to the character (in this case, a lightsaber).

2. Apply different motions to the character.

3. When the accessory is animated, it is often mute (in this case, when the lightsaber is on).

4. Go to the time frame where the accessory animates.

5. Select the accessory and go to File menu >> Import

6. Click the Import button to load a prepared sound (in this case, the lightsaber-on sound).
7. Add more sound effects to the accessory in accordance with the motions of the character.

8. Play back to view the result, adjust the motions and the sounds accordingly.

**Sending Data from iClone to 3DXchange**

1. In iClone, select the character and click the **Edit in 3DXchange** button in the Modify Panel. The character will be sent to 3DXchange instantly.
2. Open the **Collect Clip** track of the character and then make a range for the entire motion.
3. Right click within the range the select the **Add MotionPlus to 3DXchange** from the menu.

**Note:**
- You may choose the **Add MotionPlus to Library** command in the menu. However, you need to manually load the **MotionPlus** file into 3DXchange later on if you choose to do so.
- If you determine to save the **MotionPlus** file to a destination folder, then remember to activate the **Accessory Data >> Sound** boxes in the **MotionPlus Option** panel.
4. Go to 3DXchange in the Motion Library, you will see one more item added to the end of the original ones that the character has by default.

5. Add this MotionPlus clip into the Perform Editor. This step ensures the clip is appended to the Perform list in the right-click menu of the character.

(Optional) Double click on the Clip cell of the clip to rename it.
6. Export (Ctrl + E) the character to iClone. Make sure you include both the character and the MotionPlus clip.

Using New Perform Commands

1. Back to iClone
2. Apply the new character that has just been exported and right click on it.
3. You will find the new command listed in the Perform entry.
4. Utilize the new command to have the character use the accessory together with a sound effect.
Custom Key Pose Edit and Transition Curve

Key-frame Animation is the traditional method for creating animations for a prop, especially ones with bone structures. You need to set different keys at different time frames. The interpolation between the two keys, which is also called a "transition", will also be auto-produced. It is time consuming and the animation may need to be fine-tuned repeatedly.

Producing a Custom Pose

1. Apply a prop with bone structure (you may create this kind of prop by using the attach and merge method).

2. Click the Edit Animation Layer button in the prop Modify panel and Animation tab.

3. Set an Animation key by editing the bones with IK / FK methods.
Producing a Key-frame Animation

When you are familiar with the usage of setting one animation layer key in a certain time frame, then you can go to another time frame to set more animation layer keys, which can produce so-called key-frame animations. The transition between two keys will be auto-generated by iClone.

1. Set a pose at a certain frame (in this case, the start frame).

2. Go to another frame and set another animation layer key.

3. The in-between animation is automatically generated. Repeat the same steps to generate a custom key-frame animation.

4. You are able to right-click on the keys in the Animation Layer main track and select a transition curve to vary the transition speed between two adjacent animation layer keys.
Layering Animation keys to Existing Clips

Once you apply an animation clip to a prop, then you may want to fine tune the offset (position) for each bone. This can be done via the Edit Animation Layer feature. The pose with the edited bones will be kept as a key in the Animation Layer track, and its effect will remain throughout the clip unless another key is set. The transition between the two animation layer keys will then auto-generate.

Adding Animation Layer Keys

If you want to set an animation layer key so that the effect of the key blends into the underlying animation, then follow the steps below:

1. Select a prop that already has an applied animation.

2. Click the Edit Animation Layer button in the prop Modify panel and Animation tab.

3. Move to the specific time where you want to overlay the offset key in the clip.

4. Use the IK/FK methods with the or tools to add an animation layer to the initial animation. The key will automatically be added into the Animation Layer track and be blended in the pose of the animation in the Animation track.

5. Repeat the same step at a different time frame and you can then fine-tune the initial animation.

Adding animation layer keys for offsetting bones. The animation layer keys affect the entire animation clip.
Collect Clip Track
The Collect Clip track is a very unique track. You cannot set keys in it, nor can you add any clips to it. However, it allows you to collect keys and clips, merge them together to generate a whole new perform clip.

Collect Clip from Actor
Generate Motion
1. Please make sure that some of the tracks (Transform, Motion, Hands, and Motion Layer) for the actor contain keys or motion clips. If these tracks are empty then the motion you generate will only be turned into a default idle motion.
2. Open the Collect Clip track, click and drag to include the range in which the desired motion clips or keys exist.
3. Right-click within the range of the Collect Clip track and select Add Motion to Library. Name the clip.

4. Browse to a location where you want to save the motion and click Save button. All the clips and keys in the tracks listed above will be merged and compacted into a motion file. You may then import it back by right-clicking on the Motion track and selecting the Import command.

Generate Gesture
If you wish to generate custom motions for both hands, then you may select the Add Gesture to Library item when you right-click on the Collect Clip track. The motions collected will be saved in the Custom library.

Note:
You can select the Add Motion to 3DXchange or Add MotionPlus to 3DXchange to directly send the collected motion clips to the motion library for further use. For more information, please click the links: What is MotionPlus and Animation Section page of the 3DXchange Online Manual.
Collect Clip for iProp

1. Please make sure that some of the tracks (Transform and Animation) for the iProp contain keys or motion clips. If these tracks are empty then the motion you collect will be completely empty.

2. Open the Collect Clip track, click and drag to include a range in which the desired animation clips or keys exist.

3. Right-click within the range of the Collect Clip track and select Add to Perform. Name the clip and click OK.

4. The animation clip will be embedded to the prop and added to the Perform list. All the clips and keys in the tracks listed above will be merged and compacted into an animation file. You may then import it back by right-clicking on the iProp and selecting from the Perform menu section.

Collect Clip for Prop

This is a very practical feature for you to create your own animated props, or so-called, Helper. You may attach other static objects to the helper and then generate the animation for the objects along with the helper. For more information about the helper, please read Creating Animation Helper and Prop Animation with Helper sections.

1. Apply any desired 3D block to the current project. Make sure that the position is at the origin (0, 0, 0).

2. Open the Collect Clip and Transform tracks of the block.

3. Add keys at different frames on the Transform track to generate key-frame animation for the block.

4. Drag in the Collect Clip track to make a range for generating a new animation clip.

5. Right-click within the range of the Collect Clip track and select Add to Perform. Name the clip and click OK. All the keys in the transform tracks will be merged and compacted into this prop. You may then right-click on the prop and apply the animation in the Perform menu section.
Creating and Saving a Unique Pose

By using the Collect Clip technique, you can easily create a custom one-frame pose for the character to start acting at the start frame with the pose.

1. Apply a character. It is initially still with only an idle pose.

2. Produce motions by any means.

3. Playback and pause at the time frame where the character acts a pose you want to extract.

4. Open timeline (Shortcut: F3) and open the Collect Clip track of the character.

5. Single-click on the cell of the time frame on the Collect Clip track to easily make a one-frame selection.

6. Right-click on the time frame and select Add Motion to Library, save it as a motion file (*.iMotion).

7. Save the current project for further editing.

8. Drag and drop the saved motion file onto the character at the first time frame. The character will have a new start pose.
**Spring Track**

The actors and the props (with bone structures) in iClone may sometimes contain extended bones. Although the extended bones are not included in the standard bone structure for motion puppeteering, they can be given Spring Effects. When the actors or the props are moving, these extend bones will automatically bounce along with the movements.

The Spring Effects can also be turned on and off as keys in a private track.

1. Select the object that has already had the spring effect applied.

2. Move to another time frame when you want to stop the spring effect.
3. Click the Off button in the object Modify panel >> Spring section.

4. The object will be frozen and still when the spring effect is off.
**Blending Keys**
In case the spring effect starts or stops abruptly, you can use the blending keys (fade in and fade out keys). The blending keys ensure the spring effect gradually goes on and off.

The **Blending Key** decides when the spring effect starts and when it ends. This type of key may be dragged so that you decide the fading in and fading out speed. It shows only when you select the data on the **Spring (On/Off)** data track.

- **A**: Spring **Fade In Start** key
- **B**: Spring **On** key
- **C**: Spring fading in duration
- **D**: Spring **On** duration
- **E**: Spring **Off** key
- **F**: Spring **Fade Out End** key
- **G**: Spring fading out duration

If the durations are prolonged, then the blending will be longer, and vice versa.
Look At Track

Setting keys on the Look At track can make an Actor, Camera or Spotlight look at a target at one point in time and then look at another target or stop looking at the target at another point in time.

1. Pick the lady and go to the desired frame to look at the boy.
2. In the Modify panel, scroll to the Look At section.
3. Click the Pick Target button and click on the boy.

4. Go to another frame, click the Pick Target button again, and then click on the broken vase on the floor.

Note:

For more information about the operation of Look At for Actor, Camera and Light, Please refer to these sections:

- Actor - Look At
- Camera - Look At
- Spotlight - Look At
**Link Track**

Setting keys on the **Link** track can make an **Actor** Prop Camera or Spotlight Point Light link to a target at one point in time and then link to another target or unlink at another point in time. Thus the transition of an **Actor**, Prop Camera, Spotlight Point Light comes from the target’s moving and rotating animation even though they may or may not be static. Please refer to the **Link** section for more information.

1. Pick the crate and go to the desired frame to link it to the forklift.
2. In the **Modify** panel, scroll to the **Linkage** section.
3. Click the **Pick Target** button and click on the forklift. You may optionally align the crate to the forklift if its position is not adequate.

4. Go to another frame, click the **Pick Target** button again, and then click on the train as the new target.

5. The crate will be brought away by the train afterward.

A: Link the crate to the forklift

B: Link the crate to the train
Material Track

Once you change the parameter settings in any of the texture channels, you set Material keys within the timeline. If you set material keys in different frames, you can create material animation. Please refer to Material Keys and Material Key Frame Animation and Saving Keys to Material Template sections for more information.

1. Select the prop and go to the desired frame, in this case we take frame 15.

2. In the Modify panel, switch to the Material tab and the Material List section. Use the Picker tool to pick the material for glowing.

3. Scroll to the Texture Settings section and add one image to the Glow channel. Set the Strength to zero. A key will then be added into the Texture Strength track instantly.

4. Go to frame 38 and set the Strength of the Glow map to value 50. When you move the slider you can see the model glow, and a key is added into the Texture Strength track automatically.
Lens Track

Please follow these steps to set keys on the Lens track. You may also refer to the Lens of the Camera section for more information.

1. Select a camera from the Scene Manager. Go to the desired frame you want to set the lens key.
2. In the Modify panel, scroll to the Camera section.
3. Choose one of the template buttons for lens focal length or drag the slider to define custom focal length. A new key will then be added into the Lens track automatically.

4. Go to another frame and change the lens value.

5. iClone generates the transition effect between the two keys.

The transition effect should look like the following illustrations. The camera looks like it is moving but it is actually the result of changing the lens focal length.
DOF Track

Follow the steps below to set keys on the DOF track to create DOF animation. Please read the DOF (Depth of Field) section for more information.

1. Select a camera from the Scene Manager. Go to the desired frame you want to set the DOF key.
2. In the Modify panel, scroll to the Depth of Field section.
3. Check the Activate box to enable this feature. You may set the distance manually or use the Pick Target button to let iClone select the correct value.

4. Go to another frame and change the DOF value.

5. iClone generates the transition effect between the two keys.

The transition effect should look like the following illustrations.
**Color Track**

The Color track stores the color information of lights. These can be used to create animated light color in your project. You may even imitate light on/off effects by setting keys in this track. Directional Light Spotlight and Point Light all possess the Color track for you to create complicated light effects.

1. On the menu bar, click the Create >> Light to create a light. Go to the desired frame you want to set the color key.
2. In the Modify panel, scroll to the Light section.
3. Click the color picker to specify a color for the start frame of the light color animation.
4. Go to another frame and set another color key for the light.
5. If you want to turn off the light, set the light color to Black.
6. The transition effect among these keys will be generated by iClone.

The transition effect looks like the following illustrations.
Parameter Track
In addition to the Color track, the Spotlight and Point Light tracks contain a Parameter Track in which the Range Angle and Falloff key data is stored. Please read the Intensity, Beam and Falloff and Range of Point Light sections for more information.

Turn On the light with Parameter Track
Since there is no On/Off key for lights we will use the Range parameter to simulate a Turn On effect for a Spotlight or Point Light.

1. Go to the desired frame and set the Range value to 0.

2. Go to the next frame and increase the Range value.

The light is turned on by setting two keys in the Parameter track.
Drag-and-Drop to Preview Window

Instead of using the Content Manager or Import methods to load your assets, you can drag and drop them into the iClone Preview Window from your system explorer. This way you can store all your desired files in a single folder and use the Drag-and-Drop feature to quickly load them into iClone.

If you are using a dual-monitor environment, you can have multiple explorers displaying your assets on one monitor and then drag the assets into iClone running on the other monitor to increase your production efficiency.

Drag and Drop

Drag and Drop Media to Space

If you drag and drop an image or video onto the space of the project, it will be set as 2D background.

Drag and Drop Media to Object

Drag and drop an image or video onto an object and it will be mapped to the Diffuse channel of the object.
Drag and Drop With Ctrl Pressed

- If you drag and drop an image or video while holding the Ctrl key, a simple board that is mapped with the image or video will be generated. And it works great with popVideo as well.

- If you drag and drop a PNG image that contains alpha channel data, iClone will automatically take care of the masking for you.

- You can modify the transformation data of the board to increase its size, width, depth, etc.

- The board will snap to the grid differently depending on your viewing angle to the world axis.

Drag and Drop from Content Manager to Folder

Not only can you drag and drop assets into iClone but also the other way round. Assets can be dragged from the iClone Content Manager to any target folder for better management.
Drag and Drop Media with Right Mouse Button
When you drag and drop media files with the right mouse button, you are prompted with a menu to select the desired action for how the media is applied.

- **Image or Video**: If you want to apply an image or video to a specific channel, please select the **To: XXX** entry, where the XXX is the material name of the target object, and select the target channel in the submenu.

![Image Layer Menu](image.png)

Drag and Drop Mesh Objects
You can drag any object with meshes such as **Actors, Props, Accessories, Terrain, Sky**.. etc. into iClone to load it at the location you drop it.

**Variations of Accessories**
If you drag and drop an accessory file (.iAcc) on an actor, it will follow the accessory’s conventional behavior; if dropped on the floor, it will become a prop.

![Accessory Variations](image.png)

**Drag and Drop Non-Mesh Objects and Media**
Non-mesh objects (**Particles, Grass, Material**) and Media (**Images, Videos, Audios**) can also be applied into iClone by using the drag-and-drop method.
Material
Drag and drop a material file (.iMtl) to any draggable object (with mesh, trees excluded) and the images in the seven channels will be replaced with the ones saved in the material file.

Before Drag and Drop .iMtl file onto the prop
Drag and Drop .iMtl file to the target face
Result

Image and Video
By dragging an image or video and dropping on any draggable object (with mesh, trees excluded) or sky, you can replace their original image in the Diffuse channel.

- **Image formats**: JPG, BMP, GIF, PNG and HDR.
- **Video formats**: AVI, WMV, RM, RMVB, MPEG, ASF, MOV, FLV, iWidget and any video that can be played on your system.

Drag and Drop image or video
Result

Audio
When you drag and drop an audio file (.wav, .mp3) into the preview window, the file will be imported and set as the background music of the project.

Supported Asset Files
In general, any asset file with an extension that starts with ‘i’ can be dragged and dropped into the preview window.

Please note that asset files from before version 3 (.VNS files) cannot be imported into iClone 6.

However, the asset files whose extension starts with ‘cc’ can also be dragged and dropped or applied into the preview window.

Content Manager Tabs Navigation Pane Ext. File Name
Project .Project
Avatar .Avatar
Head .Face
Parts > Eyes .Eye
Parts > Lower .Lower
Parts > Skin .Skin
Accessories .Acc
Motion-Plus .MotionPlus
Hands .Hand
Image Layer .ImgLayer
Camera .Cam
Props .Prop
Particle .Particle
Sky .Sky
Sound .mp3
Navigation Pane Ext. File Name
Parts > Gloves .Glove
Parts > Oral .Oral
Parts > Upper .Upper
Parts > Hair .Hair
Parts > Shoes .Shoe
Facial Animation .iTalk
Atmosphere .Atm
Effect .Effect
Grass .Grass
Water .Water

*Please note that asset files from before version 3 (.VNS files) cannot be imported into iClone 6.*
Image Layer

To enhance the overall project, you may also create a simulation image to overlay on top of your viewport. By using the Image Layer, you can simulate as if you are driving a car, flying an aircraft or overlaying a message.

- Creating New Image Layer
- Editing and Animating Image Layers
- Layer Order for Image Layer Objects
- Combining Image Layer Objects
Creating New Image Layer

An image layer allows you to overlay a text or image to the whole project.

1. Double-click the 0_New Template from the Content Manager >> Stage tab >> Image Layer library. A brand new image layer will be added to your project.
2. Select the image layer in the Scene Manager if it is not selected.
3. Switch to the Material tab in the Modify panel.
   - Double-click on the Diffuse icon to open an image or video to apply.
   - Double-click on the Opacity icon to open an image or video to apply as an alpha source.
   - Double-click on the Glow icon to apply a glowing source.
## Editing and Animating Image Layers

With **Image Layer** in iClone, you can now set keys for its position and scale. You can also arrange the layer order if you are using multiple layers.

### Transform Image layer

When you have added an image layer to the scene you can move and resize the image layer by following methods:

- Select the image layer and hover the cursor over to the four corners to resize it. You can also hold the Shift key to constrain the ratio while resizing.
- Select the image layer and hover the cursor over it to move it.

### Strength vs. Opacity

**Strength** and **Opacity** are different concepts that may affect different parts of the Image Layer. **Strength** adjusts the whole image layer’s channels effectiveness, whereas **Opacity** adjusts the whole image layer’s visibility.

### Animate Image Layer

Since you can control the strength and opacity of the selected channel, you can also adjust its transition and material channel to create image layer animation keys in **Timeline**.

1. Select an image layer and create two position keys in different frames.
2. These keys will appear in the Transform track under Image Layer.
3. Select the **Opacity** channel and adjust the **Strength** slider to 100.
4. Drag the timeline slider to a new frame.
5. Adjust the **Strength Slider** to 0.
6. Drag the timeline slider to a new frame and set the **Strength** to 100.
7. Three new keys are formed in the **Material** sub tracks under Image Layer.
Layer Order for Image Layer Objects

Arranging the order of the Image Layers lets you position the layer in your project easier than before.

Move Forward

When you have two Image Layers, you may use the Move Forward button to move a target layer up one level.

Move Backward

When you have two Image Layers, you may use the Move Backward button to move a target layer back one level.

Move to Top

When you have multiple Image Layers you may select one of the layers to move it to the very top of all the layers.

Move to Bottom

When you have multiple Image Layers you may select one of the layers and move it to the very bottom of all the layers.
Combining Image Layer Objects
When you have a huge number of Image Layers in one single project, you can add them to Image Layer Custom library.

1. Select all the Image Layers in the Scene Manager.

2. Click the Add button in the Content Manager.

3. All the Image Layers are now saved in the Custom library. You may simply apply saved Image Layers from Custom library.
Building Scene with 3D Blocks

iClone provides abundant prop contents for you to quickly build up your scene. However, you can also build up the scene with embedded 3D blocks.

3D Blocks Libraries

There are two types of 3D blocks libraries, one is **3D Blocks** and the other is **3D Blocks (Substance)**. The latter one contains 3D blocks applied with Substance materials for further adjustments.
Apply from Library
There are three methods for applying the blocks:

- Select the desired block in the library and click the Apply button at the bottom of the Content Manager, the block will be placed at the origin of the world.

- Double click on the desired block, the block will be placed at the origin of the world as well.

- Drag the desired block to a certain position and drop it there.

Transformation for 3D Blocks
After desired blocks are applied, you are free to transform them into the size and angle that are suitable for creating the scene.
Transforming Blocks

1. Select one of the applied block in the scene.

2. Switch to the **Move** tool. Move the block to anywhere you want.

3. Switch to the **Rotate** tool and rotate the angle of the block.

4. Switch to the **Scale** tool to re-size the block.

5. Repeat the same steps to transform any block you want.
Reset Transform Data
Because the Scale tool provides only the Local scaling, you maybe found it difficult to scale a prop along the side of the blocks in non-uniform way. In addition, when you want to set the transform data of any block to 100% and 0 angle, then you need to use the Reset Transform feature.

1. Make sure the block is selected.
2. Open the Modify Panel.
3. In the Transform section, click on the Reset Transform button.

4. The local coordinate of the block will thus be align to the world axis.

5. You can then transform, especially rotate and scale the block in a uniform methods.
Attach Blocks as Groups

With the same method, you are able to pile up as many blocks as you want.

However, then are all independent entity currently. If you want to move them together or combine them into an object, then please follow the steps below:

1. Select a block that will be the child node.

2. Right click on it to show the right-click menu. Select the **Attach** > **Attach to** command.

3. Pick another block to make it parent.
4. Repeat the same steps to attach other object to the parent. Please note that the hierarchy of the structure is determined by the way to attach them.

5. After the attachments are done, these blocks are combined as a group. You can move, rotate or scale them simultaneously.

**Duplicating Blocks**

After the attachments, you can duplicate the group to save times from repetitive steps described previously.

1. Select the block group.
2. In the Edit menu, Select Multi-Duplicate command (shortcut Ctrl + K).
3. Use the Multi-Duplicate panel to generate more identical block groups.
Applying Materials

After the blocks are set, you can apply different materials to them from our Material library. There are two types of Material libraries for you to use. One contains traditional material and the other contains PBR substance templates.

It is highly recommended that you use the template from the PBR Substance library because they are more real with adjustable parameters.

1. Simply drag and drop the template onto the target block.

2. Adjust the UV settings if necessary (consider to detach the group blocks before doing so for individually assign the UV settings).

Finally, use other features provided in iClone and set a good camera perspective to view the entire scene.
Pivot of Prop

In iClone each object has its own Pivot which is the base for the Transform data. If you intend to attach or link a prop to another, then the pivots are also the bases for both objects. It can also be taken as the Center of the object. Switch to the Gizmo mode so that you may see the position of the pivot in selected objects, since the Gizmo is located in the same place as the pivot.

The fully flexible Pivot Editing system allows you to assign different object positions as pivots, so that you can easily create rolling wheels or rotating doors.

What is Pivot

Once you create an object via your favorite 3D software (such as SketchUp), the pivot will automatically generate. Some of the 3D editing tools allow you to assign pivots manually, otherwise it assigns the pivot automatically. Other 3D editing tools do not provide this feature. Therefore, if you create your object away from the origin, then the pivot will be eccentric. iClone also loads objects with their pivots aligned to the world axis if you double-click to apply them.

How does the pivot affect Transform Data

Since the pivot is the base for the transform data to refer to, then the Move, Rotate and Scale work according to the pivots of objects. If a pivot is outside of the model entity, then unexpected results happen, especially Rotate and Scale, when you adjust the transform data of the object.

Set the pivot location

You might come across models that have eccentric pivots. In iClone, you may freely change the pivot of the selected object without the use of any external software.

Please select the target prop and toggle the Gizmo mode to view the position of the pivot. And go to the Pivot section under its attribute tab in the Modify panel.
Using Quick Set

Each prop is surrounded with a bounding box which shows the height, the width and the depth range of the prop. There are 27 fixed points located on the bounding box for quickly setting the location of the pivot.

1. Select a prop and switch to the move, rotate or scale tool. Turn on its gizmo.

2. Use the drop-down list to decide which intersect plane of the bounding box you want to use.

3. Click on one of the nine points to re-locate the position of the pivot.

Note:

- Do not rotate a prop and then set its pivot with Quick Set feature. Because this feature always sets pivots according to a straight virtual box that fits the prop, which can mess up the pivot's position.
Setting Pivot Anywhere
If the prop shape is complicated and using the Quick Set does not ensure the pivot is re-located to the correct position of the prop, then you need to set the pivot freely by manual Edit Pivot

1. Select a prop to relocate its pivot.
2. Click the Edit Pivot button. You will see that the pivot of the prop may be eccentric as the illustration shows below.

3. Use the Move tool to relocate the pivot to the desired position of the prop. Alternatively, you may enter exact values for relocating the position of the pivot.

4. Since the pivot’s orientation is always local, then use the Rotate tool to align the pivot orientation to the prop.

5. Click the Edit Pivot button again to leave the editing mode.

Note:
Please refer to the World or Local Axis section for more information on the reason that you need to rotate the pivot orientation.
World or Local Axis
Although the pivot of a prop is merely a point, it still has its own orientation; the orientation of the pivot can be aligned to the world coordinate or to the local coordinate, which tremendously affects the Local movements and the Scaling directions of the prop.

Pivot Orientation
- Each prop has only one pivot. However, each pivot contains two coordinates, World and Local.
- The Look At feature of the prop is based on the local coordinate of the pivot.
Transform Tools in World and Local Mode

- **Move - World Mode** in iClone, you are allowed to move an object in World Mode with the World Move tool; which means to move the object along the X, Y, Z of the world coordinate.

You can not easily move the jeep along the ramp with World Move tool.

- **Move - Local Mode** You can move an object in Local Mode with the Local Move tool; which means to move the object along the direction of the prop.

Use the Local Move tool instead.

- **Rotate** The Local Rotate tool is for Local Rotation only. If you want to rotate the object according to world coordinates, you may either switch to the World Rotate tool, or go to the Modify panel >> Attribute tab >> Transform section, and enter values into the Rotate numeric fields.

Local rotation only.

Type in values for world rotation.

- **Scale** The Scale tool is also for Local Scale only. This can prevent the prop from skew or distortion when you scale it.

The prop is scaled by the Local coordinate. (No skew)

The prop is scaled by the World coordinate - not used in iClone except with the Prop Puppeteering feature. (Skew occurs)
Rotating Props Continuously (New for v7.1)
Continuously rotating prop can be done by setting transform keys with the **Rotate Tool** or with the **Rotate X Y Z** fields on the **Modify** panel.

**Using Rotating Tool**

1. Apply a prop and go to the time frame when the prop starts to rotate (in this case, frame 1).

2. Go to another time frame when the rotation stops.
3. Switch to the **Rotate Tool** (**Parent** or **Local** will do). If you can not see the gizmo, press **Ctrl + Q** to show it.

4. Drag on the **Gizmo** to rotate the prop (in this case, the **Green** arc on the gizmo).

**Note:**

The number of rounds for the prop rotation depends on the distance the mouse is dragged.

5. Go back to the time when the prop starts rotate. Play back to view the result. Notice that the rounds of rotation will be kept.
Rotating with Rotate XYZ Fields

1. Apply a prop and go to the time frame when the prop starts to rotate (in this case, frame 1).

2. Go to another time frame when the rotation stops.
3. Make sure the prop is selected and open the Modify panel.
4. In the Transform section, enter value into the Rotate X Y Z fields (in this case, the Y axis).

Note:

The number (in degree) can be positive or negative; and it can be over 360.

5. Go back to the time when the prop starts rotate. Play back to view the result. Notice that the rounds of rotation will be kept.
"Look At" Feature for Prop

In iClone, you can apply the Look At feature to props so that they can be triggered to move and rotate with other moving object such as characters or another prop.

Setting Look At for Prop

Basics Steps

1. Select a prop.

2. Go to the Look At section under the prop's attribute tab in the Modify panel.

3. Click the Pick Target button and select a target object (in this case, the sun).
4. If the direction is not adequate, then please use the Look At Axis drop-down list to decide the axis you wish to target the Look-At. Please note that the axis is the Local Axis.

5. The Look Weight decides if the prop looks at the target, less or more.

6. Move the target object to trigger the movement of the prop it is looking at.
Look At the True Pivot
If you find that the prop is not looking at the pivot of the target and you want it to look at the true center of it, then you may follow the steps below:

1. Perform the **Look At** feature to a prop.

2. Click the **Look At** button.

3. Select the root node where the pivot is truly located.

4. Click the **OK** button and the prop will look at the pivot of the target.
Setting look At Limitations
By default, the prop’s local Z axis is always aligned to the world z axis, which causes a sudden flipping issue as the target object moves over the top of the prop. In addition to this situation, sometimes the rotate angles of the prop must be limited so that you can create constrained movements of a prop such as a battery, a cannon or a radar, that looks at a target.
iClone thus provides Set Limit feature to lock the axis and to limit the angles of the prop.

Lock Axis
The Lock Axis helps you avoid sudden flipping issues when the target object flies over the looking prop.

1. Switch to the Local Move moving tool and turn on the gizmo.
2. The radar dish is looking at the ball by its local Z axis (the blue arrow), while the X axis (the red arrow) shall be hinged to the radar dish.
3. In the Lock Axis drop-down list, select the X axis to be locked. This ensures that the local X axis is always at the current orientation.
4. Move the target object and the sudden flipping issue is solved.
Create Cannon by Setting Limit
Combining the usage of the Lock Axis, Azimuth, Altitude and Attach features, you may then create a cannon that looks at a target with joint and limited angles.

1. Prepare a cannon structure with chassis and gun tube; also prepare a target object to look at.

2. Select the chassis. Set it to look at the target object with the proper Local axis; in this case it is the local X axis (the red arrow).

3. Since the chassis can only rotate on the ground within a certain angle, set the range of Azimuth to (Min = -50, Max = 50) and Altitude to (Min = 0, Max = 0) so that the chassis never rises up.

4. Select the gun tube. Set it to look at the target object with the proper Local axis; in this case, it is the local X axis (the red arrow).

5. Since the gun tube can only rise vertically within a certain angle, set the range of Azimuth to (Min = 0, Max = 0) and Altitude to (Min = 0, Max = 80).

6. Attach the gun tube to the chassis.

7. Move the target object. When the target object is out of range, the cannon will be stuck from looking at.

Look at with constrained angular range

The cannon is stuck when the target is out of the range.
Duplicating Props

In order to duplicate props in iClone, you can combine the use of transform tools and the Ctrl key. However, if you need to duplicate a lot of similar props, then you can use the Multi Duplicate feature.

You are allowed to quickly duplicate objects by simply entering a number. Once duplicated, you may optionally transform, rotate or scale your objects at the same time just as if you wish to create a set stairs.

Duplicating Props with Ctrl Key

1. Select one or more props you want to duplicate.

2. Switch to the object transform tools such as Move ( or ), Rotate ( or ), or Scale tool.

3. Hold the Ctrl key and then move, rotate or scale the select props. The same props will be duplicated.

4. Repeat several times to duplicate more of the same props.

Using the Multi-Duplicate Panel

With the Multi-Duplicate panel, you do not need to use the Ctrl key to copy and paste many times. Adjust the parameters in the panel and you may then produce many of the same props at one time. Please note that this feature can only be applied to single props, not multiple props.

Collaborating with Object-Moving

1. Select the pawn.
2. Click the **Edit >> Multi-Duplicate** command on the main menu bar to show the panel.

3. In the **Duplicate** numeric field, set the number for duplicating. The minimum number is 2.

4. Enter the number to the **Move X Y or Z** to duplicate at a certain offset distance.
5. Alternatively, toggle the gizmo mode so that you may drag to decide the moving offset.

Each pawn offsets the same distance from the previous one.

6. Click the OK button when you are done.

Collaborating with Object-Rotating
1. Select the step.

2. Click the Edit >> Multi-Duplicate command on the main menu bar to show the panel.
3. In the Duplicate numeric field, set the number for duplicates. The minimum number is 2.
4. Move the duplicated steps so that they align to the appropriate position.

5. Rotate the duplicated steps to create a spiral staircase.

Each step rotates the same angle from the previous one.

6. Click the OK button when you are done.

Producing a Prop Array by Multi-Duplicate
In the previous section you learned that the Multi-Duplicate feature supports only a single prop; however, when you want to create a prop array, such as a brick wall, then you may still use the Multi-Duplicate feature with the attaching method.
1. Select a brick.

2. Duplicate the brick by the **Multi-Duplicate** panel.

3. Select the duplicated bricks and right-click on the 3D preview window. Attach all of them to the first brick to create a group.

4. Select the group.

5. Perform duplication again. You may need some adjustments to the duplicated group in order to align them to the appropriate positions.

6. Optionally detach the sub-nodes of each group if necessary.
Using Spatial Offset

Basically, the duplicate distance, angle or size (also called Spatial Offset) between two adjacent duplicated props is a constant number specified by you. However, the space offset can be progressively increased or decreased. This can duplicate your prop with more geometrical graphics.

1. Apply a prop and select it.

2. Open the Multi-Duplicate panel.
3. Set the Move to line up the duplicate props.

4. Change the Rotate.

5. Adjust the Scale values.

The duplicated props are scaled down.

6. Drag the Spatial Offset slider to increase or decrease the offset quantity.

Spatial Offset is decreased.

Note:

The duplicated props are all instances of the mother prop, they share one same material, which is capable of tremendously downsizing the project size.
Controlling the "Look At", "Reach" and "Path" of Character, Camera, and Props

A dummy prop is a pseudo prop for looking, linking, attaching or reaching targets. You may use them to offset the aim away from the main objects. In addition to that, an object with several dummies attached can have the character hold it firmly with both hands. By using the dummy prop, you can mix up the path keys with separately recorded move, rotate and scale keys by puppeteering.

Please note that all the dummy props can be shown or hidden in the 3D preview window for editing, but they will not appear in the exported media.

- Dummy as Looked Target
- Offsetting the Line of vision of Camera
- Dummy as the Reaching Target
- Using Follow Path Feature with Dummy
Dummy as a Looked Target

When you need a prop to be looked at from head to toe by other characters or props; as it only have one pivot, the other objects can only looks at its pivot. By using dummies, the other objects can thus look at the prop's different parts.

1. Apply a main prop. The other objects such as the characters can only look at its pivot.

2. Apply several primitive props spreading around on the target prop. You may optionally remove all the textures from these dummy-to-be props to downsize the project.

3. Select the primitive props and individually enable the Set as Dummy box in the Prop section under its attribute tab of the Modify panel.

4. Attach all the dummies to the main prop.

   The highlight of the dummy prop turns to red.

5. Use the Look At feature of the other objects to look at these different dummies. Please note that you may show / hide the dummies by using the shortcut, Ctrl + D.

Characters look at the dummies.

Dummies are hidden.
Offsetting the Line of Vision of Camera

When a camera is looking at a target, it is actually looking at the target’s pivot. However, if you want the camera to look at the target with a little offset, then you need to use the dummy props. This method is very useful especially when you have a close-up shot.

1. Add a custom camera. Have it look at a street light.

![The custom camera looks at the pivot of the street light. The view of the custom camera.](image1)

2. Move the custom camera and it will always look at the bottom of the street light. You can not view any other part of the street light.

![Move the custom camera. Only the bottom of the street light can be seen.](image2)

3. Apply a primitive prop and move it to the other part of the street light. Attach the prop to the street light.

![Apply a primitive prop and move it to the other part of the street light. Attach the prop to the street light.](image3)

4. Select the primitive props and enable the **Set as Dummy** box in the **Prop** section under its attribuate tab of the **Modify** panel.

5. Have the camera to look at the dummy. You may then adjust the position of the dummy to have the camera look at the different parts of the street light. Please note that you may show / hide the dummies by using the shortcut **Ctrl + D**.

![The custom camera looks at the dummy.](image4)

![Move the dummy so that the custom camera can see all the parts of the street light.](image5)
Dummy as the Reaching Target

Each prop contains only one pivot for a target. Therefore, when a character wants to hold a prop firmly with both hands, both hands have to hold on to the same pivot, which causes hands penetrating each other, or the prop attaches to one hand, and the other hand can only strike a holding gesture that you need to constantly adjust if the prop or character moves.

With the use of a dummy, you can easily reach both character's hands so that the dummies are attached to the prop. Even if the character or the prop moves, you do not need to worry too much about the results.

1. Select the bar which will be reached by a character.

![The bar has only one pivot.](image1)

2. Select a character and have both hands reach the bar.

![Both hands reach the same point. Penetration occurs.](image2)

3. Apply two primitive props and move them closer to the bar. Attach the props to the bar.

![Reach both hands of the character to the dummies.](image3)

4. Reach both hands of the character to the dummies.

![Adjust the hand gesture. Please note that you may show / hide the dummies by using the shortcut, Ctrl + D.](image4)

5. Adjust the hand gesture. Please note that you may show / hide the dummies by using the shortcut, Ctrl + D.
Using Follow Path Feature with Dummy

When a prop is following a path, there is no way for you to rotate it. With the use of a dummy, you can have the prop move along a path while using the Prop Puppet feature to rotate the prop.

Please refer to the Prop Puppeteering section for more information.

1. Apply a rocket and have it move along a path; remember to turn on the Follow Path.

![Rocket following a path](image)

2. Use the Prop Puppet to record its rotation. You will find that the rotating clip do not have any effect although it is actually recorded into the Animation track. This is because the path key has a higher priority than the animation clip.

![Animation track](image)

3. Leave the animation clip but delete the keys in the Path track of the rocket.
4. Apply a primitive prop. Attach the rocket to the prop.

![Rocket attached to a primitive prop](image)

5. Select the primitive props and enable the Set as Dummy box in the Prop section under its attribute tab of the Modify panel.
6. Command the dummy to move along the path. The rocket will go along with the dummy.
7. The rocket will then rotate while moving along the path. Please note that you may show / hide the dummies by using the shortcut, Ctrl + D.
Prop Puppeteering

The **Prop Puppet** feature helps you move your mouse and trigger the prop to transform, while the transform animations are all being recorded. This method saves time when setting a bunch of individual keys for moving, rotating, or scaling. In addition to that, the smoothness of the animation is higher than what you can achieve by manually adding keys.

1. Select a prop.

2. Click the Prop Puppet button under the prop animation tab of the **Modify** panel.

3. In the Prop Puppet panel, select a mode (Simple and Advanced) for puppeteering.

4. Press the Preview button and then the space bar; move your mouse and preview the movements of the prop (Shortcut: Space bar).

5. Press the Space bar to stop previewing.

6. If you are satisfied with the preview result, then press the Record button and then the space bar; move your mouse and record the movements of the prop.

7. Press the Space bar to stop recording.

**Note:**

- The speed of the prop animation depends on the speed of your mouse movement.
- You may use this method to control a **Kinematic rigid body** to collide into other physics objects.
- The recorded result will be stored into the **Animation** track in clip type.
- See also:
  - Simple Mode
  - Advanced Mode
Simple Mode

In Simple mode, the selected prop animation is mapping to the movements of your mouse cursor in Screen-Based technique, which is locked to the screen resolution.

Move

This mode controls the object to move on the horizontal or vertical plane, which is very useful if you want a lot of props to pass by in the back scene, such as street cars.

- **Horizontal Movement** Move the prop left, right and to the depth of the camera or a horizontal circle on the horizontal plane.

- **Vertical Movement** Move the prop left, right, up and down or in a vertical circle.
Rotate
This mode is suitable if you need to rotate a prop round and round, such as a merry-go-round or a propeller.

- Move the mouse cursor left/right to have the prop rotate left or right according to the perspective of your camera.

- Move the mouse cursor up/down to have the prop rotate forward and backward.

- Drag the Sensitivity to decide if the prop rotates a few or more rounds when you move the mouse cursor.

Scale
This mode is very useful if you need to have props act like they are breathing.

- Move the mouse cursor left or right to narrow or broaden the prop.

- Move the mouse cursor up or down to make the prop taller or shorter.

- Roll the mouse cursor so that the prop starts to act like its breathing.
- Drag the Sensitivity to decide if the prop expands less, or more, when you move the mouse cursor.

Note:
- The speed of the prop animation depends on the speed you move your mouse.
- During the previewing or recording process, you may press the 1, 2, 3 or 4 keys to toggle between these modes.
- You may use this method to control the Kinematic rigid body to collide all the other physics objects.
- The recorded result will be stored into the Animation track in clip type.
Advanced Mode

In the Advanced mode, you are allowed to use a puppet profile to move the selected prop, or you may also manually adjust the profile settings for puppet movements. The puppeteering movements are Axis-Based, which are practical for more exact control by the [world or local axis].
Using the Profile

Each one of the profiles is a combination composed of various settings on the right side of this panel, which may cover often-occurred movements in the real world.

1. Select a prop. Open the Prop Puppet panel and switch to the Advanced mode.

2. Pick one of the profiles in the left pane. In this case, the cup will rotate by the Z axis.

3. Press the Preview button and then the space bar; move your mouse and preview the movements of the prop (Shortcut: Space bar).

4. Move your mouse left/right to preview the puppeteering results. Press Space bar to stop previewing.

5. If you are satisfied with the preview result, then press the Record button and then the space bar; move your mouse and record the movements of the prop.

6. Press the Space bar to stop recording.

Manually Adjusting the Profile Settings

If you want the prop to be puppeteered by one or more exact axis, then you may use a combination of the Profile Settings. This method ensures that the prop move, rotate or scale along the specified axis.

Sensitivity

The movements of the puppeteered prop are bases on the mouse cursor, and the value for each slider decides the mapping methods according to the position of the cursor from the center of the 3D Preview Window.

- **Move**: Adding or subtracting 1 means the prop moves 1 cm when your mouse cursor moves from the center to the edge of the 3D preview window.
- **Rotate**: Adding or subtracting 1 means the prop rotates one degree when your cursor moves from the center to the edge of the 3D Preview window.
- **Scale**: Adding or subtracting 1 means the prop scales one time the original size when your cursor moves from the center to the edge of the 3D Preview window.

- Your entire screen is the reaction area. You may move your cursor anywhere within your screen to puppeteer the prop.

World or Local

The puppeteering method can be performed using the World or the Local coordinates; which is also known as World and Local. Please refer to the World or Local Axis section for more information.

Note:

- The speed of the prop animation depends on the speed you move your mouse.
- You may use this method to control the Kinematic rigid body to collide all the other physics objects.
- The recorded result will be stored into the Animation track in clip type.
Creating Animation Helper

In iClone, you may create your own animation helper by setting Transform keys and using the Collect Clip track. Saving the custom helper into the content manager allows it to be applied to any project multiple times. This will save a lot of time when creating objects with the same animations in different projects.

In the following sample, we will create a helper containing taking-off and rotating wings animations.

**Collect Clip**

1. Apply any 3D block to your scene. If you drag a prop into the scene, then switch to the prop's attribuate tab of the Modify panel and click the Reset (Zero Out) button in the Transform section to centralize the object.
2. Open the Transform track. There will be one key already in frame 1. Go to frame 20 and move the block up the Z axis to your desired height. You now have a taking off animation ready.

![Taking Off Animation](image)

3. Go to frame 21 and click Reset (Zero Out) button again.
4. Go to frame 30 and rotate the block along the Y axis. Click Reset (Zero Out) at frame 40. Now your rotating animation is ready.

![Rotating Animation](image)

5. Open the block's Collect Clip track and drag to select a range to include frame 1 and frame 20. Right-click in this range and select Add to Perform. Name it as Taking Off.

![Collect Clip Track](image)

6. Drag to select a range to include frame 21 to 40. Right-click in this range and select Add to Perform. Name it as Flapping Wings.

![Flapping Wings](image)

7. Add this Helper to the custom library by clicking the button at the bottom of the Content Manager. Please refer to Prop Animation With Helper section for more information about utilizing the helper.
Prop Animation with Helper

An Animation Helper helps you to pre-define some specific animations and embed the animations in the helper itself. The helper then can be re-used unlimited times and add the same animations to a different prop. Please read Creating Animation Helper first before you start this section to get a better understanding of the principles involved.

Basic Rules
- Creating Animation Helper at the origin.
- One level attaching only.
- Merging models and helpers before assembling them as one composite prop.

Attach Single Model to One Helper
1. Apply the helper created in Creating Animation Helper section.

2. Apply a desired model into the project: Overlapping the pivots of them.

3. Pick the model and go to its attribute tab in the Modify panel. Scroll to the Attach section, click on the Pick Parent button and click the helper.

4. Select the helper again. Switch to its material tab in the Modify panel and set the Opacity value to 0.

5. Click the Edit >> Merge command on the menu bar.
6. Please follow the same steps to create more parts to be combined later.

   - Apply the helper.
   - Apply a wing model and attach it to the helper.
   - Set the helper’s Opacity to 0.

7. You may right-click on the merged object and apply the animation clip from the Perform list. Examine the perform clip for each part:

   - The “Taking Off” is applied to the sailing ship.
   - The “Flapping Wings” is applied to the wing.
Assembling Parts
Once you have merged several models and helpers as parts, you may then start to assemble them as one composite object.

1. Decide a part to be the Parent Node.

The sailing boat is assigned to be the parent.

2. Pick other parts and then click Pick Parent in the Attach section.

Attach the two pieces of parts to the parent.

3. Repeat last step till all the parts are attached to the parent node.

The model now can take off with flapping wings.

4. You may then control the composite object and command each helper individually to act its animation at different times via the Animation track.
Setting Prop as Dummy
Setting a prop as a dummy allows you to attach a group of props to the dummy which in turn allows you to use the dummy as a transform controller.

Transform Controller on Path
Since you cannot set its own position keys when picking path to an object, attaching a prop to a dummy object which is in turn attached to the path can get around this issue. Using the dummy as the parent of the prop you can set offset keys while the dummy follows the path.

Set Prop as Dummy
1. Add a prop to the scene and select it to Set as Dummy

2. Now, add a camera to the scene.
3. Position the camera to the dummy object.
4. Select the camera in the Scene Manager
5. Scroll down to the Linkage section of the camera modify panel.
6. Click the Pick Parent button and link it to the dummy object.

Dummy to Path
1. Create a path for the camera to move on.
2. Select the dummy and Pick Path to the path.
3. Since we have set the dummy as the parent of the camera, the dummy will move along the path with the camera.
4. You can now set the position keys for the Dummy on the path while also adjusting the Camera’s rotation and position.

Dummy as the Parent
Attaching a group of props to a dummy parent and moving them as a group can save you a lot of time since you won’t have to adjust each props’ opacity.

1. Set a prop as the dummy.
2. Add a few props (in our example the skirt part) to the scene and position them to the dummy.
3. Select the prop and attach each piece to the dummy.
4. After making a group of items you may select the dummy and link it to the character.
5. Now the dummy with the attached objects will move with the character.

Note:
When you set a prop to be a dummy object, the dummy will not be rendered.
Custom Key Pose Edit and Transition Curve

Key-frame Animation is the traditional method for creating animations for a prop, especially ones with bone structures. You need to set different keys at different time frames. The interpolation between the two keys, which is also called a "transition", will also be auto-produced. It is time consuming and the animation may need to be fine-tuned repeatedly.

Producing a Custom Pose

1. Apply a prop with bone structure (you may create this kind of prop by using the attach and merge method).

![Image of a prop with bone structure]

2. Click the Edit Animation Layer button in the prop Modify panel and Animation tab.

![Image of the Edit Motion Layer window]

3. Set an Animation key by editing the bones with IK / FK methods.

![Image of a prop with a timeline for setting Animation keys]
Producing a Key-frame Animation

When you are familiar with the usage of setting one animation layer key in a certain time frame, then you can go to another time frame to set more animation layer keys, which can produce so-called key-frame animations. The transition between two keys will be auto-generated by iClone.

1. Set a pose at a certain frame (in this case, the start frame).

2. Go to another frame and set another animation layer key.

3. The in-between animation is automatically generated. Repeat the same steps to generate a custom key-frame animation.

4. You are able to right-click on the keys in the Animation Layer main track and select a transition curve to vary the transition speed between two adjacent animation layer keys.

The Ease In & Out curve is applied.
Layering Animation keys to Existing Clips

Once you apply an animation clip to a prop, then you may want to fine tune the offset (position) for each bone. This can be done via the Edit Animation Layer feature. The pose with the edited bones will be kept as a key in the Animation Layer track, and its effect will remain throughout the clip unless another key is set. The transition between the two animation layer keys will then auto-generate.

Adding Animation Layer Keys

If you want to set an animation layer key so that the effect of the key blends into the underlying animation, then follow the steps below:

1. Select a prop that already has an applied animation.

2. Click the Edit Animation Layer button in the prop Modify panel and Animation tab.

3. Move to the specific time where you want to overlay the offset key in the clip.

4. Use the IK/FK methods with the or tools to add an animation layer to the initial animation. The key will automatically be added into the Animation Layer track and be blended in the pose of the animation in the Animation track.

5. Repeat the same step at a different time frame and you can then fine-tune the initial animation.

Adding animation layer keys for offsetting bones. The animation layer keys affect the entire animation clip.
IK, FK Editing for Props

If you have props with bone structure applied in iClone, you may use IK and FK to adjust the poses and generate motions.

Launching Panels

Click on the Prop, then switch the Modify panel to the Animation tab and click the Edit Animation Layer button to access the panel.

At the top-right corner, you may see the Bone Edit Mode box and the Bone Settings button.

- **Bone Edit Mode** Activate to view the bone structure of the object for accurately picking the part of the object. Deactivate it to view in bounding box mode.

Bone Mode:  
Bounding Box Mode (Wild animal content pack by real-lusion only).
- **Bone Settings**: Click on the wrench button to show the **Bone Settings** panel.

  ![Bone Settings Panel](image)

  - **Bone Size**: Adjust the bone size for adequate size for not obstacle the object while big enough for more easily picking.
  - **Activate the Affect to all Bones** box so that the adjustments via this panel can affect to all bones instead of a single one.
  - **Display Settings**: Determine the color and opacity of the bone(s).

**FK Method**

1. Select an actor and launch the panels as described in the previous section.

2. Select the **Rotate** tool in the **general toolbar**.

3. Pick a bone in the 3D viewer. Alternatively, you may pick a bone by clicking on the node in the tree view in the **Edit Motion Layer** panel.

   ![Bone Selection](image)

   Click on the actor to pick the bone.

4. Use the rotate gizmo to rotate the selected bone.

   ![Bone Rotation](image)

Please refer to the **What is IK/FK** and **How to Use FK** sections for more information about FK.
**IK Method**

Since IK relates to a chain of nodes, then it is necessary to anchor the head of the chain in order to move the end node with IK method.

1. Select an actor and launch the panels as described in the previous section.

2. Select the **Move** tool in the **general toolbar**.

3. Hold down the Ctrl key and click on a node to define it as the start of the IK chain. It will then be marked with a blue box (You may Ctrl click again to cancel the anchor). Please note that you may also click or Ctrl-click on the target node inside of the **Edit Motion Layer** panel.

4. Pick another node to be the end node of the chain. (Ctrl key released)

5. Use the move gizmo to move the selected bone and affect the entire IK chain.

Please refer to the **What is IK/FK** and **How to Use IK** sections for more information about IK.
Translate Bone for Props and Accessories

Key-frame Animation is the traditional method for creating animations for a prop or an accessory, especially ones with bone structures. In addition to the IK FK Editing for Props and Accessories, you are able to Translate Bones of them to generate more exotic and dramatic animations.

Setting Translate Keys to Alter Appearances
1. Apply a prop with bone structure, attach it to a character to turn it into an accessory.

2. Go to specific time frame when the character performs motions.

3. Select the accessory and click the Edit Animation Layer button in the Modify panel. Edit Motion Layer panel will display.

Bone Selection

RootNode

- pCinder1
- pCinder2
- pin1
- pin2
- pin3
- pin4

IK Constrain
Mirrorm
Reset Key
Cancel
4. Select a target bone (in this case, joint3) and switch to the Move tool so that you are able to move the bone away from the hand of the character (please note that the mesh will be stretched along with the bone since they are rigged in the external 3D tools).

5. You may then find the layer key for the prop (accessory) in the Animation Layer track.

6. Go to another time frame and then leverage the same manner to add another key to move the bone back into the hand of the character.

**Producing Layer Keys for Existing Animation**

When you are familiar with the usage of setting one translate key for bones of props or accessories, then you can append animation layer keys to modify or dramatize their existing animations.

1. Create animations of a prop with rigged bone structure.

2. Go to a specific time frame.
3. Select the prop and click the **Edit Animation Layer** button in the **Modify** panel. The **Edit Motion Layer** panel will display.

4. Select target bones (in this case, the spine, forelegs and rear legs) and switch to the **Move** tool so that you are able to move these bones away from their initial positions (please note that the meshes will be stretched along with the bones since they are rigged in the external 3D tools).

5. Move the bones away to generate a layer key to affect the animations.

6. You may then find the layer key that affect the animation clips for the prop (accessory) in the **Animation Layer** track.

7. Go to another time frame and move the bones back to the rational positions.
Editing Props in 3DXchange (New for 6.1)

For single-meshed, bone-skinned or structured props, that you wish to reduce the draw call times, set the spring effect, smooth out the seam lines, on the surface or flip the faces when they appear to have holes, edit the perform list, turn them into a character, and sculpt the meshes, which cannot be done in iClone, then you need to edit the props in 3DXchange. Instead of saving the target prop first in iClone and then sending it to 3DXchange for further editing, you can simply click a button to instantly send it to 3DXchange.

1. Apply a prop (in this case, a bone-skinned one), make sure it is selected.

2. Click the Edit in 3DXchange button in the Modify >> Edit tab >> 3DXchange section.

3. The prop will be sent to 3DXchange for further editing.

These modifications can be made in 3DXchange:

<table>
<thead>
<tr>
<th>Single-Mesh Props</th>
<th>Bone-Skinned or Structured Props</th>
<th>Reducing Draw Calls (Merge Identical)</th>
<th>Setting Spring Effects</th>
<th>Smoothing Surface</th>
<th>Flipping Faces</th>
<th>Adjusting PerForm List</th>
<th>Sculpting Meshes</th>
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</thead>
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2D Background Section

Background Color
Clicks the color picker to select a solid color as the background of the current project.

Activate Image
Activates the box and then click the button to load any prepared image as the background. Select from the Display Mode drop-down list to define the mapping method for the image background. You may save a background image into your desired directory, or modify the image in an external image editor.

Using Video as 2D Background
You may also load a background video for your project. The object in the scene is actually still while the animations come from the video itself.

External Image Path
Shows the external image file location when the File >> Import Settings >> External Texture command on the main menu bar is checked. You may browse to find the background image or embed the background image into the project.
Utilizing Sky

In iClone, the Sky is actually a sphere. The inner surface of the sphere is visible while the outer surface is not. Therefore, with the inside of the sphere mapped with sky images, when you view to all directions in the sphere, it looks as if being surrounded by the sky dome.

Applying Sky Templates

1. Create a custom scene with different objects, such as props, plants or waters.

2. Go to the Content Manager to search for the sky library.

3. Apply the template that is most suitable for your scene.
Using Dynamic Sky

iClone provides special dynamic sky system for you to create animations of time elapse. Including the light transformations, the sun and moon trajectories, the cloud movements, the flickering stars and so on that are related to the time and weather.

You can find the sky tool template in the Content Manager.

By double-clicking on the template, your are ready to use the sky tool in your project.

Please refer to the sections below for more information:

- The User Interface Introduction of Sky Tool
- Settings for Time Elapse
- Cloud, Moon and Star Settings
The User Interface Introduction of Sky Prop Tool

You will see a panel shows after you apply a Sky Prop Tool from the Content Manager.

1 Panel Control
- To close the panel.
- To make the panel floating on the screen or to be confined within the preview window.

2 Time Clock
- The sun icon auto-moves around the clock to determine the time of the day.

3 Setting Tabs
- The sky elements are divided into three tabs, including the Time, Cloud and Night settings.

4 Settings
- It displays different settings for different sky elements.

5 Record
- Click this button to start recording animations, in accordance with the settings, for the sky objects as the time goes by. Click again to stop recording.
Settings for Time Elapse

If you want to create a time elapsing animation, then please follow the steps below.

1. Create a scene without any light.

2. Apply the Sky Tool from the prop library. You will instantly see the sky and light in the scene and a panel on the preview window.

3. Drag the sun icon in the panel to the position to determine the time of the day for starting your animation. In this case, it is set to the night time, therefore the moon comes up.

4. Make sure the time tab is chosen and adjust the Time Scale to determine the speed for the time to move on (in this case, maximum speed).

5. Click the Record button to start recording the animation. The moon, sun and lights will orbit simultaneously and the animations will be recorded.

6. Playback to view the result. You can always re-record again with different settings if you are not satisfied with the result.
Cloud, Moon and Star Settings
When you record the time elapse animations, you can set the cloud in the sky, the eclipse of the moon and the density of the stars for the night. In the case for this page, a night scene is used as an example.

1. Set the time to night with the Sky Tool.

2. Switch to the Cloud setting tab.

3. Drag the sliders to determine the density of the cloud and the speed for the clouds to flow.
4. Switch to the **Night** settings tab.

5. Drag the slider to determine the density of the stars and the eclipse of the moon.

6. Click the **Record** button to record the time elapse animation.
7. Playback to view the result. You can always re-record again with different settings if you are not satisfied with the result.
**Plants**

*iClone* provides a live plant system which allows users to plant trees or grass on top of the terrain. These plants can sway along to a given wind value, presenting a life-like dynamic feeling. Besides, the new *SpeedTree* technology provides a lot more content besides trees, including flying bugs, butterflies, fences, rocks, leaves, and plants in the shape of 3D text. Moreover, all of the grass is now 3D as well.

- The Tree
- The Grass
The Tree
iClone provides you with a system to adjust the parameters of planted trees. You may plant trees on the terrain or even link or attach them to some other target object. The trees can cast and receive shadows or sway with the wind during playback. You may then create a forest or potted plants in your project.

To Plant a Tree
It is relatively easy to plant a tree. Go to the Content Manager, apply the desired terrain and sky, drag and drop your desired tree templates into the 3D viewer.

You may even move the trees with the Move, Rotate and Scale tools to manipulate the trees in the same way as props.

Plant Wind Settings
If you increase the Strength value, the trees you plant sway harder when you play the project and vice versa.

Speed Tree Linkage
Because a tree is similar to a prop, you may link your tree to a target such as a flowerpot.

Note:
Please note that since trees do not possess any tracks in the timeline, you must be careful when you set Link or Unlink keys to the trees.
The Grass

iClone gives you a realistic grass system in which you plant various types of grass and plants in your scene.

The Concept of Grass Instance

Once you apply one of the grass templates from the Content Manager, you choose the Seed of the Grass you wish to plant. Each click of your mouse button will place another instance of that seed so you can build up patches of grass throughout your scene. However, you will only see one name of the chosen seed in the Scene Manager.

To Plant the Grass

1. Switch to the Set tab in the Content Manager.
2. In the Grass library, double click on your desired grass template (or drag it into the preview window).
3. Click the Star Gardening button in the modify panel. You will see a paint bucket indicate the location for planting the grass.
4. Drag the Size slider (or scroll the mouse wheel) to define the size of the Gizmo.
5. Drag the Density slider to define the number of grass instances growing in 100 square units.
6. Click on the target position to plant.

Strength = 1  Density = 10
Changing the Look of Grasses - Dimension
1. Set the Width and Height values to change the size for each piece of grass.
2. If you want the height of the grass to be different, increase the value of Variation.

Changing the Look of Grasses - Color
Using the Start Color and End Color to define the gradient color dyes for each grass instance with every click on the ground. You may then create bunches of flowers with different colors with only single seeds.

To Mow, Clear or Remove?
Mow: To cut off the unnecessary grass instances of the current seed.
Clear: To mow all the grass instances of the current seed.
Remove: To mow all the grass instances and also delete the seed from the scene.

Save Your Grass
You may click the Add button to store custom grass in the Content Manager/Custom library. The settings saved are:
- Diffuse and Opacity
- Wind Strength

Note:
- You can also drag the thumbnail image to the target location for planting.
- Right-click to toggle between planting and mowing mode
- Use the left mouse button to plant or mow.
The New SpeedTree
In this new SpeedTree update, you will find a lot more content besides trees, including flying bugs, butterflies, fences, rocks, leaves, and plants in the shape of 3D text. Another enhancement is that all of the grass is now 3D.

The benefits of the new SpeedTree are:

- Visual Quality Improvement
- Enhanced LOD (Level of Detail)
- Lively Plants Swaying

Visual Quality Improvement
All trees now come with multiple texture channels, including diffuse, normal, specular, and even alpha values for light-transparent effects. You can even see the bark details and light as it passes through the leaves.

Enhanced LOD (Level of Detail)
Although SpeedTree previously had an LOD system to ensure steady performance in a massive forest, some skips or jittering could still occur when changing mesh levels or altering camera distance. In iClone, you will find hardly any changes during these level transitions.

Note:
- Please note that the same smooth transitions have also been applied to SpeedTree objects such as rocks, fences, or other props.
- Refer to the SpeedTree Enhanced LOD video for more information about the LOD and SpeedTree.
Lively Plants Swaying
Wind behavior has also been vastly improved. Different species of plants like broad-leaf, needle-leaf, or grass now react accordingly to wind settings. Even a single tree can have branch and leaf motion settings so you can see it naturally oscillating in the wind. In addition, you can now use the timeline to key in wind changes from still and gentle to hurricane speed.

1. Apply a SpeedTree from the Tree library.

2. In the Scene Manager, you will see the tree and a Wind object.

![Image of Scene Manager with Wind object highlighted]

The Wind object will be shown as a Fan in the preview window.

Note:
The wind object is automatically added when you apply a tree; when there is no tree in the scene, the wind object will be automatically eliminated as well.

3. Show the parameters within the Modify >> Edit tab of the Wind object by the following methods:
   - Make sure the tree is selected and click the Plant Wind Settings button in the Modify >> Tree section. The Modify panel will change as shown below.
4. Adjust the settings in the panel.

- Alternatively, select the **Wind** object from the **Scene Manager**. The **Modify** panel will change its section as well.

**Direction**

The **Direction** settings determine the direction of the wind. You may either set the X, Y or Z values from (0, 0, 0) to (359, 359, 359) or rotate the wind gizmo in the preview window.

Rotate the wind gizmo to set the direction of the wind.

Play back to view the result.

The tree will be oscillated along with the direction of the wind.

Note:

The X, Y and Z directions follow the world axis.
**Strength**

The **Strength** of the wind for the trees is a range; each gust of wind is generated with random strength within this range. The range is defined by the two triangles under the strength slider.

1. **General Strength**: This triangle determines the maximum strength of the basic wind forces. This setting is able to form the idle animations of the SpeedTree.
2. **Gust Strength**: This triangle determines the maximum strength of the gust.

The strength range falls at the weak side (left end) of the slider to generate breeze.

The strength range falls at the strong side (right end) of the slider to generate strong wind.

The strength range spans the weak and strong sides (left to right ends) of the slider to generate intermittent wind gusts.
**Gust Frequency**

The value of the **Gust Frequency** determines the random occurrences of the gust in a certain period of time. A higher value means the gust happens more and vice versa.

![Gust Frequency = 50](image1.png)

![Gust Frequency = 100](image2.png)

**Note:**

Please note that the wind setting is global for every applied **SpeedTree** that is embedded in **iClone 6**. The trees from earlier version are not influenced by it.
The Concept of Terrain System
The Terrain serves as solid ground that Actors and iProps can stand on or move along but not pass through. With the use of Terrain, users have several benefits:

Benefits
- You may directly place objects right on the terrain and edit the movement and positioning along the terrain without the need to worry about making height adjustments.
- You are allowed to grow grass or trees on the terrain surface.
- The terrain cannot be selected with the mouse. This prevents you from accidentally selecting the terrain or making unwanted changes.

Limitations
- There can be only one terrain per project.
- The moving object can not move up a 90-degree angle. It will instead jump to the higher surface abruptly.
- Any link relationships will be removed once a prop is converted to become part of the terrain.
Height Map Terrain

The Height map terrains inside iClone are 9 times larger and have faster loading times than in previous versions. With the enhanced Detail maps, you may now enjoy high quality visual performances while zooming in and out. You may find these terrain templates in the Terrain library under the Set tab of the Content Manager.

Note:

- Please refer to the Height map Terrain Creation Process page for more information about using Earth Sculptor to create a Height Map Terrain.
- If you want to create a height map terrain based on the template terrains embedded in iClone, then please refer to the sections below for more information:
  - Create Custom Height Map Terrain
  - Replacing Textures to Change Landscape

The Benefits of Height Map Terrain

- The height map terrain size is 9 times larger than the mesh terrains of iClone 4.0 or earlier.
- It is created with multiple texture tiles instead of one big texture image, which saves a lot of memory space.
- The real-time rendering performance is also better with the LOD (Level of Detail) on.

LOD On
The details on far surfaces are rendered slightly in order to get faster real-time playback and editing.

**LOD Off**

All details are rendered during real-time playback, which increases the system loading capabilities.

- It is now easier to apply vegetation (grass, trees), or other features such as snap, walk, or physical collisions on terrains.
- The shadow quality has significantly improved.

Height map terrain casts and receives more shadow details when turning on the Shadow feature.

You can see exquisite texture details even in close up shots.

Height map terrain is applicable to any close shot without any texture artifacts.

It maintains perfect texture details on vertical surfaces, such as cliffs.

Perfect texture details on the cliff of a height map terrain.

Traditional mesh terrain - The textures appear rough during close shots.

Traditional mesh terrain - Poor texture quality on vertical surfaces.
Details of Height Map Terrain

One of the benefits of the Height Map Terrain is that it combines with the LOD (Level of Detail) feature, which presents you a large terrain with exquisite details, materials and textures without increasing the burdens of your computer to render the remote surface details that are difficult for human eyes to notice. It is suitable for faster editing and previewing. If you want to see the fine render results, then turn the LOD off.

1. Apply a Height Map Terrain from the Content Manager >> Set tab >> Terrain library >> Height Map_Large library.

2. Activate the Preference panel >> Level of Detail box for switching on / off the LOD effect.

3. You may switch the display mode of the terrain to view the differences.

   **LOD = On**

   ![Image](image1.png)

   **LOD = Off**

   Rendering the surface details will decrease the performance of your system.

4. Adjust the Performance / Quality slider to determine the distance from the camera for starting the LOD effect.

   **Performance > Quality**

   The near surface details are decreased as well for increasing the performance.

   ![Image](image2.png)

   **Performance < Quality**

   Increasing the quality of the details for the terrain surfaces.

   ![Image](image3.png)
Replacing Textures to Change Landscape

The **Height Map Terrain** templates in iClone Terrain library are designed with different seasons and scenarios. However, you can change them by simply replacing the textures the terrains are given, while the landforms will remain unchanged.

Please note that the landscape of each embedded **Height Map Terrain** template is composed of 4 different materials, in which each material contains three texture channels: **Diffuse**, **Detail** and **Bump**.

The distribution for the four materials are defined by another mask image in **PNG** format (Please note that the illustration below shows partial areas of the entire mask image).

Please note that you can not open this mask image and edit in any image editor because the result will be unpredictable. Instead, you need to use **Earth Sculptor** to export a mask image of this kind.
Changing Texture of Height Map Terrain

1. Load a Height Map Terrain template from the Content Manager >> Set tab >> Terrain library >> Height Map Large library as a base.

   ![Content Manager screenshot]

   - Set Template
     - Props
     - Tree
     - Grass
     - Particles
     - Terrain
       - Height Map Large
         - Mesh Medium
           - Water
           - Sky
           - Path
         - Butte
         - Canyon

2. In this case, the Volcanic Rock is applied.

   ![Volcanic Rock applied]

iClone 7 User Manual - 740
3. Select the terrain in the **Scene Manager**, and switch the **Modify** panel to the **Material** tab.

4. Select one of the materials that contains the texture map you want to replace from the material list.
You may also press down the **Picker** button and then click on the terrain to retrieve the target material.

5. The three textures in the material will be retrieved and display in the thumbnails in the **Texture Settings** section.

6. The areas affected by this material are defined in the mask image as shown below.

7. Double click on the **Diffuse** channel and load another image to replace the original one.
8. The lava area turns to water.

9. Repeat the same steps to the bank areas.

10. Replace the texture to create foam and sprays.

11. By adjusting the parameters in the Adjust Color section, you are able to re-define the texture color to change the season of the terrain. A volcano rocky land can turn into a meadow.
Replacing Material with Material Presets

If you want to replace one of the four materials, then please follow the steps below:

1. Load a **Height Map Terrain** template from the **Content Manager > Set tab > Terrain library > Height Map Large** library as a base.

2. In this case, the **Volcanic Rock** is applied.
3. Select the terrain in the Scene Manager, and switch the Modify panel to the Material tab.

4. Select one of the material of which the texture you want to replace from the material list.
You may also press down the **Picker** button and then click on the terrain to retrieve the target material.

5. Go to the **Content Manager** >> **Media** tab >> **Material** library.

6. Drag and drop the template onto the scene to replace the material selected in step 4.
If you have prepared custom material templates in other folders, then you are able to drag and drop them from your folder into the iClone 3D viewer.

7. The currently selected material will be replaced.

8. Repeat step 4 to 5 to replace the four materials of the terrain.

Note:

- Each material template from the iClone Material Library includes Color Settings, Texture Channels, and pre-defined UV Tiling values. Please refer to the Loading and Saving Materials section for more information.
- Therefore, you may need to manually adjust the UV settings of the textures in the material to get the best result.
Creating Custom Height Map Mask

In theory, a **Height Map Terrain** is composed of one terrain mesh covered with up to 4 materials. The distribution for the materials are determined by a **Height Map Mask** image file in PNG format, also known as **Detailmap** in **Earth Sculptor**. Although the mask is an image, you cannot open it in an image editor to adjust the distributions. You must use **Earth Sculptor** to edit or generate the mask image instead.

The Basic Concept of Detailmap

When you decide to cover your terrain with Detailmap, you may assume that there are two invisible image plans hanging above the terrain mesh, one is the texture image and the other is the mask plane.

When you paint on the terrain mesh, you are actually modifying the mask plane so the texture plane may project texture accordingly onto the terrain.

Note:

The mask plane for the first channel is off by default. Therefore, if you load a texture image for the first channel, the texture will always cover the entire terrain.
Creating a Material Mask in Earth Sculptor

1. In Earth Sculptor, create a new terrain.

2. In the Main Menu, execute the Import >> Heightmap Image command and load a grayscale image.

3. Press down the Detail button in the Toolbar. Detail panel shows.

4. Click the Set Detail Texture button. Locate a desired image (TGA, DDS, PNG or BMP) and click the Open button to load the image to replace the original one (check board).

   - For channel 1, the target image tiles the entire terrain as soon as it is loaded since the mask is off.
For channel 2, 3 and 4, the target images are masked out. You must paint on the terrain to modify the masks to determine the distributions of the textures.

After painting for the 4 materials, you will get a terrain with detailed textures.

Note:

Please note that the change of Scale value for tiling the texture in Earth Sculptor does not affect the real UV Tiling results in iClone.
Obtaining Height Map and Material Mask Images for iClone

Finding Required Images in Earth Sculptor
After you have created a new terrain with 4 materials as described in the previous section, you may then import the Height Map and Mask images to iClone, in order to create your custom height map terrain.

1. Take the terrain created above as an example (in Earth Sculptor).

2. Save the terrain as *.map file (Earth Sculptor project file).
3. Execute the Utility >> Explore command from the main menu.

4. A system explorer will open the folder where you save the project. You will see several images inside of it.

- *.map: The Earth Sculptor project file.
- *.png: The Height Map image for creating the landforms.
- *.c.png: The color layer image that overlapping on the terrain.
- *.d.png: The Detailmap (Height Map Mask) image file.
- *.l.png: The light map image for simulating the light and shadow effects.

* Please note that only the *.png and *.d.png are necessary for creating a custom height map terrain in iClone.
Loading Height Map and Mask Images in iClone

1. Load a Height Map Terrain template from the Content Manager >> Set tab >> Terrain library >> Height Map_Large library as a base.

2. In this case, the **Butte** is applied.

3. Select the terrain in the Scene Manager, and switch to its attribute tab in the Modify panel.
4. Double click on the **Height Map** channel and replace the original image with the *.png* (for generating landforms) as described above.

5. Double click on the **Mask** channel and replace the original image with the *_.png* as described above.

**Note:**

- The material that is applied to a specific color area defined in the original mask will be applied to the same color area defined in the loaded mask.

- It is not recommended to use an image editor to adjust the mask image map, as material distribution may not be accurate, and may not reflect the smooth blending between textures.

**Re-arranging Materials**

If you are not satisfied with the material results, you can manually adjust it further via the controllers in **iClone**.
1. Switch to the **Material** tab in the **Modify** panel.

2. Click the **Picker** button and click on the desired area for retrieving its corresponding material.

3. Click the **Save** button to save the material as a file.
4. Repeat the same steps to save the 4 materials.

5. Click on the **Picker** button again.
6. Click on the terrain to select a target area for changing material.

7. Click the **Load** button to load the desired material file saved in step 4.

8. Repeat the same steps to adjust and change the materials.
Tiling Cliffs on Height Map Terrain

After you have applied materials to a height map terrain, you may occasionally find texture stretching issues on the cliffs or the vertical surfaces as shown below:

This is because the texture of the material projects vertically from above the entire terrain and even if you adjust the UV tiling numbers, the stretching issue is still unable to be solved because these two settings only affect the tiling time on the UV plane.

Increasing UV numbers can not resolve the texture results on the vertical surfaces.
Tiling Texture on Cliffs

In order to solve this problem, **iClone** provides another parameter, \( W \) (in addition to the **UV** settings), which allows you to adjust the vertical tiling parameters.

1. Select the terrain in the **Scene Manager**. Switch to the **Material** tab in the **Modify** panel.

2. Click the **Picker** button and click on the desired area to retrieve the desired material.

3. The textures in this material will be put into different channels in the **Texture Settings** section.

4. Scroll to the **UV** section and increase the \( W \) value (in this case, 8) to tile more on the vertical surfaces.
Adding More Details to Terrain Material

A height map terrain contains up to 4 materials, and each material is composed of three channels of **Diffuse**, **Detail** and **Bump** texture images.

If you use only the **Diffuse** and **Bump** textures, the material sometimes presents a dull result. By using the **Detail** image, you can add more exquisite details to the material to make it more dramatic. You can also increase terrain material details for better close-up shots.

**Using Detail Channel**

1. Load a **Height Map Terrain** template from the **Content Manager** >> **Set** tab >> **Terrain** library >> **Height Map_Large** library.

   ![Content Manager](image)

   In this case, the **Canyon** is applied.
2. Select the terrain in the **Scene Manager**. Switch to the **Material** tab in the **Modify** panel.

3. Click the **Picker** button and click on the desired area to retrieve the corresponding material.

4. The textures in this material will be put into different channels in the **Texture Settings** section. Although the appearance may look good, you can make it better.

5. Double click on the **Detail** channel and load a detail image to blend more details onto the initial diffuse image to make the material more sophisticated.

Scroll to the **UV** section, individually adjust the **UV** settings (in this case, **150** and **190**) for the **Detail** channel to determine the tiling of the texture across the terrain.
Physics Settings for Height Map Terrain
Each height map terrain contains physics settings so that any physics objects will react naturally to it upon collision. This new enhancement can effectively improve wheel or track vehicles physics over terrain and display smooth moving results.

1. Load a Height Map Terrain template from the Content Manager >> Set tab >> Terrain library >> Height Map_Large library.

2. Apply a height map terrain to the scene.

3. Apply physics objects to the scene. In this case, the track is from the Physics Toolbox pack.
4. Select the terrain in the Scene Manager. Scroll to the Terrain Physics section under the Material tab in the Modify panel. Make sure the Enable Terrain Physics box is activated.

![Terrain Physics](image)

5. Start to simulate the animations of the physics prop by clicking the **Play** button.
6. If you find the prop swamped or becoming too sticky during the performance, then increase the **Collision Margin** value a little bit.

![Collision Margin = 0.01](image)

Collision Margin = 0.01

The meshes of the objects and the terrain are so close that they intersect occasionally, which causes the structure of the prop to jitter and fall apart.

![Collision Margin = 10](image)

Collision Margin = 10

Increase the **Collision Margin** value to slightly expel the prop from the surfaces of the terrain to prevent from intersection issues.

7. The values **Friction** determines the level of slip on the surface of the entire terrain. Set it close to 0 for an icy, glass or wet ground and to 100 for a muddy or rocky land.

![Friction = 0](image)

Friction = 0

An icy terrain causes the physics objects to proceed with mostly inertial force.

![Friction = 100](image)

Friction = 100

A rocky field causes physics objects stop sooner.

8. The **Elasticity** value determines the overall rebound power the terrain exerts to the physics props when the props hits it.

![Elasticity = 0](image)

Elasticity = 0

A rocky terrain should be given lower elasticity.

![Elasticity = 10](image)

Elasticity = 10

A grassy or cotton-like field might have higher elasticity to rebound physics objects.

**Note:**

- Please note that the Elasticity value of the physics props is also another factor for the bounciness. The bouncing reactions is the result of multiplying the **Elasticity** values from the terrain and the props.
- Please refer to the **The Properties of a Rigid Body** section for more information about the settings for the physics props.
Snap To or Follow Terrain

iClone allows you to drag and move actors or props along the terrain in three modes: Off, Snap to Terrain and Follow Terrain by clicking the Edit >> Terrain Snap command on the menu bar.

Drag and Drop a Prop to the Scene

**Off**

Off is the method to move objects without regarding the contours of the terrain. You can always move in any direction and the object will pass through the terrain as if it is not a solid object.

**Snap to Terrain**

When you drag an object to move along the terrain, the Move - Z data of the object will adjust automatically. This way the object’s pivot will always move up and down along the contours of the terrain. This method is unrealistic for vehicles such as cars or bikes.

**Follow Terrain**

When you move an object along the terrain, not only will the Move - Z data of the object be adjusted automatically, but the Rotate - X, Y, Z as well because iClone tries to match the angle of the object’s Z-axis to the Normal Directions of each face of the Terrain. This is the ideal method to use for all kinds of vehicles.
Create Your Own Terrain

Other than loading iClone terrain from the supplied templates, you can also load a large-sized 3D surface. In addition to that, you can also add any static 3D props and make them part of the terrain. Please note that if there is no terrain defined in the project, iClone takes the floor (Z axis = 0) as the default terrain.

Convert Props to Terrain

1. Go to Set tab >> Props library in the Content Manager
2. Apply the desired prop template to the project.
3. Right-click on this object and select Convert to Terrain.
The surface or prop then will be converted to the Terrain of the project.

How to Add a Terrain

1. In the Content Manager, go to the Set tab >> Terrain library and apply the desired terrain template into the 3D viewer as the base terrain.

Note:

You can also use the following steps to create your own detailed terrain.

2. Apply props that you intend to become part of the terrain from the Template or Custom library.

3. Right-click on the props individually and select Convert to Terrain from the right-click menu.
4. Click the Edit >> Terrain Snap on the menu bar, and check the Snap to Terrain or Follow Terrain option.
5. Use the move tool to move your actor or iProp over the terrain. Watch as it follows the contours of the terrain, including the bridge in the example below.

Select the prop for moving

Use the move tool to move it and it will follow and snap to the terrain
Turn Bounding Mesh On or Off

In the 3D world, each object has its own bounding mesh, which is basically a box that identifies the XYZ ranges of the object. You may decide to turn it on or off after you convert the object to become part of the terrain. Then you may move objects or plant vegetation over the mesh itself or the bounding mesh that surrounds it.

The Difference between On and Off

1. Access the Edit >> Terrain Snap command on the menu bar, and check the Snap to Terrain or Follow Terrain option.
2. Apply a prop (Pyramid) to the project. Right-click on it and select Convert to Terrain.
3. In the Scene Manager, pick the prop under the Terrain entry.
4. Go to the Terrain section of the Modify panel. Uncheck the Use Bounding Mesh box.
5. Apply another prop (Sphinx) and drag it across the terrain to see the result.
6. Check the Use Bounding Mesh box. Drag the prop across it again and see the different result.

Note:
To examine the bounding mesh of a prop before adding it to the Terrain, go to the Scene Manager and change the Render State setting from Normal to Bounding.

Why Turn Bounding Mesh On?

This feature is useful if you want to utilize the Follow Terrain or Snap to Terrain function in iClone. It can prevent your objects from twitching as they are crossing a complicated but small folds of terrain components.
Customize a Terrain with Collision Detection
If props are added, they can be made part of the terrain. If the prop is high enough, the actor will not be able to pass through it if the Collision setting is activated.

**Customize a Terrain with Collision Detection**
1. Select the prop, such as a wall, you want to be a block to hinder the moving object.
2. Check the Edit >> Prop Collision option on the main menu bar.
3. Right-click on the prop and select Convert to Terrain from the right-click menu.
4. Direct the moving object to try to move through the terrain wall.

![Image](image.png)

Click on the spot the arrow is indicating to set the destination the actor should walk to. The actor will try to bypass the wall as it detects the collision.

![Image](image.png)

The Prop Collision of the wall is Unchecked
The Prop Collision of the wall is Checked

**Note:**
- It is like adding a sensor in front of the Actors or iProps, iClone probes the distance that is blocked ahead of these two types of objects and determines whether to stop or bypass the object that is blocking it.
- The probe distance starts at the object’s pivot.
Water

iClone introduces the Water Prop. It is not a static prop but actually a floating one. With reflection and refraction characteristics, it presents realistic moving water in your scenes.

1. Go to the Set tab >> Water library in the Content Manager. Apply any template to the current project.
2. Select the water in the Scene Manager.
3. In the Basic Water Parameters section of the Modify panel, adjust the value to see the changes.
4. Press Play to see the result.

Before Water Applied

After Water Applied

For more information, please see:
- Basic Water Parameters - Color
- Basic Water Parameters - Wave
- 3 Types of Water
- Water edge Softness
- Underwater Fog
- Reflection
- Refraction
Basic Water Parameters - Color

Change the Color

The Initial Look of the Water.

1. Select the water in the Scene Manager.
2. In the Basic Water Parameters section of the Modify panel, click the color box to select the desired color.

In this example the Color changes to blue.

Note:

- Because the water reflects the color of the 2D Background, if you want to see the real color of the water, please change the 2D Background to pure black.
- The lower the Saturation and Luminosity of the color, the more realistic the water will look.

The blue water with an unrealistic high saturation and luminosity.
Basic Water Parameters - Wave
The wave of the water utilizes the Normal mapping technique so that the face count of the water remains minimum while the waves can still be extremely realistic.

Change the Wave
1. Please click the Launch button to start your favorite image editor to paint on the image. Remember to save the image after editing.

2. Go back to iClone, and you will see the result.

Note:
- You do not have to worry if you paint a color or a grayscale image because iClone automatically renders the image as a grayscale one.
- You may alternatively click the button to load an image to form the waves.
- Click the button to remove the wave style and click the button to save the style as an image file.
- It is highly recommended to wrap around the edges of the image to prevent sharp edge lines and provide a seamless flow.

Non-wrapping images will cause the water to look unrealistic.

Size and Strength
You may specify the density of the wave image in the water prop by setting the Size value. If you want to change the amplitude of the wave, adjust Strength.

Size = 5  Strength = 30
Size = 30  Strength = 30
Size = 30  Strength = 100
3 Types of Water

iClone enhances the water with video texture, you may access to the video based water library from the root gallery which shows the unparalleled visual quality.

1. Apply a water template from the Set tab >> Water library.
2. Select the water in the Scene Manager. There are two material channels included in the water modify panel.
3. You may change video diffuse and video normal to enhance the look of the water ripples.

iClone categorizes water into three types:

- **Water (Video Normal):** These default water templates consist of video normal in the bump channel to create most stunning water effects.
- **Still Normal (Image Normal):** The water templates with image normal in the bump channel where the UV moves itself to create the movement.
• **Video Diffuse (Video Diffuse and Video Normal):** Templates with video diffuse in the Diffuse channel and the video normal in the Bump channel. Video diffuse templates consist of Video Diffuse and Video Normal.

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**Video Diffuse and Video Normal**
The following video shows you the result when both channels’ video sources are combined to enhance the quality and complexity of the water.

**Video Diffuse with Video Normal**

**Video Diffuse - Quick Mode**
Video diffuse allows you to view the water even in the Quick Mode. This can be of benefit when using a low performance computer system or just to lower the strain on your computer.
1. Double-click on the **Diffuse Map** icon to open a file.
2. Choose a video to import.
3. Applying the video diffuse to the diffuse channel immediately enhances the realism of the water.

**Video Normal - High Real-time Rendering Mode**
Video normal allows you to view the water in **High** real-time rendering mode while editing in iClone.
1. Double-click on the **Bump Map** icon to open a video normal.
2. Applying the video normal increases the water ripples’ realism.

**Video Normal**

**Note:**
- You may need to adjust the color of the water to a brighter degree in order to see the diffuse channel of the image/video.
- If you change the water bump map channel to a video, the reflection of the prop offsets itself when adjusting **water strength**. We highly suggest you to use the **WaterNormal** videos in C:\Users\Public\Documents\Realusion\Shared Templates\Video\Water to get the best result.
Water Edge Softness
Water Edge Softness allows you to reduce the sharpness of the edge to contact surfaces.

1. Select a water from the Scene Manager
2. Under the water modify panel, go to the Advanced Water Parameters section.

3. Adjust the Edge Softness of the water. By adjusting this parameter you can turn sharp edges into soft edges.

Edge Softness: 10
Edge Softness: 80
Advanced Water Parameters - Underwater Fog
If you want to create a mysterious or eerie atmosphere for underwater scenes, you can turn on the Underwater Fog feature. Please see Basic Water Parameters - Color and Basic Water Parameters - Wave before this section.

Underwater Fog OFF

1. Go to the Modify panel and then scroll to the Advanced Water Parameters section.
2. Check the Underwater Fog box.
3. Click the color picker and select the desired fog color.
4. Enter a value for Start to specify where the Fog starts.
5. Specify the value for End to specify where the Fog ends.

Start = 0
End = 3500
Advanced Water Parameters - Reflection
You may want to change the way water reflects more of the surrounding environment to create a different look.

Reflection above the Water Surface
1. Go to the Advanced Water Parameters section in the Modify panel.
2. Scroll up to the Reflection parameters.
3. If you intend to modify the reflection strength above the water surface, drag the Above Surface Strength slider. The higher the value, the stronger the reflection shows on the water.
4. Increase the Blur value so the reflection becomes less clear.

Reflection under the Water Surface
You may follow the same steps as above to adjust the reflection under the water surface. This time use the Under Water Strength slider.

Note:
If you cannot see the result, try to adjust the Above Water Clarity slider since it can change the Transparency of the water, which weakens the effect of reflection.
Advanced Water Parameters - Refraction

In optics, refraction occurs when light waves travel from the water with a given refractive index into the air with another. iClone simulates these phenomena on the water surface.

Before we start this section, it is important to adjust the **Above Water Clarity** which specifies the purity of the water.

**The Above Water Clarity**

1. Go to the Modify panel. Scroll to the Advanced Water Parameters section.
2. Drag the **Above Water Clarity** slider. The higher the value is, the clearer the refraction becomes.

   ![Above Water Clarity = 30](image1)
   ![Above Water Clarity = 100](image2)

**Refraction above the Water Surface**

This parameter specifies how intense the refraction effect will be rendered when the camera is above water.

1. Go to the Modify panel and the Advanced Water Parameters section.
2. Scroll up to the Refraction parameters.
3. If you intend to modify the refraction strength above the water surface, drag the **Above Surface Strength** slider.
   - The higher the value is, the stronger the refraction shows when the camera is above the water.
4. Increase the **Blur** value so the refraction turns to be vaguer.

   ![Refraction = 0](image3)
   ![Refraction = 100](image4)
   ![Blur = 1](image5)

**Refraction under the Water Surface**

You may follow the same steps as above to adjust the refraction under the water surface. This time use the **Under Water Strength** slider.

   ![Refraction = 10](image6)
   ![Refraction = 100](image7)
   ![Blur = 2](image8)
3D LiveProp Animation

The LiveProps from iClone 2.x are converted into iProps with Perform animation clips embedded when you load them in iClone.

1. Switch to the Set tab in the Content Manager, and apply one of the templates from the Props >> 3D LiveProps library.
2. Right-click on the prop and select the animations from the Perform list.

Right-click on the LiveProp and select animation clips from the Perform list.
Please refer to the Speed, Loop and Blending section for more information.
**Interactive Props with LUA (iScript)**

*iClone* provides props with LUA script. After applying these props, you are able to control and record their animations with additional control panels. By adjusting the settings in the panel, the animations of these props can be recorded as clips for further editing.

If you have registered *iClone* on *Reallusion Official Web Site* then you can get a free bonus pack named *iC5_Bonus_content_collection.exe*. Download and install it and you can find the Props with LUA script in the Content Manager.

**Note:**

In order to control and record animations for these props, you need to first switch the Physics engine to Bullet Engine in the Project panel.
Animating Props of the Type

1. Apply one of the templates from the Props >> Outdoor library (in this case, the seesaw).

You will see the prop and the control panel of it.

Note:

In case you accidentally close the control panel, right click on the root node of this prop and select the Script > Control Menu from the right-click menu to bring it back on the screen.

2. Set the two values (1 for the red side and 3 for the blue side) to determine the weight for each side.

3. Hit the red button. iClone will instantly start recording the animation of the prop. You are able to click the red or blue button any time you want.

4. All the animations will be recorded as a clip in the Animation track of the props for play back.

Note:

If you do not want to create animations for the prop manually, you can activate the Auto box for automatically generating animations by its own.
Adding Characters

If you want to attach characters to the props of this type, you only need to use the feature provided by the LUA script to have the characters taking it.

1. Apply a character.

2. Right click on the prop and select the **Script > Select actor for Position A (or B)** from the right-click menu.

3. Click on the character you want to use, then the character will be automatically seated on the prop.

4. When the prop is animated, the character will move along with it.
Lighting

iClone provides you with four kinds of lights (Ambient Point Directional and Spotlight) for different purposes. You are allowed to set unlimited number of these lights in any project; however, having more lights in a scene can decrease the performance of your computer.

- The Comparison of Lights
- Increasing Light Contrast with Multiplier
- Manipulating the Directional Light
- Ambient Light
- Spotlight
- Point Light
- Saving Attached Lights
- Using Lighting Tool
  - Controlling Lights with Single Menu
## The Comparison of Lights

<table>
<thead>
<tr>
<th>Feature</th>
<th>Ambient Light</th>
<th>Point Light</th>
<th>Directional Light</th>
<th>Spotlight</th>
</tr>
</thead>
<tbody>
<tr>
<td>On/Off</td>
<td>Always On</td>
<td>Adjustable</td>
<td>Adjustable</td>
<td>Adjustable</td>
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<tr>
<td>Shadow</td>
<td>No Shadow</td>
<td>No Shadow</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>Shadow Range</td>
<td>Not Available</td>
<td>Available</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>Setting Keys</td>
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<td>Available</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>Picking</td>
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<td>Not Available</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>Intensity</td>
<td>Not Available</td>
<td>Available</td>
<td>Not Available</td>
<td>Available</td>
</tr>
<tr>
<td>Beam and Falloff</td>
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<td>Not Available</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>Look at Another Object</td>
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<td>Not Available</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>Link to Another Object</td>
<td>Not Available</td>
<td>Available</td>
<td>Available</td>
<td>Available</td>
</tr>
</tbody>
</table>
Increasing Light Contrast with Multiplier

In iClone, the strength of each light is specified by the color. When you want to increase the strength and contrast of the light, you may de-saturate the color of the light to make the entire scene lighter in color.

By using the Multiplier feature of the light, you are allowed to keep the original color of the light while increasing the global strength and contrast. This feature applies to Directional Lights, Spotlights, and Point Light. It provides room for an artist to turn ordinary animations into uniquely stylish ones.

Producing Lighting at Noon with the Multiplier

1. Prepare a project with a default light.

2. Select the light in the Scene Manager and go to the light modify panel.
3. Change the light color to light yellow.

4. Increase the light strength by adding values to the Multiplier.

Multiplier = 2.5
The light is brightened while the color of the light remains the same.

Note:
- If you use the color picker to try to increase the brightness of the light, then the result merely turns the entire scene pale; also the contrast will not increase.
Please refer to the Darkening the Shadow section for more information.

Multiplier, Spotlight and Point Light

With the same concept, you may use the Multiplier to highlight the light center cast by the spotlight or point light.

- **Spotlight**

  The spotlight effect is dramatized after the Multiplier is increased to 3.

- **Point Light**

  The point light effect is dramatized after the Multiplier is increased to 3.
**Ambient Light**

The **Ambient Light** is the light for giving an overall tone to the whole scene in *iClone*. Changing the color of the ambient light allows you to create atmosphere.

*iClone* provides only one ambient light with changeable color settings. You cannot set keys to it, but you can only set the light color to affect the whole project.

![Ambient Light Image]

Default Color of Ambient Light

1. Switch to the **Atmosphere** tab in the **Visual Settings** panel.
2. Click the color box in the **Ambient Light** section. Pick the desired color from the palette panel.

![Ambient Light Color Palette]

- If you want to turn the scene dark then pick **Black** or **Dark Gray** as the ambient light color.

- The **Ambient Light** is not selectable neither in the **Scene Manger** nor the **3D Viewer**.
- Please refer to the **Comparison of Lights** for more information about the **Ambient Light** characteristics.
- For more information about generating dynamic ambient light effect, please refer to the **Utilizing IBL Effect** section.

![Black and Red Ambient Light Images]
Manipulating the Directional Light

Change the Angle of Directional Lights

1. Select one of the directional lights you want to modify from the Scene Manager.
2. Select the Rotate Object tool from the Manipulation Tools group on the general toolbar.

3. You can then either adjust the angle of the directional light with two methods listed below:
   - If the Rotation Gizmo is shown, then drag the Red Green Blue circles or the entire gizmo sphere to rotate the directional light.

   ![Red Green Blue circles](image1)

   ![Entire gizmo sphere](image2)

   - If the Rotation Gizmo is hidden, then drag the left, right, or both mouse buttons to adjust the longitudinal / latitudinal degree of the directional light.

   ![Left mouse button](image3)

   ![Right mouse button](image4)

   Drag the left mouse button (directional light rotates horizontally)

   Drag the right mouse button (directional light rotates vertically)
Spotlight

The Spotlight allows you to choose specific objects to light in your project. You may adjust the parameters of it, link it to a target or even have it to look at another entity.

- Intensity, Beam and Falloff
- Link for a Spotlight
- Spotlight - Look At
Intensity, Beam and Falloff

iClone provides you with adjustable parameters for the Spotlight to generate different types of spotlights. By changing these values, you may create various effects and styles. You may even change the settings on the timeline to set keys (Shadow and Decay boxes are excluded) and produce light animation effects.

Intensity

In the Intensity section, you may define the end of the light by adjusting the Range slider. Thus, objects out of the range may not be affected by the spotlight. This may not be true in the real world but it is very useful in the 3D world.

1. Drag the slider to 470 to extend the distance of the light effect.

![Intensity Extending Example](image1)

2. Drag the slider to 250 to limit the range of the light.

![Intensity Limiting Example](image2)

Usually, you will turn on Decay to have the spotlight strength decrease gradually from the light source at the end of the Range. This prevents a sharp ending edge as shown in the illustrations.

![Intensity with Decay Off](image3)

Range = 470
Decay = OFF

![Intensity with Decay On](image4)

Range = 470
Decay = ON
**Beam**

The style of the spotlight Beam can be customized by changing the **Angle** and **Falloff** values of the spotlight. The beam generated from the light is in the form of a cone, like you would get from a flashlight. The bottom circle size of the cone is decided by the Angle slider.

1. Drag the **Angle** slider to 30.

![Angle = 30](image1)

2. Drag the **Angle** slider to 80.

![Angle = 80](image2)

**Falloff**

If you feel the beam is too sharp, you may blur the edge of the light beam by adjusting the **Falloff** slider.

![Falloff = 15](image3)

![Falloff = 99](image4)
Link for a Spotlight

If you want to create a light, such as a flashlight, which is being held by an actor, you do not have to adjust the transform data key after key as the actor moves away. All you need to do is link the spotlight to the flashlight in the actor’s hand.

1. Click the Create >> Light >> Spotlight command on the main menu bar to add a spotlight.
2. Select the Spotlight in the Scene Manager to invoke the light modify panel.
3. Go to the Linkage section and click the Pick Parent button.
4. Click on the target object you want the spotlight to link to.

5. Move the parent of the Spotlight to view the result.
**Spotlight - Look At**

When you want to shine a spotlight on a target object, you may use the **Look At** feature.

1. Click the **Create >> Light >> Spotlight** command on the menu bar to add a spotlight.
2. Select the **Spotlight** in the **Scene Manager** to invoke the light modify panel.
3. Go to the **Look At** section and click the **Pick Target** button.
4. In the 3D viewer, click on a target.
5. Move the target object to see the result.

The spotlight rotates and follows the moving actor.

**Note:**

You may also have the spotlight **Look At** the target object over a certain period of time, and have it be **Set Free** outside the time range.
Point Light

The Point Light is used to light up a partial scene. The light of it goes to all directions from a single centre. With this type of light you can simulate torches, candles or light bulbs. Note that in iClone, point lights do not produce any shadow effects on any objects.

- Range of Point Light
- Utilizing Point Light
Range and Decay of Point Lights

The effect of a point light is relatively simple since you only need to adjust the Range and Decay parameters.

**Range** The radius of the point light. Since the point light sends light in all directions, all objects in this range can receive light.

<table>
<thead>
<tr>
<th>Range</th>
<th>Decay</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>Off</td>
<td>Range = 40, Decay = Off</td>
</tr>
<tr>
<td>130</td>
<td></td>
<td>Range = 130</td>
</tr>
</tbody>
</table>

**Decay** Check the Decay box to have the light strength decrease gradually from the light source to the end of the Range.

<table>
<thead>
<tr>
<th>Range</th>
<th>Decay</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>Off</td>
<td>Range = 200, Decay = Off</td>
</tr>
<tr>
<td>200</td>
<td>ON</td>
<td>Range = 200, Decay = ON</td>
</tr>
</tbody>
</table>
Utilizing Point Lights

In the following example, the candle flame is actually a prop mapped with a glow texture; it does not give off real light at all. We will locate a Point Light at the same place as the prop to imitate the candlelight.

The original appearance of the project

1. Click the Create >> Light >> Point Light command on the main menu bar to add a point light.
2. Select the Point Light in the Scene Manger and move it in the 3D viewer to the correct position.
3. Go to the Light section in the Modify panel.
4. Change the color of the light.
5. Adjust the Range and/or Decay to specify the effect of the point light.
Using Aux Light Mode (New for v7.0)

The **Aux (Auxiliary) Light** is suitable for when the entire scene turns completely black because of the lighting sources of the scene comes entirely from emissive objects (**material glow, self-illumination, particle**).

Besides, if there are any light effects that will cause the performance downgraded and you want to authorize the project without any lighting source for best performance, then you can consider to use the **Aux light**.

Also, when the **GI** settings are prepared but the **GI Main Switch** needs to be turned off temporarily for better performance in order to edit animations:

- When turned on, the default directional light becomes the sole light source and all other lights become temporarily disabled.
- This feature only affects the view-port real-time rendering and not the final render for the **Image** or **Video**.

![No physical light in the scene](image1.png)

![The Aux Light is turned on](image2.png)
Using Light Tool

In the Light Tool library, you can find several props with lights attached. These lights operate via Lua scripting language which gives each light an individual control menu. You do not need to touch the Modify panel to adjust the basic settings for the light, such as the color or strength.

Using the Light Tool

1. Apply one of the props from the Light Tool library. A control menu for the attached light will shown at the top-right corner of the preview window.

Note:

A. **Close Panel** Click this button to close the control menu.
   To reopen the control menu, please right click on the prop and select the **Script >> Control Menu** command to open it.

B. **Flash On/Off** Click this button to turn the light flickering behavior on or off. You may determine the flickering pattern within the **Properties** panel.
C. **Properties**: Click this button to show the detailed properties such as the color of the light or the flickering pattern.

![Flash Setting](image)

- **Flash Setting**
  - The light automatically turns on and off in a constant frequency.
  - The light randomly turns on and off like a broken one.
  - The light randomly adjusts multiplier and intensity values to simulate a flickering fire lighting scenario.

D. **Dimmer**: Drag the knob on an orbit to increase or decrease the strength of the light.

E. **On / Off**: Click this knob to turn the light on or off.

2. Click the **Play** button to start playing the project.

3. When the project is playing, use the **Control Menu** to adjust the light.

4. The changing will be instantly recorded into the tracks of the **light** including the **Transform**, **Color**, **Multiplier** and **Parameter** tracks.

![Track View](image)

**Note:**

The color settings will be recorded into the **Color** track, while the other adjustments will be recorded as keys into the **Multiplier** track.

![Color Track](image)

The transformation of the light caused by the flashing pattern will be recorded into the **Transform** track.

![Transform Track](image)

5. Play back again to view the recorded result.

**Note:**

- If you are not satisfied with the result and you want to record again, then please right-click on the **light** and select the **Remove Object Animation** command to clear all the recorded keys to prevent keyframe mix-up. Keep in mind that this will remove all other animations you have applied to the prop however.
- Please also refer to the **Controlling Lights with Single Menu** section for more information.
Controlling Lights with Single Menu

In the Using Light Tool section, you are able to control one lighting prop with one control menu. If you apply more lighting tools, then there will be multiple control menu, which will pile up at the right side of the preview window, and you need to drag the vertical scroll bar to see each of them. By following the steps in this section, you can use only one control menu to control multiple lights.

Controlling Custom Lights with Single Control Menu

In this section, one embedded Light Tool prop is applied. The other custom lights will be controlled by the control menu of it.

1. Apply one of the prop from the Light Tool library. A control menu for the attached light will shown at the top-right corner of the preview window.

2. Apply another prepared prop.

3. Place four custom lights to the appropriate positions of the new added prop and attach them to the prop (or the sub-prop).

4. Select the custom lights (or their one-level-up parent) and then attach them to the Light Tool.
5. Adjust the controls on the control menu of the **Light Tool**. Every light in the scene will thus be controlled.

![Image of Light Tool control menu]

### Controlling Light Tool with Single Control Menu

If you have applied multiple **Light Tool** and you want to control them with one control menu, then you may follow the steps below:

1. Apply one of the prop from the **Light Tool** library. A control menu for the attached light will shown at the top-right corner of the preview window.

![Image of Light Tool control menu applied to a prop]

2. Duplicate this prop into multiple **Light Tool** (you will see multiple control menu shows as well).

![Image of multiple Light Tool control menus]

3. Select the duplicated props and attach them to the first applied **Light Tool**.

![Image of selecting and attaching props]

4. Adjust the controls on the control menu of the first **Light Tool**. Every duplicated light in the scene will thus be controlled.

![Image of adjusting control settings]
Saving Attached Lights

You can add an infinite number of lights in your scene. This allows for endless combinations of more detailed and complex lighting schemes, both for interior and exterior use. Moreover, you can be creative with developing your own lighting assets. Simply attach any light to your objects and start building your own custom light library for re-using them in different projects or sharing with others.

Saving Attached Lights
1. Prepare a prop.

2. Go to the Create >> Light menu and create light according to the type of the prop. In this case, the Spotlight is created.

3. Adjust the parameters of the light, including the transformation, strength, color and so on, in the Modify panel.

4. Right click on the light, execute the Attach command and then click on the prop to take it as the parent for the light to attach.
Transform the prop and the light will be transformed along the prop.

5. Make sure the prop is selected and click the **Add** button under the **Content Manager** to add the prop with the attached light into the **Prop** custom library.

**Note:**

Please note that you must switch the **Content Manager** to **Set** category before click the **Add** button.
Shadow

In iClone, all lights are capable of generating shadows except the Point Light, Image Base Lighting, and Ambient Light.

- Activate the Shadow option under the Shadow Map tab in the Visual Settings panel to set the shadow effect.

- More about Shadow
  - A realistic way to calculate the physical projections of shadows from the light source with the shadow map technology.
  - Casting shadows is from characters and props / scene.
  - A higher resolution shadow map is required if you wish all scene elements to cast shadows.
  - Shadows can only be projected on 3D objects but not on the virtual floor (X-Y plane).
  - Please refer to Shadow Option for more information.
Shadow Option

When you enable the **Shadow** option, you are using the so-called shadow map which covers all viewable parts of the scene, to globally calculate the shadow area for all objects that are able to cast a shadow.

Please note that the following parameters are global. You cannot assign different values for different lights in the project.

**Resolution**

- The values from the drop-down list decide the resolution of the shadow map (indicated by blue lines). The higher the value, the more detailed the shadows will be calculated and presented.
Shadow Opacity
- Adjust the **Opacity** value to define the transparency of the shadow. In general, stronger light (especially directional lights) will cast higher opacity shadows.

Opacity = 20

Opacity = 100

Soft Shadow
- Check the **Soft Shadow** box to enable this feature. Adjust the **Performance/Quality** slider to define the edge softness of shadows.

Soft Shadow = 1

Soft Shadow = 3

Shadow Bias Adjustment
- This function helps to correct some shadow displacement errors caused by extreme shadow angles.

Bias = 0

Bias = -3

Shadow Range
If your scene is very wide and you want to use low-resolution shadow map for reducing the system strain, then the shadows can be of low-quality and jagged; because, by default, the **Shadow Range** is set to **Auto**, which applies the low resolution shadow map to the entire scene.

In the following example, the shadow map is shown with a blue grid for better observation.

Resolution = 512 x 512
Shadow Range = **Auto**

All shadows in the scene are jaggy.

You may decrease the range in order to apply the shadow map to a larger area than the camera view instead of the entire scene in order to reduce issues of jagged shadow edges.
1. Switch to the **Visual Settings** >> **Shadow Map** tab, in the **Shadow Range** section, choose the **Manual** radio button.

![Visual Settings - Shadow Map](image1.png)

2. Decrease the value of the slider to shrink the size of the shadow map until you are satisfied with the shadow result.

![Shadow Range Comparison](image2.png)

**Note:**
You may also combine the high-resolution shadow maps with this skill to get an exquisite shadow result.

**Focus Near Area (Directional Light Only)**

The **Focus Near Area** can dynamically adjust the details and quality of all shadows according to the object distance from the camera. The variation becomes even more dramatic as the **Focus Near Area** value increases. Hence, you may increase the shadow details of the objects near the camera, with the trade-off of decreasing the clarity of the shadows cast from the objects that are far away.

![Focus Near Area Comparison](image3.png)
Darkening Shadows (New for V7.0)

The Darken Shadow feature is involved with three control sliders: Strength, Global Darkness Multiplier and Darkness for each light.

Both the Global Darkness Multiplier and the Darkness sliders isolate shadow darkness adjustments from the shadow Strength slider.

- **Strength**: The true shadow generated in accordance with the shape of the object, the light strength and the angle of the camera. It is a legacy setting from iClone 6.

- **Global Darkness Multiplier**: The global shadows darkness strength for the entire project.
- **Darkness** for each light: The individual shadow darkness strength for individual lights. When the **Global Darkness Multiplier** is set to 0 for the project, adjusting the **Darkness** parameter on individual lights will have no effect, and vice versa.
Shadow Catcher in Default Project (New for V7.0)

In **iClone 7**, each embedded default project contains an invisible shadow catcher. It can be used to blend in with the background image. A shadow catcher prop can be used to save the time it takes to create a shadow receiving floor plane.

To show or hide the dummy object, you can press **Ctrl+D** or toggle the visibility via **Project Settings** panel > Display section > Dummy Object check box.
Casting Shadow on Invisible Mesh Plane (New for V7.0)

In this section, you will learn how to create a custom shadow catcher by using a hidden prop from rendering but still receive shadows for compositing. It also fixes an issue with iClone 6’s floor-less environment not receiving cast shadows. By using this feature, you can cast shadow on any invisible mesh regardless of its shape.

1. Make sure the camera angle matches those of the background image or video.
2. Select or create a floor plane that will be used to receive cast shadows.
3. Under Modify > Prop > Set as Dummy, select Normal from the drop-down list.
4. Activate the Matte Shadow check box; the plane will turn hidden from view but still receive cast shadows.
5. Show / Hide the dummy object by pressing Ctrl+D.
Shadows and Transparent Props

The shadows for props with **Opacity** map can be individually set in the **Modify** panel. If the opacity texture is grayscale, then you can decide the look of the shadow according to the object’s **Opacity** image.

[iClone](#) provides **Alpha Threshold** and **Shadow Threshold** settings for adjusting the shadows of props with opacity maps.
Shadow Threshold and Shadows

The **Shadow Threshold** deals with only the shadow of the prop mapped with **Opacity** texture. The pixels in the opacity texture will be detected if their grayscale values fall within the threshold or not. The part of the surface mapped with the pixels will thus be shown or hidden. The higher the threshold is, the fewer shadows are cast. Please note that this method keeps the appearance of the prop.

In addition to the props with **Opacity** map, by adjusting the value of **Shadow Threshold**, you can make the shadow of the hair more exquisite without doing any modification to the hair.

Alpha Threshold and Shadows

**Alpha Threshold** turns the opacity texture into binary format to change the appearance of the prop and its shadow. Any part of the object mapping with pixels that reach the **Alpha Threshold** will be displayed. The rest part of the prop will appear invisible.

You can also use the **Alpha Threshold** to trim the hair even better. The shadow will also be adjusted when the hair is modified.
**Alpha Threshold**

*iClone* provides **Alpha Threshold** settings for objects with **Opacity** textures. When you apply a grayscale image to the opacity channel, you may encounter some issues with earlier version of *iClone*. However, with the **Alpha Threshold** setting, these artifacts can be removed.

The artifacts caused by grayscale opacity texture

**Alpha Threshold** uses the opacity texture to trim props. Shadows will then be altered as the prop changes look. Although the shadow result may look the same as the **Shadow Threshold** does, the prop appearance will actually be different.

![Material Settings](image)

The benefits of using the **Alpha Threshold** feature are:

- Increasing real-time speed and performances
- Fixing undesired edge lines from objects
- Removing illogical outlines from character's hair

**Increasing Real-time Speed and Performances**

- If you apply an grayscale image for the **Opacity** channel to create a transparent prop, then the program always calculates the transparent, the semi-transparent and the opaque areas.

![Gradient opacity image](image)

**Alpha Threshold = Off**

- If the prop contains no semi-transparent part, such as a chicken wire or fence, then you can enable the **Alpha Threshold** and adjust the value to skip calculating the semi-transparent parts.
Black and white opacity image

**Alpha Threshold = On**

- This method increases the playback speed and performance.

**Fixing Undesired Edge Lines from Objects**

- When you use the **Opacity** channel to produce a partial transparent object, then you may find edges around the object.

**Alpha Threshold = Off**

- By activating the **Alpha Threshold** setting and adjust the slider, you may then eliminate these annoying edges.

**Alpha Threshold = On**

**Correcting Character's Hair for Toon Shader, and NPR Post Effect**

- Each character's hair contains **Opacity** textures, which may cause incorrect **Toon Shader** or **NPR** results. By activating the **Alpha Threshold** box of the hair, the visual artifacts can be removed.

**Alpha Threshold = Off**

**Alpha Threshold = On**
Using Shadow Casters (New for V7.0)

Emissive lighting (Material Glow / Self Illumination and Particle effects) along with point lights do not cast shadows. Now you can pair up Shadow Caster with these types of shadowless lighting to better their authenticity.

**Directional Shadow effect**

**Spot Shadow effect**

**Directional Shadow & Spot Shadow Comparison**
Creating Shadow Caster
You can create two types of shadow caster from Create menu > Shadow Caster > Directional Shadow or Spot Shadow.

After the shadow caster is created, you can see the aster under the Light group in the Scene Manager.

Note:
Both the Directional Shadow and SpotShadow nodes contain Darkness slider to increase the intensity of its cast shadows.
Utilizing IBL Effect

The IBL (Image Based Lighting) feature simply uses image map to simulate the ambient light source which gives higher realism but save lighting computing efforts, and also increases the flexibility to create base ambience.

Apply one of the templates from the atmosphere library to see the optimized result of IBL effect.

Dusk       Midday

Dawn       Horror

The Concept of IBL

The image applied for the IBL is mapped onto an invisible sphere and projected from the sphere’s surface towards the center of the sphere.

The benefits of IBL are:

- The ambient color can have various details rather than just one.
- You can set keys to the IBL sphere, which compensates for the insufficiency of ambient lights.
- Multiple point light effects can be generated by merely adjusting the source image.
- If you use a video, the ambient light can be dynamic.
The User Interface Introduction of IBL (New for V7.0)
1. **IBL Images**
   - **Activate IBL** Under normal circumstances, PBR should use IBL (EXR or HDR formats are recommended for optimal results).
   - **GI Indirect Light** Activate this box in order that the IBL lights can bounce between different surfaces in the projects when the GI effect is turned on.
   - **IBL Image** This is where you load the HDR image; we recommend .hdr or .exr formats. You can directly drag in a .hdr or .exr image to this area to change the IBL image. Using other aforementioned formats such as .jpg or .png can create undesirable results.
   - **Baking IBL with Initial Source** Activate this box to use the loaded IBL image for HDRI baking.
   - **Use sRGB** If you are using HDR or EXR formats, do not check this box because the these formats are in linear color-space.
   - **Add New IBL Clip** Use this to insert a new IBL image clip at the current frame in the timeline. Every IBL clip has one IBL image and a blend region at the head of the clip that can be adjusted in the timeline track.

2. **Sky Settings**
   - **Visualize Sky** These two buttons are used to show / hide the Sky entity.
   - **Sync Sky** By activating the Image and Rotation boxes, you are able to synchronously adjust the IBL and Sky image or angle.
   - **Sky Softness** This slider can blur the Sky while keep the diffuse image of the sky untouched.
   - **Sky Setting** Click this button to open the Modify panel > Sky section for further adjustments.

3. **Baking IBL**
   - **Bake Image Size** Set the desired resolution for the image after baking.
   - **Auto Load HDR** Activate this box to automatically load the baked IBL images once it has finished calculating.
   - **Bake IBL** Bakes an HDR image in .hdr format from the pivot of the selected object in the scene.

4. **IBL Transformation**

   ![IBL Transform](image)

   - **Rotate IBL** Click this button to toggle the IBL rotation gizmo On / Off, the keyboard shortcut is Shift + I
   - **Transformation Field** In addition to use the gizmo for transforming the IBL sphere, you are able to use these fields to type the desired values.
   - **Reset** Click this button to retrieve the initial transformation values of the IBL sphere.
Generating Custom IBL by Replacing Source Images (New for V7.0)

Apply one of the templates from the atmosphere library to see the optimized result of IBL effect.

1. Turn off all the lights (directional, spotlight and point light) and darken the Ambient Color.

2. In the Visual Settings panel, switch to the Atmosphere tab. Scroll to the Image Based Lighting section and activate the IBL on option.

3. By default, an interior HDR image is loaded and the entire scene will be lighted up.
This object reflects the light comes from the **IBL** sphere, which is currently invisible.

4. You are allowed to replace the image with custom images.

The light from the IBL will instantly change.

**Note:**

The methods of loading custom **IBL** image:

- Double click on the image channel and load a custom image.
- Drag and drop the custom image onto the channel.
- Select the channel and click the **Load** button to load the custom image.

The supported file formats are:

Editing Image for IBL

Editing with External Image Editor
The illustration below is a scene in which all the lights are out.

1. Click the **Launch** button to invoke the external image editor.
2. Modify the image. If you are a beginner, it is recommended to set the image black first.

3. Save the image and switch back to **iClone**.

4. Repeat steps 2 and 3 until you are satisfied with the result.

Note:
- Blur the source image to eliminate sharp edges for best results.
- Since **IBL** does not cause any shadows, please use directional light or spotlight to create shadows.
- You may set **Transform** keys for the **IBL** sphere to adjust the location, angle and size of the light source.
Editing with Color Adjustment Panel

By modifying the color settings of the IBL image with the Color Adjustment panel, you may quickly change the tone of the scene.

1. Apply an IBL image. (you may use custom image or apply from the template library)

2. Click the Adjust Color button under the IBL image to open the Color Adjustment panel.
3. Drag the sliders in the panel to change the entire tone of the image.

Note: Please note that if the IBL image is in HDR or EXR formats, then the adjustable sliders will be limited as shown in the illustration above.

4. Adjust the parameters in the Color Level and Color Balance sections.
**Editing with Softness Parameter**

The image applied for IBL may be too sharp, especially when you are using HDR or EXR images, which can cause the IBL to look like it is projecting textures onto objects. *iClone* provides a softness feature to help you blur the image to generate a proper IBL effect.

The illustration below is a project without any lighting sources.

The images in the left cell of the table below is the same project applied with IBL image in HDR format while the right one is the result when the *Softness* of the image is increased.

<table>
<thead>
<tr>
<th>IBL image (HDR image) applied</th>
<th>Soften the map to make it more natural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Softness = 0</td>
<td>Softness = 15</td>
</tr>
</tbody>
</table>
**IBL and Sky**

In iClone, the **IBL** and **Sky** are two individual sphere. The **IBL** sphere is invisible but emits lights inward sampled from a mapped image; the **Sky** sphere, however, displays the image mapped on it but gives off no lighting.

- **A Sky Sphere** - It is used to create surrounding background with environmental textures.
- **B IBL Sphere** - It is used as light sources with HDR or EXR textures.

Their source images can be identical or totally different in accordance with the scenarios.

The **Sky** and **IBL** spheres are separately mapped with different textures. The lighting is different from the background. However, you are able to adjust certain characteristics of the **IBL** and **Sky** at the same time.
Quickly Open IBL and Sky Panels

New fast Show / Hide UI letting one modify IBL and Sky settings more conveniently and quickly. One can quickly open the Sky Panel under Visual > Image Based Lighting > Sky setting. After picking the sky, one can quickly open the IBL panel under Modify > Sky > Image Based Lighting setting. The following hotkeys are also available for your convenience:

- Click the Sky Setting button in the Visual panel > Image Based Lighting section will open the Modify panel > Sky section.
- Click the Image Base Lighting Setting button in the Modify panel > Sky section will open the Visual panel > Image Base Lighting section.
Adjusting Sky Settings in IBL Section (New for V7.0)

Instead of switching back and forth between the IBL and Sky panels for setting their parameters, you can simply adjust some of the sky settings within the IBL section. Besides, synchronizingly adjusting the IBL and Sky settings can help you to save times from setting them respectively.

Adjust Sky Settings in Image Based Lighting Section

**Sky Softness**

You can quickly blur the sky, with performance vastly improved, allowing for real-time adjustment of **Sky Softness** in order that the blurry sky simulates the DOF effect to stand out the main object in the scene and create spatial feelings.

**Sky Softness** can be adjusted in the following two places:

- **Visual panel > Image Based Lighting section > Sync Sky group > Sky Softness slider**
- **Pick the Sky and perform Modify panel > Material tab > Texture Setting section > Softness Slider.**

You can clearly observe the viewport differences before and after the **Sky Softness** is increased.

Note:

- When adjusting **Softness** IBL / Sky Diffuse texture source maps will not change. Only the **Viewport** visual results will be adjusted (IBL and PBR shader details are not affected).
- Once the adjustments are done, you can load different IBL / Sky Diffuse textures without losing the blurry effect. Basically, the **Sky Softness** value does not really change the loaded image resolution but only the render results.
Show and Hide the Sky

You can adjust the convenient Show / Hide Sky settings of the IBL under Visual panel > Image Based Lighting section > Visible Sky options. It is useful when you want to focus on specific objects without being visually intervened by the sky.
Sync to Sky (New for V7.0)

If you want to link Sky with IBL image settings then use the new Sync Sky feature.

In order to use Sync Sky, there must be a Sky in the scene. Sync Sky can be used to impart IBL Rotate and image data to Sky.

When Sync Image is activated, any changes made to the IBL Image will be reflected on the Sky, this way IBL and Sky can match.
**Sync Rotate** will let **IBL Rotation** influence the **Sky**. Hold **Shift+I** keys to show and use the rotation gizmo.

Deactivate the **Sync Sky > Image** to only adjust the **Sky** image to select the desired texture.

Deactivate the **Sync Sky > Rotate** to keep the current orientation of the **Sky** and independently adjust the rotation of the **IBL**.
Turning on Image Base Lighting for PBR (New for v7.0)

The PBR materials basically behave like the material in the real world. They absorb and reflect lights. Therefore, without lights, the PBR effect is not obvious.

In order to observe the PBR materials, you need to set lights. However, if you want to create a scenario that lights up the character from Omni-direction, then you have to add a lot of directional, point lights or spotlights around the character, which is tedious and time consuming.

The IBL (image base lighting) is a good solution because you only need one image to simulate the environment surrounding the character with lights. You are able to view the character from different perspectives for better observation with enough lights.

- The PBR materials without any light.

- The PBR materials reflect the lights (Self-cast shadows).

- The PBR materials reflect the IBL (No shadows).

- The PBR materials reflect both the light and IBL (PBR and shadows).

Note:

Please note that the IBL Sphere is invisible. You can only see it by means of the reflections on the PBR surfaces.

- Turn the Sky sphere on for better observation of the direction of the IBL (Sync Sky Image is ON).
**Baking IBL (New for V7.0)**

In iClone 7, you can use Bake IBL function to create a custom IBL image. Once the Bake IBL function is activated the current scene state will be used to create an accurate image of the current environment.

**Basic Concept**

For example, the following within the following project, the material ball situated in the middle does not reflect the two objects on its sides:

Once you the ball in the middle and clicks on Visual > Image Based Lighting > Bake IBL, the objects surrounding the picked ball will be included in the bake, while the object itself is excluded from the baked IBL image.

*If nothing in the scene is picked, then the pivot point from which the IBL is generated is set to world space origin (0,0,0)*

**Center Point for Baking IBL**

The center point of IBL baking is set to the pivot of the object that is picked in the scene.

*Be aware that the pivot of an object may not always align with the center of the manipulator gizmo.*

Take the environment (360 degree video) in the following video as an example:

- Pivot at the top of the scene:
Pivot at the center of the scene:

Pivot at the bottom of the scene:

Note:

Due to the pivot being on the surface of the floor, the bottom half of the baked IBL captures the environment map as it intersects through the floor. Different pivot positions will provide different viewpoints of the same scene:

Applications for Baking Indoor Environments

If the IBL image used does not derived from the surroundings of an indoor scene environment, then the lighting will not match the surrounding lighting conditions.
This is a perfect opportunity to take advantage of the Bake IBL function to create a custom IBL image suitable for the indoor environment (it is recommended to have Auto Load HDRI checked).

Once the IBL is baked, make sure to reset its transformations to match the scene environment.

**Original IBL vs Baked IBL Detailed Comparison**

Please check the links below to observe the differences:

- **Case 1**

- **Case 2**

- **Case 3**

**Maintaining Baked IBL Light Source**

Multiple IBL baking will have an additive effect on the previously baked IBL image.

If you want to keep using the same lighting source then it is best to specify a specific IBL for the baker to use as illumination.
Do this by activating **Baking IBL with Initial Source** (= Light Source for Bake IBL) and proceed to load an image.

Now every time the baker is used, it will sample from the same HDRI image for illumination rather than sourcing upon itself, thus avoiding the additive effect.

* Baking IBL with Initial Source is only used for baking IBL, not for the rendering of the 3D Viewport.
Important Notes for PBR Specular

PBR uses IBL for its Specular contribution, under the same IBL environment all specular highlights will match.

Given an HDR image as shown below:

The scene below uses an indoor HDRI which does not contain the objects in the scene. Specular highlights under this IBL do not match current state of the actual scene.

By baking an IBL from the scene, the objects and current state of the scene is included.

However, since every single object material is reading from the same IBL, all of the specular data is reused. Since all PBR specular is derived from the same IBL image, there is no avoidance of this issue. Just be aware of this issue and plan your IBL image and scene accordingly.
**Animated IBL with Keys (New for V7.0)**

**IBL Key** can open up many possibilities, depending on the type of project, one can use different IBL images to achieve better visual results.

1. Click on **Visual panel > Atmosphere tab > Image Based Lighting section > Add New IBL button** to create a new IBL clip.

2. Adding a new IBL clip will duplicate the previous IBL track.

**Note:**
- You may choose to replace the IBL for the clip by picking the desired track and then replacing the source HDRi.
- On the front of the IBL clip is a blending region that intersects with the previous IBL clip, usage of this blend region is the same as a Motion Clip.
Camera

iClone provides you **Multiple Camera System** with placement and easing movement control for you to view or shoot your film for different purposes.

- The Comparison of Cameras
- Creating and Manipulating Custom Camera
- Camera and the Mini viewport
- Locking Camera
- Smooth Camera Movement
- Multiple Camera Switcher
- Real Camera System
- Clipping Planes of the Camera
- DOF (Depth of Field)
- Camera - Look At
The Comparison of Cameras

The multiple camera system in iClone contains **Preview Camera** and **Custom Camera**

**Purpose**
- To provide basic operations on the 3D viewer.
- To observe scene and objects from different angle.
- To easily transform and move objects.
- Not adding camera keys to timeline

**Key Generating**
- You may access the **Preview Camera** and modify its parameter, but no key is set.
- Use **Preview Camera** for data preparation, object transform editing, tasks not involving in changing the final camera keys, or just for pre-viewing the project.

**Being Toggled by Camera Switcher to Shoot**
- You may select the **Preview** camera from the **Camera List** on the tool bar.
- Not Available

**Camera Selection Look At**
- Available

---

**Custom Cameras**
- To set camera keys for playback.
- To finely adjust in the **Timeline**
- To be switched among cameras in **Timeline**
- To be able to Link/Unlink or **Look At Set Free** in different point of time.
- A key in a particular frame can be changed or added as soon as the camera view is changed.

---

- Available.

- You may select the **Custom** camera from the **Camera List** on the tool bar.
- Available
- You must enable / disable the **Look At** feature manually, and it is added as **Look At** key in the **Timeline**
Creating and Manipulating Custom Camera

Every Custom Camera can be seen, selected and manipulated in the Preview Window in the same manner as with any other object. This allows you to easily locate or change the angle of a custom camera, set keys to it or even have it move along a path.

Creating a Custom Camera
1. In the Preview Window, pick a desired camera from the Camera List on the tool bar.

2. Create a custom camera through any of the following methods:
   - Access the Create >> Add Camera command on the menu bar.
   - Right-click on the 3D viewer and select Create >> Camera from the menu.
   - Apply a camera template from the Content Manager >> Stage tab >> Camera library.
3. iClone duplicates the status of the camera selected in step 1 to generate a custom camera. What you’re viewing through the Preview Window now is exactly what the custom camera would see.

Viewing the Custom Camera in Preview Window
1. In the Preview Window, use the Camera List to pick any camera other than the custom one you just created.

2. Zoom out the preview window and you may see the Gizmo of the custom camera.

Note:

Please also see:
- Camera - Look At
- Smooth Camera Movement
- Camera on Path and Look At Target
Camera and the Mini Viewport

In addition to the 3D Preview Window, you may sometimes need another viewport to see another view at the same time. iClone provides the Mini Viewport feature to display another mini window beside the main preview window, so that you may see two different views at the same time.

The Mini Viewport turns iClone into a professional photography and film studio. You may then use it to observe your subjects between preview and custom camera mode.

1. Prepare a project. Add a new custom camera and adjust its angle.

2. Press down the Show Mini Viewport button (Shortcut: F8) on the tool bar. The Mini View panel appears.

3. Click the camera selector so that the camera’s view shows on the mini viewport.

4. If you move the custom camera, then the view in the Mini Viewport will auto-update.

5. Press up the Show Mini Viewport button again to close the viewport.

Note:

- The Mini Viewport is always in Quick Mode, the Bump, Glow, Reflection, Refraction and HDR effects can not be shown on this viewport.
- Any material key animations do not take effect in the Mini Viewport.
- It is for displaying the 3D scene; you can not pick any target in this port.
Locking Camera

Whenever the position or animation of a custom camera is satisfying, you can Lock it so you will not select or move it accidentally (causing additional camera keys to be added) in the preview window. This allows you to see the camera for reference without the need to hide it via the Scene Manager.

It is recommended to use the Preview Camera when editing the project instead of using frozen cameras.

Lock Camera in Scene Manager
1. Create a custom camera. In the preview window, change to the Preview Camera.
2. Manipulate the preview camera until you see the custom camera created in step 1.
3. Optionally animate the camera. Select it when done.
4. In the Scene Manager, click the Lock icon of the camera.

The camera cannot be picked from within the preview window to prevent accidental transformation.

Note:
- The Lock feature only work on Custom Cameras.
- When you open a file in which the camera cannot be picked or transformed, please make sure it is not frozen.
Smooth Camera Movement

Since iClone interpolates between two keys (especially for the Transform keys) in a LINEAR algorithm so a camera's path may not be smooth enough. Using the Smooth Camera Movement feature will have iClone insert transform keys to make the camera move on a curve-like path.

Move Only
If you intend to pan the camera along a smooth trail without rotating its angle, it is highly recommended to utilize the Path feature.

1. Access the Create >> Create Path command on the menu bar to create a path.
2. Add a new camera and select it in the Scene Manager.
3. Jump to the start frame for panning the camera. Click the Pick Path button in the Path section of the Modify panel.
4. Jump to another time frame and pick another location of the path by setting Position keys in the Timeline.

Note:
Please refer to the Path section for more information.

Move and Rotate
If you assign the selected camera with Move and Rotate keys, the viewing result can be abrupt and sudden for the intermediate keys. iClone provides a Smooth Camera Movement feature to have the camera pan smoothly.

1. Set Transform and Rotate keys in different time frames for the selected camera.

2. Check the Edit >> Camera >> Smooth Movement command from the menu bar. iClone will calculate a proper path for the camera based on the position and the angle of the camera.

Note:
Perform steps 2 before step 1 will also have the same results.
Multiple Camera Switcher

In the multiple camera system of iClone, you may queue the camera to shoot the film as you are a real director. By assigning different camera names in the timeline, you may easily complete this technique.

1. Access the Create >> Add Camera command on the menu bar.
2. Select the desired camera from the Camera List on the tool bar.

3. Edit or add keys in different frame in the Timeline.
4. Repeat step 2 and 3 till you are satisfied with all the cameras' courses.
5. Click the Track Menu List button in the Timeline and open the Project >> Switcher track.
6. Right-click in different time frame, select a desired camera that you want to switch to in this time frame from the Camera List.
Real Camera System (New for V7.0)

iClone 7 comes with a new and improved camera that can mimic real world settings. Thus iClone 7 is increasingly compatible with mainstream 3D software in areas of video and cinematography.

- User Interface Introduction for Realistic Camera Settings
- Lens of Camera
- Camera Aperture, Focal Length, and Angle of View
- Film Back
- 3D Virtual Camera Matching
- Data for Export and Import
- Workflows for Exporting and Importing Camera
- Examples
User Interface Introduction for Realistic Camera Settings (New for V7.0)

The realistic camera features come in three main sections as show below.

A. iClone’s default settings are now exposed as a group of adjustable attributes.
   - **Fit Render Region**: The resolution fitting method of the camera (Horizontal for iClone 7 and Vertical for iClone 6).
   - **FOV Type**: The FOV fitting method of the camera (Horizontal for iClone 7 and Vertical for iClone 6). Adjust this to horizontal when exporting to industry standard 3D software.

B. The new **Angle of View** setting exposes a critical aspect of camera adjustments.
   - **Angle of View** is formulated from **Aperture** and **Focal Length** variables.
   - **Focal Length** is adjusted simultaneously with the **Angle of View**
- **Film Back** a drop-down list of camera settings. You can customize the default settings by editing: `Resource\ICCameraSection\FilmBackSetting.ini`

- **Camera Aperture** settings can be used to modify the camera body, or more specifically, the photo-sensitive capture plate. Use the radio buttons to the right to switch between units of measure affecting both **Width** and **Height** variables.

- **Film Aspect Ratio** in the **Camera Aperture** can be used to change the **Width** according to the measurement of the **Height**

- Please toggle on **Preference > Display > Show Camera Ratio** to view the relationship between **Aperture** and **Render Size** in the viewport.
Camera Focal Lens Function

The **Focal Lens** has a variable focal length so that **Camera Moves** can be made without actually moving the camera. You can modify the camera view using the lens function and the **Focal Lens** can be set as a key on the **Timeline**. You may then create fisheye or vertigo effects with this feature.

1. Go to the camera modify panel.
2. In the **Camera** section, click on one of the template buttons or drag the **Focal Lens** slider.

3. You can see different lens effect on the view port.

<table>
<thead>
<tr>
<th>Focal Length</th>
<th>View 1</th>
<th>View 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 mm</td>
<td><img src="image1" alt="Focal Lens = 80 mm" /></td>
<td><img src="image2" alt="Focal Lens = 80 mm" /></td>
</tr>
<tr>
<td>50 mm</td>
<td><img src="image3" alt="Focal Lens = 50 mm" /></td>
<td><img src="image4" alt="Focal Lens = 50 mm" /></td>
</tr>
<tr>
<td>35 mm</td>
<td><img src="image5" alt="Focal Lens = 35 mm" /></td>
<td><img src="image6" alt="Focal Lens = 35 mm" /></td>
</tr>
<tr>
<td>20 mm</td>
<td><img src="image7" alt="Focal Lens = 20 mm" /></td>
<td><img src="image8" alt="Focal Lens = 20 mm" /></td>
</tr>
</tbody>
</table>

**Note:**

- Please refer to the **Camera Aperture, Focal Lens and the Angle of View** section for more information about the relationships between them.
- You may set different **Focal Lens** keys in different time frames to create **Focal Lens** animation. Please read the **Lens Track** section for more information.
- Basically, the lower the value, the more of the scene can be seen. However it will be more distortion generated near the edge of the view.
Camera Aperture, Focal Length, and Angle of View (New for v7.0)

A camera can be thought of as having three main components: the body, lens, and the viewing area (a.k.a. viewing angle).

**Red: Lens or Focal Length**

- **Focal Length**
- **Angle of View**
- **Film Back:** Full-Frame
- **Camera Aperture:**
  - mm
  - inch
- **Width:** 36.000
- **Height:** 24.000
- **Film Aspect Ratio:** 1.50

**Green: Camera body or Camera Aperture**

- **Focal Length**
- **Angle of View**
- **Film Back:** Full-Frame
- **Camera Aperture:**
  - mm
  - inch
- **Width:** 36.000
- **Height:** 24.000
- **Film Aspect Ratio:** 1.50
Blue Viewing area or Angle of View

Note:
Please note that the Angle of View is formulated from the Camera Aperture and Focal Length attributes.

The Relationships between Camera Aperture, Focal Length and Angle of View

Adjusting the Camera Aperture (Width Height and Film Aspect Ratio) will influence the Angle of View but NOT the Focal Length. Think of it like someone switching out the camera body but re-using the same lens.

Adjusting the Focal Length will influence the Angle of View but NOT the Camera Aperture (Width Height and Film Aspect Ratio) settings. Think of it like someone switching out the lens on the same camera body.

Adjusting the Angle of View will influence the Focal Length but NOT the Camera Aperture (Width Height and Film Aspect Ratio) settings. iClone makes the assumption that when the user desires a different Angle of View, you just merely want to change out the lens.
Film Back (New for v7.0)
The **Film Back** is a drop-down list of camera settings; it contains all the film resolution of each frame and sensors specification of popular camera models nowadays.

Different camera has its unique settings, which causes different view sizes and lens.

You are allowed to customize the default settings by editing the camera-related ini file: `Resource\ICCameraSection\FilmBackSetting.ini`

<table>
<thead>
<tr>
<th>[FilmBack]</th>
<th>[Width]</th>
<th>[Height]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative - 35mm</td>
<td>22</td>
<td>16</td>
</tr>
<tr>
<td>Negative - super 35mm</td>
<td>24.89</td>
<td>18.66</td>
</tr>
<tr>
<td>Negative - super 16mm</td>
<td>12.52</td>
<td>7.41</td>
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<tr>
<td>ARRI - ALEXA</td>
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<td>ARRI - ALEXA XT</td>
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<td>Canon - EOS C500</td>
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<td>Red - Epic Dragon</td>
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<tr>
<td>Red - One MX</td>
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</tr>
<tr>
<td>Sony - F35</td>
<td>23.6</td>
<td>13.3</td>
</tr>
<tr>
<td>Sony - F5</td>
<td>22.6</td>
<td>12.7</td>
</tr>
<tr>
<td>Full-Frame</td>
<td>36.0</td>
<td>24.0</td>
</tr>
<tr>
<td>Max</td>
<td>78.409</td>
<td>52.629</td>
</tr>
</tbody>
</table>
Examples for a Fixed Camera but Different Film Back

- The fixed camera shooting the character

- Negative - 35mm

- ARRI - ALEXA 65

- Red - Epic Dragon
3D Virtual Camera Matching (New for v7.0)

The new adjustable FOV Type allows iClone camera settings to match that of other mainstream 3D software.

Matching FOV Type for iClone 6 Projects to 3D Software

In iClone 6, the default FOV and Fit Resolution settings are both Vertical; however, the FOV for some 3D software is, by default, set to Horizontal but Hidden. Therefore, the camera view in iClone does not match the one you see in these 3D tools because the \( (V, V) \) does not match the \( (V, H) \).

In iClone 7, set the FOV Type is set to Horizontal, the camera will match this hidden value in other 3D tools.

Check out the settings in Maya. It is a Vertical and a Hidden Horizontal values.

If you set the Fit Resolution in iClone 7 to Horizontal, then also adjust Fit Resolution value in other 3D tools to match the camera views.

Set the Fit Resolution to Horizontal as well in other 3D tools (in this case, Maya).
Data for Export and Import (New for v7.0)

Export and Import Related Data
- Sensor Size - Film Back Size / Camera Aperture
- Focal Length / Angle of View
- Animation (x, y, z rotation, translation)
- Near / Far Clip Plane
- Fit Resolution
Extra Data Only Brought in by Import
- Matchmove Data (playback time length, target track_video)
Workflows for Exporting Camera (New for v7.0)

Basic Concepts for Exporting Camera(s) from iClone

The default setting for FOV is set to Vertical in iClone 6, so please pay special attention while working with iClone 6 project files. The default setting for FOV is set to Horizontal in iClone 7, thus making it more of a standard in usage.

Note:

FOV refers to Field of View (the extent of the observable scene through the camera). Before exporting the camera makes sure Camera Setting > FOV Type is set to match the settings of the target software.

The following is a list of industry leading 3D software and their support for FBX Camera:

<table>
<thead>
<tr>
<th>Software</th>
<th>Fit. Resolution</th>
<th>FOV Type</th>
<th>Focal Length</th>
<th>Aperture Unit</th>
<th>Aperture Size</th>
<th>Clipping Plane Range</th>
<th>DOF</th>
<th>Transform</th>
<th>Constraint Animation</th>
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<tbody>
<tr>
<td>3ds Max</td>
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<td>Horizontal</td>
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<td>mm</td>
<td>V</td>
<td>V</td>
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<td>V</td>
</tr>
<tr>
<td>Maya</td>
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<td>Horizontal</td>
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<td>V</td>
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<td>X</td>
<td></td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Unreal</td>
<td>Cine Camera: Fit to Filmback Setting Game</td>
<td>Horizontal</td>
<td>V</td>
<td>Cine Camera: mm</td>
<td>Game Camera: X</td>
<td>X</td>
<td>X</td>
<td>V</td>
<td>V</td>
</tr>
</tbody>
</table>

Note:

- Camera export for Cinema 4D, Lightwave, Unity, and Unreal is still under development.
- **Unity Camera** should have a -90 in the Y rotation in order to achieve the correct transformation.

In order to be compatible with other tools and software FOV type settings, use **Menu > Modify > Convert Camera FOV** to match their settings. Changing camera FOV will also modify its framing, double check to make sure that the camera's viewing frame is still acceptable.

**Exporting Camera(s) from iClone**
1. Select the camera(s) in the scene for export.
2. Go to **Menu > File > Export > Export to Fbx...**
3. Adjust the export range then click on the Export button.
4. Select a directory to export the camera in FBX format.
Preparations in 3D Tools for Importing iClone Camera(s)

For Maya
Make sure the Preferences > Settings > Time in Maya is set to NTSC Field (60 fps).

For 3Ds Max
Set the Customize > Units Setup > Metric to Centimeters.
Then set the **System Unit Setup > 1 Unit = 1.0 (Centimeters)**

Also, set the **Time Configuration > Frame Rate > FPS to 60**
Workflows for Importing Camera (New for v7.0)

Importing Camera(s) into iClone via FBX

Go to Menu > Import > Import Camera. You will see the panel as shown below:

- In the following window prompt, you can set the Camera Scale in world-space if needed.
- All imported cameras are locked from user manipulation.
- You can not readjust the Import Camera settings once the camera is imported.

Note: Import Camera supports 2015 and prior versions of FBX.

Please check out the workflow animation for importing camera into iClone 7.
Examples (New for V7.0)
iClone Camera Exported to Maya and 3ds Max (3 environments in layered comparison)

Note:

Maya and 3Ds Max are using the default Shader.

Maya Camera Exported for iClone

The newly imported camera(s) will also bring along and create their time-line tracks:
Clipping Planes of the Camera

If your actor moves in a building, you may want to ignore the walls or furniture between the actor and the camera, you may use the Clipping Planes feature. By defining the range consists of Near and Far parameters, you may see the actors behind the wall or relieve the load of your system. This feature can not be set as a key in the Timeline.

Rule of Clipping-planes
The Clipping-Planes provide two parameters, Near and Far, to define the render range of a camera.

Setting the Near Clipping Plane Value
If your actor is indoor, the wall of the room will always hinder the view. You may use the Near Clipping Plane to filter out the objects within this distance.
1. Go to the camera modify panel.
2. In the Camera section, click the up arrow of the Near Clipping Plane.

Near Clipping Plane = 0
Near Clipping Plane = 40

Note:
- If you encounter Z-fighting situation (Two extremely close faces cause the flicking result), increase the Near Clipping Plane value by 1 or 2 may solve this problem.
- Clipping Planes affects only the rendering result instead of actually cutting any entity in the project.

Setting the Far Clipping Plane Value
If your Terrain is so wide that it is beyond the camera's rendering range, you may adjust this value to solve this issue.
1. Go to the camera modify panel.
2. In the Camera section, click the up arrow of the Far Clipping Plane.

Far Clipping Plane = 9999
Far Clipping Plane = 12000

Note:
- The Sky will always be shown without considering the value of the Far Clipping Plane.
- It is highly recommended to decrease this value if your scene is not so wide since increasing the Far Clipping Plane value can also increase the load of the system.
The Concept of DOF (New for v7.1)

DOF, also known as Depth of Field, adds extremely dramatic effects to the results. You can pick an object at a specific distance to be rendered clearer while all the others are blurred. The DOF can be set as a key on the Timeline to generate an even more stunning animation.

Please refer to the sections below for more information:

- The Concept of DOF
- The Introduction for DOF Related User Interface
- Setting Focus Distance
  - About Perfect Focus Range
- Enhancing Spatial Impression with Blur Effect
- Adjusting Blur Transition Regions
- Using Bokeh Effects
- Creating DOF Animation
- Fixing Visual Defects of Out-of-focus Objects
- Known Issues
The Concept of DOF (New for v7.1)

In iClone, the DOF can be defined by 5 zones as shown below:

- **Pure Red Zone**: The perfectly focused region. All objects in this region display clearly.
- **Pure Green Zone**: The out-of-focus region beyond the Red Zone. Objects in this region are blurry.
- **Pure Blue Zone**: The out-of-focus region between camera and the Red Zone. Objects in this region are blurry.
- **Violet Zone**: The region for the transition of blurriness between the Red and Blue Zones.
- **Orange Zone**: The region for transition of blurriness between the Red and Green Zones.

These zones are divided by four red frames in iClone illustrated below (these frames can only be seen from the side view of the camera whose DOF and View DOF Regions features are both activated).
If you want to observe with the **DOF Region** colors, then you must do it through the view of the camera whose **DOF** feature is turned on.

- **Pure Red Zone**: The perfectly focused region. All objects in this region display clearly.
- **Pure Green Zone**: The out-of-focus region beyond the **Red Zone**. Objects in this region are blurry.
- **Pure Blue Zone**: The out-of-focus region between camera and the **Red Zone**. Objects in this region are blurry.
- **Violet Zone**: The region for the transition of blurriness between the **Red and Blue Zones**.
- **Orange Zone**: The region for transition of blurriness between the **Red and Green Zones**.

**The DOF Result:**

Note:

Please keep in mind that unlike the camera in the real world, **DOF** in **iClone** is not generated by means of the camera lens.
The Introduction for DOF Related User Interface (New for v7.1)
Modify Panel

1 **Activate** Check this box to activate the DOF effect.

2 **Focus Settings**
   - **Pick Target** Push this button and click on the surface on the view port to determine the target mesh to be focused. It will automatically set the value of the **Focus Distance**.
   - **Focus Distance** You can use this value to fine-tune the focus distance to a part that can not be selected from the view port, such as the leaves of speed trees.
   - **Perfect Focus Range** Set a range that will be clearly focused. The value times two defines the perfect focus range. Every object within this range will be free of blurriness.

3 **Blur (De-focus) Settings** Use these sliders to determine the width of the near and far transition regions, and the blur levels for the completely defocused near and far regions.

4 **Blur Edge Sample Scale** This value is used to fixed some sharp-edge imperfection of the objects in the defocused or transition regions.

5 **Bokeh Type** This drop-down list can be used to determine the glowing shapes for the highlights in the blur or transition regions.

6 **View DOF Regions** Activate this checkbox in order to view the different regions in their representative colors.
Preference Panel

Open the Preference panel (Shortcut: Ctrl + P) in the Real-time Render Options section, you can find the DOF related settings. They are used to visibly render the DOF in the viewport. Please keep in mind that for exported media, the settings are always ON even if they are deactivated in the Preference panel.

1 Depth of Field: These two settings can have the most accurate DOF real-time render effect. However, they also consume a lot of system resources. You can consider turning them OFF for lower-end system devices because it will not influence the final rendered result (always ON).
   - Soften Edge: Activate this checkbox to have Blur Edge Sample Scale value (4th item in the previous table) take effect in the viewport.
   - Correct Transparency: Enable to correctly render out of focus objects behind semi-transparent materials.
Setting Focus Distance (New for v7.1)
The **Focus Distance** is the distance between the camera and the focused object. You can set the value by using the **Pick Target** feature or by entering a certain value.

**Note:**
The unit of the value for **Focus Distance** is cm (centimeter); and the default value is **1000** which is 10 meters.

**Picking the Target**
**Picking between multiple objects**

Hit the **Pick Target** button and click on the object you want to focus, the point on the surface you click will be used to measure the **Focus Distance** value.
Picking Certain Surface Point of One Large Object

With the Pick Target feature, you are able to set the focus on a certain surface point of a large object.

Because the DOF is now surface-based instead of pivot-based (traditional iClone method), any point on the mesh of an object can be picked as the focus center (FD in the illustration stands for Focus Distance).

Manually Setting Focus Distance

In addition to use Pick Target method to set the Focus Distance, you are allowed to manually type in a value. This helps you to set the distance especially when you want to focus on something that can not be picked, such as the leaves of speed trees.

1. Hit the Pick Target button and click on the stem or the root of the speed tree that you want to focus.
2. Manually adjust the Focus Distance value in order to focus on the leaves instead of the stem of the plant.
About Perfect Focus Range (New for v7.1)

The **Perfect Focus Range** is a region in which everything looks clear in the camera view.

You can set the width of the Perfect Focus Range in terms of distance (**centimeter**):

![Modify Depth of Field](image)

This value actually defines the far and near boundary distances offsetting from the focus center (defined by the **Focus Distance**). Therefore, the value times 2 is the real width of the range. In the illustration below, the **N** is the value we see on the Perfect Focus Range field.

![Perfect Focus Range illustration](image)
Through the camera with DOF on, the diagram looks like the illustration below:

Note:

The unit of the value for **Perfect Focus Range** is **centimeter**.
Enhancing Spatial Impression with Blur Effect
(New for v7.1)

In order to increase the spatial impression of your project like the photos taking in the real world, you can use the DOF effects. By adjusting the blurriness of different (far and near) regions, the impression can be enhanced drastically.

Given a project as shown below: the depth of the scene is not obvious due to the angle of the camera.

You can activate the DOF effect and set the Focus Distance with Pick Target or manually enter a value:

Setting Blur Strength
The Blur Strength can be used to increase or decrease the blurriness for the de-focused region.
1. Make sure the DOF effect is turned on as shown in the previous illustration.
2. Select the camera whose DOF is turned on. Open the Modify Panel
3. Scroll to the Depth of Field section; in the Blur Settings group, drag the Near Blur Strength slider around.

Because the Lock Near and Far Effect checkbox is activated, the Far Blur Strength is disabled and its value will be auto-set along with the value of Near Blur Strength.

4. If you want to respectively modify the blurriness for the near and far blur regions, then deactivate the Lock Near and Far Effect checkbox.

5. Respectively adjust the value for the Near Blur Strength and Far Blur Strength.

In this case, the Far Blur Strength is increased to make the object in this region more blurry while the Near Blur Strength is decreased to show the objects within this region more clearly.
**Adjusting Blur Transition Regions (New for v7.1)**

In iClone earlier version, the **DOF** has only three regions, the **Perfect Focus Region**, **Near Blur Region** and **Far Blur Region**. However, this design will cause sharp boundaries between the focus and out-of-focus regions.

In **iClone 7.1**, two new regions, **Near Transition Region** and **Far Transition Region**, are added to solve this issue.

Note:

The unit of the value for **Transition Regions** is **cm** (centimeter), and the default value is **200**.

**Setting Length of Transition Regions**

The **Transition Regions** can be used to increase or decrease the length of the regions from the perfect focus area to the completely blurry areas.

1. Make sure the **DOF** effect is turned on as shown in the previous illustration.
2. Select the camera whose **DOF** is turned on. Open the **Modify Panel**.
3. Scroll to the Depth of Field section; in the Blur Settings group, drag the Near Transition Region slider around.

Because the Lock Near and Far Effect box is activated, the Far Transition Region is disabled and its value will be auto-set along with the value of Near Transition Region.

4. The sharp boundaries between the perfect focused area and the completely blurry areas are eliminated.

Note:

If you want to separately modify the blurriness for the near and far blur regions, then deactivate the Lock Near and Far Effect box.
Using Bokeh Effects (New for v7.1)

Bokeh, in photography, can be defined as the way in which the lens renders out-of-focus points of light. In iClone, the DOF effect also provides the Bokeh feature with different shapes.

Using Bokeh Effect

1. Prepare a project in which the background contains highlights, mid-tones and dark areas.

2. Select a camera, open the Modify Panel and turn on the DOF effect.
3. Scroll to the **Depth of Field** section and choose a shape from the **Bokeh Type** drop-down list.

Different bokeh type can have different effects on the highlights in the blurry regions.

Note: The higher the blur strength is, the stronger and clearer the **Bokeh** shapes will become.
Creating DOF Animation (New for v7.1)
By setting DOF keys in different time frame, you can also create DOF animation in order to draw the audiences’ attention to follow certain objects in the scene.

Open the DOF track of the custom camera to set keys in order to generate DOF animation.

The results shown below:
Fixing Visual Defects of Out-of-focus Objects (New for v7.1)

Fixing Sharp Edges for Objects in Blur Region

When the DOF is turned on, there maybe some objects in the blurry regions that erroneously retain sharp edges.

1. Open the Preference panel.
2. In the Real-Time Render Options section, activate the Soften Edge checkbox in the Depth of Field group.

3. Make sure the camera is selected and open the Modify Panel.
4. In the **Depth of Field** section, increase the slider value for **Blur Edge Sample Scale**.

The sharp edges of the blurry object will also become blurry.
Fixing Blurriness behind Semi-transparent Object

When the blurry region falls behind any semi-transparent objects, the blurry effect will be turned off as shown below (the camera focus is set on the painting on the glass):

1. Open the Preference panel.
2. In the Real-Time Render Options section, activate the Correct Transparency box in the Depth of Field group.
3. The objects behind the semi-transparent objects correctly display the out-of-focus effect, as well as the transition regions effect.

Note:

- These two settings in the Preference panel only affect the real-time rendering result of the view port, for the final rendering, they are always activated.
- These features consume considerably more system resources.
Known Issues for DOF (New for v7.1)

Although **DOF** can increase the visual quality, however, there are still some known issues with the **DOF** effect.

**Highlight Flickering in View Port**

When the project is played, the objects with high reflectivity (**Roughness** image is close to **black**) will have flickering visual defects. Once **DOF** is enabled, the defects becomes even more serious.

**Solution for Final Rendering**

When you want to export image or video from the project of this kind, please apply **Super Sampling - 3x3** setting to decrease the flicking issue.

**TAA and DOF**

When **TAA** and **DOF** are both turned on, the object with high reflectivity in the blurry region flickers.

*Note:*

The flickering issue only shows in the real-time view port and does not happen for the final rendering.
Interference Between Near and Far Blur Regions

When the objects in the **Near Blur Region** enter the **Far Blur Region** on the view port, the adjusting of the **Far Blur Strength** influences the blurriness of these objects in the **Near Blur Region**.

**Far Blur Strength** = 0.4
The edges of the objects, the bush, in the **Near Blur Region** are sharpened.

**Far Blur Strength** = 1.8
The edges of the objects, the bush, in the **Near Blur Region** are blurred.

**DOF and Edges of Object in Near Blur Region**

If you have turned on **DOF** effect and turn up the **Far Blur Strength** value, the near objects in the **Perfect Focus Range** occasionally display parallel lines around the edges of the object as shown below:

**Note**: Currently, there is no solution for this issue.
Blur Edge Sample Scale Influence Transition Region Effects
When you are creating DOF animation, turning up the Blur Edge Sample Scale value will degrade the transition effects of the Near and Far Transition Regions.

Semi-Transparent Object Layering Issue
When there are other semi-transparent objects that sit behind other semi-transparent objects that are in focus, the following defects will occur:

Note: There is currently no solution for this issue. Try your best to avoid this type of scenario.
Camera - Look At

It is hard to keep the camera stable while aiming at an object in a scene. Thus, iClone introduces the Look At feature for the camera to achieve this goal in several simple steps.

1. Select the desired camera in the Scene Manager.
2. Go to the Modify panel >> Look At section, click the Pick Target button.
3. In the 3D viewer, click on a target.
4. Move the target object away to see the result.

The camera is driven to rotate and follow the moving car.

Example: A lady walks down the street with the camera following her.

Note:

You may have the camera Look At the target object over a fixed period of time and use Set Free outside the time range to stop looking at the object.
Physically Based Rendering - PBR (New for v7.0)

The Physically Based Rendering (PBR) feature renders object appearances of materials as in the real world. It increases the quality of textures and simulate the actual material by using simple textures instead of complicated settings and parameters, which is best suited for you to create realistic materials, especially the metal and bump ones on the surfaces.

The PBR of the materials in Character Creator is mainly defined by Albedo, Metallic and Roughness textures:

- **Albedo**: The colored texture of surface's color without reflectivity, light and shadow effects. It is the result of blending the Base Color, Blend textures and Diffuse Colors of the materials in Character Creator.

  ![Image of Albedo](image)

  Note:
  
  Please also refer to the Using sRGB to Correct Image sections below for more information about correcting the Gamma value of PBR textures.

- **Metallic**: It is a black-and-white texture to define the surfaces as insulate or metallic. In Character Creator, it replaces the slot of Specular Channel.

  ![Image of Metallic](image)

- **Roughness**: It is also a black-and-white texture to define the microsurfaces. On the other hand, the polished level of the surfaces. In Character Creator, it replaces the slot of Reflection.

  ![Image of Roughness](image)
The combinations of the Metallic and Roughness can thus depict almost every material in the real world.

Note:

- If you encounter jagged edges when you turn on the PBR effect, then adjust the Mipmap settings in order to enable the anti-alias feature.
- Please also refer to the sections below for more information:
  - The Introduction of PBR Related User Interface
  - The Requirements for Utilizing PBR
  - Turning on PBR Color Space for the Entire Project
  - Settings PBR Materials
  - Skin with PBR Effect
  - Turning on Image Base Lighting for PBR
The Introduction of PBR Related User Interface (New for v7.0)
The Physically Based Rendering (PBR) parameters can be found in different user interfaces. These settings can convert single and multiple materials or even all materials in the entire project into PBR materials.

Modify Panel

1. **Convert Shader for Selected Item**  Click this button to convert all materials of the selected object into PBR or Traditional shader type.
2. **Shader Type**  This drop-down list determine the currently select material or materials are set to PBR or Traditional shader type.
3. **Base Color**  This is the primary channel for the Albedo of the material. In addition to this channel, the albedo is composed of other settings, such as the Blend texture, and the Diffuse Color.
4. **Metallic and Roughness**  Use these two channels to determine the PBR material of the object in order to be more or less reflective to the entire environment. These two images will be automatically generated when the material is converted to PBR shader type.
   - **Metallic**  Pure black (#000000) RGB(0 0 0) texture map.
   - **Roughness**  Either the Specular map inverted or light grey (#a6a6a6) RGB(168 168 168) texture map.
Project Setting Panel

Open the Project Setting panel (Shortcut: Ctrl + Shift + P). You can determine if the 3D viewer is PBR or Classic mode. The PBR mode allows the PBR materials to be rendered in the 3D viewer while the classic mode does not.

1. **Mode**: If you want to view the PBR effect in the 3D viewer, then you must select the PBR item in this drop-down list. It will activate the ability for the 3D viewer to render the PBR effects of materials.

2. **PBR Environment Setup**: When you activate the PBR mode of the 3D viewer, you can click this button to set the ambient color to black (best color for PBR) and convert all materials in the project to PBR materials.

- **Set Ambient Color**: Activate this box in order to set the ambient color to complete black when the environment color is set to PBR mode.
- **Use Default IBL Image**: IBL images should be .hdr or .exr for the best visual results. Other formats such as .jpg or .png can be problematic and create unsatisfactory results in quality. Activate this box to use the default HDR image as the IBL source.
- **Convert Shader to PBR**: Invert the Specular texture maps and assign them to the Roughness channel of all materials in the project to convert the materials to PBR materials.
Turning on PBR Color Space for the Entire Project (New for v7.0)

In order to work with PBR, iClone 7 added a new Color Space section. Switching between color spaces is accessible under Project Settings > Color Management.

The Color Space is divided into Traditional and PBR.

- **Traditional Color Space** - Traditional Color Space uses iClone 6 color gamut, one can restore to iClone 6 Project Settings.
  - Traditional Color Space does not support PBR Shaders, therefore all PBR related functions will be disabled.
  - All content will be converted to Traditional Shader Type.
- **PBR Color Space** - PBR Color Space uses iClone 7 color gamut, you can use both PBR and Traditional Shader Type.

Switching Color Space

1. Execute the **Edit** menu >> **Project Settings** command (shortcut: Ctrl + Shift + p).

2. In the **Project Settings** panel >> **Color Management** section >> **Color Space** drop-down list, choose the **PBR** item.

Note:

- **Traditional to PBR**:
  Changing the color space directly to PBR will not automatically convert traditional shaders. In order to do so, you must use the **PBR Environment Setup** or use the **Convert Shader** tools.
- **PBR to Traditional**:
  Changing the color space directly to Traditional will automatically convert PBR shaders to their legacy equivalents.
  Switching from PBR shader to Traditional and back does not revert the shaders to their previous states, you should use PBR Environment Setup or Convert Shader tools for proper conversion.
3. The 3D viewer PBR ability is then activated.

The PBR ability of the 3D viewer is **OFF**.

The PBR ability of the 3D viewer is **ON**.

**PBR Environment Setup**

There are some recommended settings for the PBR environment. You can use the following interface to achieve a quick setup.

When converting an iClone 6 project to PBR system, you can use the PBR Environment Setup to quickly apply some important default values.

If you want to adjust the Ambient Color or convert all materials of the character, hair, clothes and accessories into PBR materials together, then click the PBR Environment Setup button on this panel.

The new settings will override the original one in the project. For example, if the original project uses Ambient Color Keying then all of the timeline keyframes will be erased and overwritten with a default pure black.

- **Set Ambient Color to Pure Black (#000000)**: Global ambient value will be set to pure black so as to reveal true color values under the PBR system.

  Ambient Color comparison for blue tint and pure black

  - Left Side: Blue tint (#091b90)
  - Right Side: Pure black (#000000)

*Ambient color can adversely affect the PBR environment but can be relied upon to stylize the scene.*
- **Use the Default IBL Image IBL** images should be `.hdr` or `.exr` for the best visual results. Other formats such as `.jpg` or `.png` can be problematic and create unsatisfactory results in quality.

  HDRI format comparison for `.hdr` and `.png`

- **Convert All Shaders to PBR** Converts all the shaders in the project into PBR shaders. This feature is convenient for converting iClone 6 projects, the alternative being the Convert Shader tool.

- Click the **Apply** button to accept the adjustments caused by these two boxes.
Setting PBR Materials (New for v7.0)

After the PBR ability of the 3D viewer is turned on, you can set the desired materials into PBR materials. The PBR material best suits for presenting Metal or Leather.

The conversion methods described below can be utilized to convert the contents before iClone V6 in order to increase the realism of objects by converting their traditional materials into PBR compatible ones.

There are 4 ways to switch between Traditional and PBR shading:

- By Material
- By Object
- By Selection
- By Project

By Material

Under Modify > Material List select the material you want to modify (or Ctrl+ Click on the material list to do multiple materials selection). Then under Texture Settings (shortcut: Y), select one of the options, Traditional or PBR, in the Shader Type drop-down list.

By Object

Under Modify > Material list, press the Convert Shader button and press the Convert button to switch.

By Selection

Menu > Modify > Convert Select Shader to convert the selected object(s).

By Project

Via the Menu > Modify > Convert All Shader window one can switch all of the shaders in the project.
Using PBR Shader (New for v7.0)

PBR Shader
Switching to the PBR Shader will automatically create the Metallic and Roughness maps with the following values:

- **Metallic**: A pure black (#000000) RGB (0 0 0) texture map.
- **Roughness**: Either the original Specular map inverted or a light grey (#a6a6a6) RGB (168 168 168) texture map.

You can use the settings, especially the Brightness in Adjust Color panel to adjust these two textures.

Once converted to a PBR shader, the Specular map (if found) will be inverted and slotted into the Roughness channel.

Once you convert a shader from Legacy to PBR, we recommend changing the Diffuse Color to pure white, that way there is no influence over the final Base Color.
Adjusting or Replacing PBR Textures
You can modify the automatically generated Roughness and Metallic map by adjusting its brightness:

You can also insert your own PBR compatible textures or use a Substance Material.

- PBR texture input:
- Applying Substance Material (sbsar):

After the substance file is loaded, you are able to adjust the material by the attributes provided in the substance file.
Turning on Image Base Lighting for PBR (New for v7.0)

The PBR materials basically behave like the material in the real world. They absorb and reflect lights. Therefore, without lights, the PBR effect is not obvious.

In order to observe the PBR materials, you need to set lights. However, if you want to create a scenario that lights up the character from Omni-direction, then you have to add a lot of directional point lights or spotlights around the character, which is tedious and time consuming.

The IBL (image base lighting) is a good solution because you only need one image to simulate the environment surrounding the character with lights. You are able to view the character from different perspectives for better observation with enough lights.

- The PBR materials without any light.

![Image of character without any light](image1)

- The PBR materials reflect the lights (Self-cast shadows).

![Image of character with self-cast shadows](image2)

- The PBR materials reflect the IBL (No shadows).

![Image of character with IBL](image3)

- The PBR materials reflect both the light and IBL (PBR and shadows).

![Image of character with both light and IBL](image4)

Note:

Please note that the IBL Sphere is invisible. You can only see it by means of the reflections on the PBR surfaces.

- Turn the Sky sphere on for better observation of the direction of the IBL ([Sync Sky Image] is ON).
**Baking IBL (New for V7.0)**

In iClone 7, you can use the Bake IBL function to create a custom IBL image. Once the Bake IBL function is activated, the current scene state will be used to create an accurate image of the current environment.

**Basic Concept**

For example, the following within the following project, the material ball situated in the middle does not reflect the two objects on its sides:

![Image of a bowling scene](image)

Once you the ball in the middle and clicks on Visual > Image Based Lighting > Bake IBL, the objects surrounding the picked ball will be included in the bake, while the object itself is excluded from the baked IBL image.

![Bake IBL in action](image)

*If nothing in the scene is picked, then the pivot point from which the IBL is generated is set to world space origin (0,0,0)*

**Center Point for Baking IBL**

The center point of IBL baking is set to the pivot of the object that is picked in the scene.

* Be aware that the pivot of an object may not always align with the center of the manipulator gizmo.

Take the environment (360 degree video) in the following video as an example:

- Pivot at the top of the scene:

- Pivot at the center of the scene:
Pivot at the bottom of the scene:

Note:

Due to the pivot being on the surface of the floor, the bottom half of the baked IBL captures the environment map as it intersects through the floor. Different pivot positions will provide different viewpoints of the same scene:

Applications for Baking Indoor Environments

If the IBL image used does not derive from the surroundings of an indoor scene environment, then the lighting will not match the surrounding lighting conditions:
This is a perfect opportunity to take advantage of the Bake IBL function to create a custom IBL image suitable for the indoor environment (it is recommended to have Auto Load HDRI checked).

Once the IBL is baked, make sure to reset its transformations to match the scene environment.

Original IBL vs Baked IBL Detailed Comparison
Please check the links below to observe the differences:

- **Case 1**: [Image]

- **Case 2**: [Image]

- **Case 3**: [Image]

Maintaining Baked IBL Light Source
Multiple IBL baking will have an additive effect on the previously baked IBL image.

If you want to keep using the same lighting source then it is best to specify a specific IBL for the baker to use as illumination.
Do this by activating **Baking IBL with Initial Source** (= Light Source for Bake IBL) and proceed to load an image.

Now every time the baker is used, it will sample from the same HDRI image for illumination rather than sourcing upon itself, thus avoiding the additive effect.

* Baking IBL with Initial Source is only used for baking IBL, not for the rendering of the 3D Viewport.
Important Notes for PBR Specular

PBR uses IBL for its Specular contribution, under the same IBL environment all specular highlights will match.

Given an HDR image as shown below:

The scene below uses an indoor HDRI which does not contain the objects in the scene. Specular highlights under this IBL do not match current state of the actual scene.

By baking an IBL from the scene, the objects and current state of the scene is included.

However, since every single object material is reading from the same IBL, all of the specular data is reused. Since all PBR specular is derived from the same IBL image, there is no avoidance of this issue. Just be aware of this issue and plan your IBL image and scene accordingly.
Advices and Tips for Using PBR (New for v7.0)

Dealing with Mipmapping

Mipmapping is a technology that processes texture files into progressively lower resolution sequence of images. These images are then saved in memory as a set of mipmaps which allows real-time swapping depending on the distance from the camera. This can be great for real-time animation, which is what iClone is good for.

In order to match the visual quality of Marmoset or Substance Painter, it is suggested that you turn off mipmapping under Preference > Real-time Render Options > Mipmap.

Once mipmap is disabled, iClone’s visual quality is approaching that of Substance Painter.
Dealing with Anti-aliasing

There is a software technique to combat problems of "saw-tooth" edges in the viewport. By default, iClone's anti-aliasing settings are set to either low or none at all, this is so that animations can run at a decent frame-rate.

If you wish to match the visual quality of Marmoset Viewer or Substance Painter than it is recommended to turn ON the Anti-aliasing settings under Preference > Anti-alias.

However, if the quality of anti-aliasing is still not ideal, one can increase the super-sampling via Export Image / Video.
What is Global Illumination (New for V7.0)

Minimum hardware requirements for Global Illumination (GI)
- Nvidia GTX 970 graphics card
- Intel i5 dual core CPU
- 8GB of RAM

What are the benefits of Global Illumination (GI)?
- **Visual Aspect**: In addition to direct lighting there are indirect sources of illumination resulting from light beam bounces from nearby surfaces. Indirect lighting can enhance the realism and beauty of a scene especially in dark unlit areas. The following video demonstrates a project which contains a directional light and IBL (Image Based Lighting). When GI is on, the shaded areas in the entire scene lights up due to bounce lighting, consequently one can notice more details in areas that would otherwise be too dark to see.

* GI is most effective in scenes with many large surfaces which increases the number of light bounces. For example: indoor scenes or Cornell box setups.
- **Creative Aspect**: In the past, indirect light must be "faked" by adding more complementary lights to increase the brightness of shaded areas. With GI, you are free from this tedious work by using just one directional light to brighten the entire space.
Technical Aspect

GI is completely dynamic in real-time:

- It perfectly handles large and dynamic scenes without any pre-processing.
- Our implementation is provided by Nvidia, and works on any DX11 GPU that makes GI much faster on Maxwell (GTX 9xx series). Please refer to the web below for more information:
  www.geforce.com/hardware/technology/vxgi/technology.
- The Specular parameters are what gives us blurry and mirror like reflections from true 3d objects (to certain extent). This is based on voxel information being reflected from one object to the other so the quality of the reflection is only as good as the voxel density resolution.

What elements in iClone project can take part in the GI (emit light photons)

* Click on the links to observe the different results when the GI is ON or OFF.

- **Lighting**
  - Directional lights
  - Spotlight
  - Image Base Lighting

- **Others:**
  - Images in the Glow channels of materials
  - Self-illumination (Static, or Video texture)
  - Particle
User Interface Introduction for GI (New for V7.0)

The overall visual adjustments for the GI can be done in the Global Illumination tab on the Visual panel.

Global Illumination Section

- **Global Illumination**: This box is the main switch for the GI feature. Activate this box in order to enable the GI effect for both real-time and final rendering. You can also click the leftmost button on the GI toolbar for turning GI on or off.

- **Ambient Light Color**: Click to open the color swatch for setting the main ambient light for the entire project. It is synchronized with the Ambient Light Color in the Visual panel > Atmosphere tab > Ambient Light section.

- **Ambient Strength**: Use this slider to determine the strength of the ambient light effect.

- **View GI Anchor Buttons**: Use these two buttons to show or hide the GI Anchor.

- **Anchor Settings**: Click this button to open the Modify panel and display the sections for setting the GI anchor.
**Diffuse Section**

- **Bounce Strength**: The intensity of the GI effect on the mesh surface of the scene objects. **Note: This setting is key-able on timeline**
- **Shadow Details**: Creates more contrast in Diffuse under darker areas so that shadows become darker and richer.
- **Shadow Bias**: This setting can resolve shadow blotching by cohesively blurring its disparate patches.
- **Voxel Cones**: The number of light rays emitted per voxel. Higher values equate to better quality at the expense of performance. The maximum for number of cones is limited to 64.
- **Multi-Bounce Scale**: The intensity of the bouncing lights. Indirect lights do not bounce multiple times if this setting is turned off. Do not increase this value suddenly otherwise the bounce rate can become over-powering causing the scene to over-expose.
Specular Section

- **Bounce Strength**: The intensity of GI effect on Specular or PBR shaders. This parameter is key-able.
- **Highlight Details**: Render darker areas of the Specular shader with more contrast.
- **Shadow Bias**: Resolves the blurry artifacts of the Specular shader.
- **Noise Effect**: Adds noise to reflective surfaces effect by GI for increased realism.
Basic GI Operating Process (New for V7.0)

- **00:00 ~ 00:38:** Observe the directional and spotlight effects when the GI is ON.
- **00:38 ~ 01:26:** Reset the GI settings to default values and turn off the GI feature. Then set up the GI from scratch.
  - ~ 0:41: Turn on the GI main switch.
  - ~ 0:47: View-port GI should be turned on as well to see the real-time effect (synchronized with the Preference > Display > Viewport GI setting).
  - ~ 0:51: Switch to the Preview Voxel mode and move the anchor to the desired location (center of the viewing area is recommended).
  - ~ 0:59: Adjusting the GI Range, make sure that:
    - Voxels covers the entire scene.
    - Observe the size of the voxels and the visual result in the view-port.
  - ~ 1:06: Modifying the basic settings in the Visual / GI Settings
    - **Diffuse Section** Indirect Lighting Intensity and Multi-Bounce Scale
    - **Specular Section** Indirect Lighting Intensity
    - A basic GI effect is thus set.
  - ~ 1:22: Switch on and off the GI to view the differences.
GI Ambient Light Settings (New for V7.0)

Ambient Light Color
Used to change the GI ambient environment color. The Ambient Light Color for iClone and GI Ambient Color are synchronized. If either one is adjusted, the other will do so as well. Click Here to view the environments with different Ambient Light Colors.

Ambient Strength
When the value is increased, the bright and dark areas of an object will be influenced by the Ambient Color simultaneously which causes the dark areas to brighten. On the contrary, when the value is decreased, only the dark areas will be influenced.

The following illustrations demonstrate the differences between the Strength values:

- **Strength = 1**

- **Strength = 10**

- **Strength = 35**
Resetting Methods for GI Settings (New for V7.0)

While adjusting global illumination, various settings are needed for comparing the different visual results.

Resetting All GI Settings

If for whatever reason, one experiences missteps in setting the GI settings, use the Reset to Default button to reset all of the parameters to their initial values:

The Reset to Default button restores the GI related settings to default values, including the range of the GI anchor.

Resetting Individual GI Settings

In order to reset individual slider settings to their default values, double-click on the label name with left mouse button.

Note:

Please note that the Multi-Bounce Scale and Opacity Alpha threshold components are not included.
Elements Contributing Lights for GI (New for V7.0)
In addition to the standard light sources (directional light, spotlight and point light), there are some other elements contributing lights for illumination:

- IBL (Image based lighting)
- Glow Texture
- Self Illumination Setting
- Particle for GI
**IBL for GI (New for V7.0)**

When the GI is turned on, the IBL starts to bounce between objects while lighting them. As shown in the illustrations below, more details of the robot can be seen after the GI is activated.

- The **GI Indirect Light** setting of the IBL is **OFF**

![Image 1](image1.png)

- The **GI Indirect Light** setting of the IBL is **ON**

![Image 2](image2.png)
Glow Texture for GI (New for V7.0)

The material turns into a light source when illumination is activated and has the ability to lighten up the environment with GI characteristics. Under these circumstances, the material can emit bouncing lights when its radiating light rays hit other objects in the scene. If the material contains Glow map, then the Glow Texture will be used as the light source for the GI. The higher the Glow Strength is, the stronger the light will be.

- The object with the Glow texture does not contribute any light for the GI effect.

- The Illumination of the object is turned ON and the Glow / Self Illumination value is set to 100.

- The Glow / Self Illumination value is set to 300.

Note:

Please note that there is a glow texture being used on the ceiling to simulate florescent lighting.
**Voxelize Thickness**

The angle of two intersecting surfaces influences the *Occlusion* result. If the occlusion effect is not satisfactory, use the *Voxelize Thickness* parameter to solve this issue.

**Voxelize Thickness OFF**

**Voxelize Thickness ON**
Self Illumination for GI (New for V7.0)

When the Illumination for a Material of an object is turned on, it means the material is endowed with the ability to lighten up the environment, to emit direct lights, and to possess the characteristics of global illumination (producing bounce lighting when its light rays hit nearby surfaces).

With self-illumination value, this type of material uses the Diffuse texture as the lighting source. The higher the Strength of the value is, the stronger the lights radiated, as the following example shows (it will not create a halo effect like Glow textures do).
Image Based Material

Self Illumination 0

Self Illumination 100

Note:

In this scene, the landscape outside of the window is merely a plane with a mapped scenery texture to the Diffuse channel.

Video Based Material

Video texture is also acceptable, notice the TV in the following example:
In the following example, the **Illumination** in the **Modify** panel for the fire particle in the fireplace is turned on for illuminating under the **GI** feature. When turned on, the particles can emit lighting and possess the characteristics of **global illumination** (produce bounce lighting). Higher **Strength** equates to stronger **Particle Lights**.

**Particle > Illumination OFF**

**Particle > Illumination ON**
GI Animation (New for V7.0)
When using VXGI, it is highly recommended that the Anchor be set to a fixed position for better visual result and reduce the probability of light flicker; however, in some scenarios, the anchor must be transformed, which happens mostly on projects with vast scenes.

GI Animation Comparison
When your find the lighting results are inconsistent during the camera movements as shown below, the anchor must be animated to solve these issues.

- Left: The anchor is fixed at the end frame of the scene (the light strength is different at the beginning and the end).
- Right: The anchor is transformed along with the camera movements (the entire video has consistent light strength).

Observe from Top View
The anchor is fixed in the position at the end frame:

The anchor moves along with the camera motion:
Observe Voxel Size and Deployment and Descriptions through Top View

The anchor is fixed at the position in the end frame and covers the entire scene.

The GI influence is weaker at the start frame because the Voxel cubes are bigger, which allows for less details of the lights and shadows.

The anchor moves along the camera motion - The anchor is linked to the camera, the voxel covers only part of the scene where the camera perspective can see.

The anchor follows the camera from the beginning to the end, therefore the GI influence is consistent for the entire animation.

At the start frame, the voxels are small and fine (high level of details for the lights and shadows).

At the end frame, the voxels are still small and fine (high level of details for the lights and shadows).
GI and Timeline

After the Anchor is selected, GI Control can be found on the Timeline, including GI Strength, Anchor Transform, and Link.

GI Strength

The Indirect Lighting intensity for the Diffuse and Specular maps are both key-able. Use when a scene spans from day time to night time by adjusting the Diffuse Intensity along with Ambient Color to create a look of a daylight cycle.

Anchor Transform and Link

The Transform (position only) and Link are also key-able.
Transparent Materials for GI (New for V7.0)
The transparent materials, including the **Opacity Texture** and **Opacity** settings, can not only contribute the light for **GI** effect, but also reveal the indirect light from the object behind the surface with transparent materials.

**Transparent Materials for GI**
The related user interfaces are in the **Modify panel > Material tab > GI Settings** section as shown below:

1. In order to fix opacity white edges or value inaccuracy, increase the **GI Settings > Opacity > Alpha Threshold** parameter. **Alpha Threshold** defaults to 30, which is sufficient for most situations and good for scene performance but may not be great for quality. Please click [Here](#) to view the comparison illustrations. However, not all opacity textures are compatible with high **Alpha Threshold** values. If alpha problems persist, try to decrease the value. Please click [Here](#) to view the comparison illustrations.
2. The other option is the **Translucent GI** which matches the resolution of the alpha channel to the view port. This option can adversely affect real-time performance.

Under the circumstances that there are overlapping transparent faces, the underlying faces will not receive the bounce lighting that is blocked by the overlying faces. Where **Alpha Threshold** can not solve this issue, **Translucent GI** can. Please click [Here](#) to view the comparison illustrations.
Comparison for Material Alpha Threshold, GI Alpha Threshold, and Translucent GI

Please check out the differences between the Material Alpha Threshold, GI Alpha Threshold, and Translucent GI.
Two Types of Dummy for GI (New for V7.0)
The dummy props are now can be assign to two different types for using in the GI environment for specific purposes: to emit lights or to block lights.

Keep GI - Hiding Emissive Prop with GI Effect
Usage
- Keep the GI effect from an emissive prop (Glow or Self Illumination) without rendering the prop itself.
- Can be included in the scene as auxiliary lights.
- Can be used as the main source light.
  Please click Here to view the comparison.
- Suitable for Final Render quality.

Instruction
1. Under Modify > Material > GI Settings, enable Illumination.
2. Adjust Glow / Self-Illumination Scale and Self Illumination to ideal values.
3. Under the Modify > Edit > Prop, enable Set as Dummy.
4. Select **Emit GI** in the drop-down list.

![Modify Prop Panel](image)

<table>
<thead>
<tr>
<th>Prop: Shadow Catcher</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Set as Dummy</strong></td>
</tr>
<tr>
<td>Normal</td>
</tr>
<tr>
<td>Emit GI</td>
</tr>
<tr>
<td>Block GI</td>
</tr>
<tr>
<td>Realtime Shadow</td>
</tr>
</tbody>
</table>

5. Show or hide the dummy object by pressing **Ctrl+D**.

**Block GI - Blocking Lights for Fixing Leaky GI**

**Usage**

Previously mentioned **GI Known Issue** about light leakage with thin walls can be fixed by wrapping the walls with a thick encasing. However, this solution is rather unsightly. With **Block GI**, you set the encasing prop as a dummy object and hide it.

**Note:**

You can show or hide the dummy object by pressing **Ctrl+D**.

The original blocking panels as shown below

![Original Blocking Panels](image)

Under **Modify > Prop**, enable **Set as Dummy** and select **Blocking GI** in the drop-down list as shown below:

![Set as Dummy](image)

**Note:**

Please note that the light leaking issue can only be fixed for **Directional Lights** and **Spotlights**. There is currently no resolution for other light sources such as **Point Lights** and **Emissive Objects**.
**Mechanism**

In the following illustration, the left one is when the directional light is occluded by a blocking dummy then the GI emitted by the red block is weakened; while the right one is when the blocking dummy is behind the red block then the full force of the directional light is exposed on the red block creating very strong bounce lighting.

![Mechanism 1](image1.png) ![Mechanism 2](image2.png)

**Note:**

Blocking dummies work best when they are closer to the occluded object.

The following illustrations demonstrate the importance of light exposure sequence. You can see an encasing blocking board that is set to a **Blocking GI dummy** and a directional light that pointing towards the bottom left.

Since the green wall on the right is occluded by the blocking dummy, it does not emit any bounce lighting. On the flip side, since the red wall is being hit directly by the directional light, it does emit bounce lighting even though behind it resides the encasing blocking dummy.
Light Bounce Strength in GI (New for V7.0)

The Light Bounce Strength (LBS) determines the reflectivity intensity when a photon hit a surface. Two examples are taken as examples to describe the concepts of LBS in this page.

Example 1

When lighting an object with studio setup lighting, one can see that the global illumination effect is rather weak when the rays of light bounces and submerge into the ambient surrounding. Thereby one can use the Light Bounce Strength parameter to increase and beautify the GI effect of individual materials and props. Simply put, use this parameter to strengthen the GI scattering effect of individual props and objects.

1. Make sure there is lighting in the scene that hits upon the object of interest.
2. Under Modify > GI Settings adjust the Light Bounce Strength to control the intensity of GI emitting from the prop.

Note:

- Higher values in Light Bounce Strength equate to stronger and wider scattering.
- Zero value in Light Bounce Strength is the same as no GI scattering at all.
Example 2
Usage
When GI and Light Bounce Strength in the IBL is turned on at the same time and the distances between neighboring surfaces are too small then lights bounces among them repetitively, which causes light blooms in these close quarters.

The problem where surfaces in close proximity has a tendency to increase the GI bounce rate. This can cause the said surfaces and thereby the object to over-expose and become overly luminous. Light Bounce Strength can be utilized to pair down this phenomenon to remedy the resultant visual artifacts. Please click Here to view the project before / after comparison with the LBS parameter decreased from 1.00 to 0.20.

The following is a comparison chart of LBS versus Glow / Self-Illumination Scale

1- Diffuse Lighting Scattering
2- Glow Illumination

Note:
White arrows represent the direction of the lighting, red arrows represent the bounce lighting.
What is Voxel in GI (New for V7.0)

VXGI technology divides the scene into lots of volume pixels in the shape of cubes, and takes the voxels as the units to calculate the direct / indirect bouncing light data (no pre-processing needed).

The meshes in a voxel receive the same lighting intensity, therefore, the Deployment, Size and Amount of the voxels are crucial factors that influence the visual results.

- **GI Range**: Each mesh in GI range receives and reflects bounce lights.
- **Voxel**: In the GI Range, the scene is divided into small cube voxels, each cube is a unit for taking and giving the direct or indirect light data within the entire environment.
- **Anchor**: The anchor is the center of the GI range to mark its location. It represents the center of the GI range and is fixed in the scene to solve the flickering issue for real-time rendering. The flickering issues happen when the scene is repetitively auto-divided due to changing of the camera perspectives.
Actual Operation in iClone

By zooming out the camera, you can see the Gi range (gray area).
GI Anchor Settings (New for V7.0)

Showing and Hiding GI Anchor

- After the 
  GI main switch is turned on, a new Anchor item will appear under the Light category in the Scene Manager.
- The Anchor is used to determine the voxel position for a real-time GI scene in order to prevent the light flickering in real-time GI.
- The anchor determines the starting center of the GI voxels, the objects closer to the anchor are influenced more by the GI effect and less so as it spreads outward.
- When the anchor is selected, GI Range Move and Link settings will be displayed in the Modify panel for further adjustments.
- Only its position can be moved and keyed, not its size or orientation.
Voxel Visualization

In order to show the voxels, you can switch the view port to View GI Voxels mode from the Modify panel.

Alternatively, you can click the View GI Voxels button on the tool bar.

You will see the view port turn to be red and blue mode to show the cubes of the voxels.

- **Visualize Voxels** is used for viewing the GI influence range and the levels of deployment.
- According to the theory described before, smaller and denser voxels mean more details of lights and shadows, and vice versa. When meshes share a same voxel cube, they receive identical quantity of the lighting (visually, the lights and shadows on the surfaces of the meshes look more evenly distributed).
GI Range and Displaying Range

If you only want to view the range instead of the read and blue screen, then you can use the **GI Range** slider and **View GI Range** check box.

You will see the **GI Range** green box show on the screen, which indicate the size and position of the area that will have GI effect.

- **GI Range** The lights that hit any objects within this range will bounce and lighten up the entire scene. The bouncing lights will contribute to the overall illumination of the scene.
- **Display Range** Toggles semi-transparent boxes to display the **GI range**.
Voxel Size and Visual Influence (New for V7.0)

How do sizes of the voxels influence the visual results? As previously described, the total light data (including direct light and indirect light) of the GI lighting take the Voxels as units of measure. The meshes in a single voxel cube take identical strength of the lights. Therefore, the smaller the voxel cubes, the more detail can be depicted in the lights and shadows. The voxel units in the illustration below is highlighted in red boxes.

- **Left** There are two voxel units which can display more details for the shaded area beneath the ball.
- **Right** There is only one voxel unit that include the half bottom of the ball, resulting in less detail for the same region.
The Actual iClone Sample

- **When the voxel cubes are bigger (Range = 500)**: In the following case, the lights and shadows spread more equally, there are fewer details for the dark parts. (Because the voxel units are bigger, there are less details available for display in the shaded areas).

- **When the voxel cubes are medium (Range = 200)**: In this case, the lights and shadows do not look much different, however, compared with the previous example with bigger voxel cubes, this scene appends additional shadows onto the floor and the wall to the right.

- **When the voxel cubes are relatively small (Range = 50)**: In this case, the entire scene turns darker because the voxels are re-divided and the lights and shadows are re-calculated as well (not divided based on the biggest cube), therefore, the visual results will not be generated from the voxel size in the previous point to add more details; instead, the voxels cubes are re-generated, which alters the deployments of the cubes drastically and the consequence is that the lights and shadows will not be different each time the voxel size and characteristics of the Voxel GI is adjusted.

When using GI, one needs to factor in the size of the scene objects along with lighting expectations.
Controlling Deployment, Size and Amount of Voxels (New for V7.0)

The size of the voxels are determined by the GI Range and Anchor Position.

The Voxel and GI Range

The total number of the voxels in VXGI is fixed, therefore, the size of the GI range determines the size of each voxel cube. A larger range presents a bigger voxel cube and vice versa.

In the following video where GI Range is adjusted in iClone contain 2 key points:

- In the 3D viewport since the cubes are re-generate repeatedly, the light and shadows are constantly re-calculated.
- In the voxel mode the size of the cubes are re-calculated from time to time.

The Voxel and Anchor

The voxels are smaller and denser when they are closer to the anchor. That is, the objects that are closer to the anchor tend to have more detailed lights and shadows.

- Click HERE and observe the visual differences caused by the changes of the Anchor Position in a same iClone project with identical scene and settings.
- Click HERE and observe in the iClone Voxel Preview Mode to see the sizes of the cubes altered along with the changes of the Anchor Position.
In the video below, the view is from the top for observing the size of the voxels when the anchor position is changed. The voxel cubes are repeatedly re-divided along with the changes of the anchor position. The spaces near the anchor position are divided into higher density of voxel cubes.

Note:

The anchor position is mostly left unchanged, otherwise the voxels will be re-arranged, which causes flickering issues in the scene. However, there are still some scenarios where one needs to set keys for changing the anchor position. Please refer to the example of the Moving Anchor.

The Low and High Voxel

The Voxel Mode buttons are the only settings that can change the number of the voxels. There are two presets for adjusting this parameter. With the same GI settings, applying these two presets have different affects.

- **Low Resolution** (Left button): Low Detail Voxels - Less details for the lights and shadows due to fewer voxels cubes, it’s the default settings for default project. The GI will then take up about 2 gigabytes of video card RAM.
- **High Resolution (8x)** (Right button): High Detail Voxels - More details for the lights and shadows due to more voxels cubes. This option is more suitable for finer details in object reflections.
- Please click [Here](#) and [Here](#) to view the comparison between the result by the low and high resolution voxels.

Note:

you will need greater amount of video memory. The *Nvidia 9 series and above* are recommended as a pre-requisite for using high detail voxel settings.
Known Issues in GI (New for V7.0)

Although GI can increase the visual quality for iClone projects, however, there are still some issues caused by the GI limitations that you must know.

- **Lights Leaking** - VXGI Common Known Issues
- **Flickering issues and Solutions**
  - Due to **Emissive Elements** (Material Glow Map, Self-Illumination and Particle)
  - Due to **Moving Objects**
- **Others**
  - **Refraction issues** - GI Limits
  - **Opacity Texture**
Lights Leaking Issues (New for V7.0)
When the intersect walls are not thick enough, light leaking may occur due to the voxel cube being larger than the thickness of the encasing walls.

Light-leaking Phenomenon
Observe that the ceiling and corners of the box are still bright and not properly occluded in shadow.

Solutions
- Try to thicken the walls or added another layer of walls around the existing ones.
- Encasing another layer on the outside.
Lights Flickering Issues (New for V7.0)
Caused by Emissive Elements (Material Glow Map, Self-illumination and Particle)

In the following animation, the object (with Glow texture) contribute light in GI, which brightens the scene but the lights are constantly flicking.

The Reason

The light sources are much smaller than the voxel cubes. When the light sources move within a voxel, the light weights from it in the voxel changes along with the movements, which causes the flickering issue.

The Solution

Activate the Super Sampling box as shown in the illustration blow to effectively mitigate the light flickering.

The result after the feature is activated.
Caused by Moving Objects
In the following animation, the object moves as well, which also causes light flickering zone by zone even though the object is bigger than the voxel cubes.

The Reason
When the light sources move from voxel A to voxel B, objects covered by A suddenly lost its light sources while the ones in B suddenly get more light sources, which causes the flickering issue.

The Solution
Activate the Suppress Light Flicker box in the Project Setting panel to effectively decrease the flickering.

This feature can eliminate the flickering issue.
Refraction Issues (New for V7.0)

Refraction - GI Limits
The object with Refraction effect can not contribute lights or any bouncing lights when GI is activated. As shown in the illustration below, when Refraction is on, the surface of the bottle can not reflect lighting to influence the environment.
Opacity Texture Issue (New for V7.0)

If the Opacity Map contains gray values (not purely black and white) then black edges will likely appear.

By activating Alpha Threshold setting on the object's material, you can solve this issue.

Optionally adjust the slider in order to have the optimized result.
Shadow

In iClone, all lights are capable of generating shadows except the Point Light Image Base Lighting and Ambient Light.

- Activate the Shadow option under the Shadow Map tab in the Visual Settings panel to set the shadow effect.

- More about Shadow
  - A realistic way to calculate the physical projections of shadows from the light source with the shadow map technology.
  - Casting shadows is from characters and props / scene.
  - A higher resolution shadow map is required if you wish all scene elements to cast shadows.
  - Shadows can only be projected on 3D objects but not on the virtual floor (X-Y plane).
  - Please refer to Shadow Option for more information.
Shadow Option
When you enable the **Shadow** option, you are using the so-called shadow map which covers all viewable parts of the scene, to globally calculate the shadow area for all objects that are able to cast a shadow.

Please note that the following parameters are global. You cannot assign different values for different lights in the project.

### Resolution
- The values from the drop-down list decide the resolution of the shadow map (indicated by blue lines). The higher the value, the more detailed the shadows will be calculated and presented.

- **Resolution = 512 x 512**
- **Resolution = 2048 x 2048**
**Shadow Opacity**
- Adjust the **Opacity** value to define the transparency of the shadow. In general, stronger light (especially directional lights) will cast higher opacity shadows.

![Opacity = 20](image1) ![Opacity = 100](image2)

**Soft Shadow**
- Check the **Soft Shadow** box to enable this feature. Adjust the **Performance/Quality** slider to define the edge softness of shadows.

![Soft Shadow = 1](image3) ![Soft Shadow = 3](image4)

**Shadow Bias Adjustment**
- This function helps to correct some shadow displacement errors caused by extreme shadow angles.

![Bias = 0](image5) ![Bias = -3](image6)

**Shadow Range**
If your scene is very wide and you want to use low-resolution shadow map for reducing the system strain, then the shadows can be of low-quality and jagged, because, by default, the **Shadow Range** is set to **Auto**, which applies the low resolution shadow map to the entire scene.

In the following example, the shadow map is shown with a blue grid for better observation.

![Resolution = 512 x 512](image7)

**Shadow Range = Auto**

All shadows in the scene are jaggy.

You may decrease the range in order to apply the shadow map to a larger area than the camera view instead of the entire scene in order to reduce issues of jagged shadow edges.

![Shadow Range settings](image)

2. Decrease the value of the slider to shrink the size of the shadow map until you are satisfied with the shadow result.

![Shadow Range Comparison](image)

Note:

You may also combine the high-resolution shadow maps with this skill to get an exquisite shadow result.

**Focus Near Area (Directional Light Only)**

The Focus Near Area can dynamically adjust the details and quality of all shadows according to the object distance from the camera. The variation becomes even more dramatic as the Focus Near Area value increases. Hence, you may increase the shadow details of the objects near the camera, with the trade-off of decreasing the clarity of the shadows cast from the objects that are far away.

![Focus Near Area Comparison](image)

**Focus Near Area Comparison**

- **Shadow Range = 200**
  - Focus Near Area = 1
  - Near shadows are more exquisite.
  - Far shadows are rough and jaggy.

- **Shadow Range = 200**
  - Focus Near Area = 100
  - Equal details for all shadows.
Darkening Shadows (New for V7.0)
The Darken Shadow feature is involved with three control sliders, Strength, Global Darkness Multiplier and Darkness for each light.

• **Strength**: The true shadow generated in accordance with the shape of the object, the light strength and the angle of the camera. It is a legacy setting from iClone 6.

• **Global Darkness Multiplier**: The global shadows darkness strength for the entire project.
- **Darkness** for each light: The individual shadow darkness strength for individual lights. When the **Global Darkness Multiplier** is set to 0 for the project, adjusting the **Darkness** parameter on individual lights will have no effect, and vice versa.
Shadow Catcher in Default Project (New for V7.0)

In iClone 7, each embedded default project contains an invisible shadow catcher. It can be used to blend in with the background image. A shadow catcher prop can be used to save the time it takes to create a shadow receiving floor plane.

To show or hide the dummy object, you can press Ctrl+D or toggle the visibility via Project Settings panel > Display section > Dummy Object check box.
Casting Shadow on Invisible Mesh Plane (New for V7.0)

In this section, you will learn how to create a custom shadow catcher by using a hidden prop from rendering but still receive shadows for compositing. It also fixes an issue with iClone 6's floor-less environment not receiving cast shadows. By using this feature, you can cast shadow on any invisible mesh regardless of its shape.

1. Make sure the camera angle matches those of the background image or video.
2. Select or create a floor plane that will be used to receive cast shadows.
3. Under Modify > Prop > Set as Dummy, select Normal from the drop-down list.
4. Activate the Matte Shadow check box, the plane will turn hidden from view but still receive cast shadows.
5. Show / Hide the dummy object by pressing Ctrl+D.
Shadows and Transparent Props

The shadows for props with Opacity map can be individually set in the Modify panel. If the opacity texture is grayscale, then you can decide the look of the shadow according to the object’s Opacity image.

Prop without Opacity texture.

Prop applied with a grayscale opacity texture. The shadow does not change with the transparency levels of the prop.

iClone provides Alpha Threshold and Shadow Threshold settings for adjusting the shadows of props with opacity maps.
Shadow Threshold and Shadows

The **Shadow Threshold** deals with only the shadow of the prop mapped with **Opacity** texture. The pixels in the opacity texture will be detected if their grayscale values fall within the threshold or not. The part of the surface mapped with the pixels will thus be shown or hidden. The higher the threshold is, the fewer shadows are cast. Please note that this method keeps the appearance of the prop.

![Shadow Threshold = 30](image1.png)
![Shadow Threshold = 50](image2.png)
![Shadow Threshold = 70](image3.png)

In addition to the props with Opacity map, by adjusting the value of **Shadow Threshold**, you can make the shadow of the hair more exquisite without doing any modification to the hair.

![Shadow Threshold = 1](image4.png)
![Shadow Threshold = 60](image5.png)

**Alpha Threshold and Shadows**

**Alpha Threshold** turns the opacity texture into binary format to change the appearance of the prop and its shadow. Any part of the object mapping with pixels that reach the **Alpha Threshold** will be displayed. The rest part of the prop will appear invisible.

![Alpha Threshold = 30](image6.png)
![Alpha Threshold = 50](image7.png)
![Alpha Threshold = 70](image8.png)

You can also use the **Alpha Threshold** to trim the hair even better. The shadow will also be adjusted when the hair is modified.

![Alpha Threshold = 0](image9.png)
![Alpha Threshold = 40](image10.png)
Alpha Threshold

iClone provides Alpha Threshold settings for objects with Opacity textures. When you apply a grayscale image to the opacity channel, you may encounter some issues with earlier versions of iClone. However, with the Alpha Threshold setting, these artifacts can be removed.

The artifacts caused by grayscale opacity texture

Alpha Threshold uses the opacity texture to trim props. Shadows will then be altered as the prop changes look. Although the shadow result may look the same as the Shadow Threshold does, the prop appearance will actually be different.

The benefits of using the Alpha Threshold feature are:

- Increasing real-time speed and performances
- Fixing undesired edge lines from objects
- Removing illogical outlines from character’s hair

Increasing Real-time Speed and Performances

- If you apply a grayscale image for the Opacity channel to create a transparent prop, then the program always calculates the transparent, the semi-transparent and the opaque areas.

Gradient opacity image

Alpha Threshold = Off

- If the prop contains no semi-transparent part, such as a chicken wire or fence, then you can enable the Alpha Threshold and adjust the value to skip calculating the semi-transparent parts.
Black and white opacity image

**Alpha Threshold = On**

- This method increases the playback speed and performance.

## Fixing Undesired Edge Lines from Objects

- When you use the Opacity channel to produce a partial transparent object, then you may find edges around the object.

**Alpha Threshold = Off**

- By activating the **Alpha Threshold** setting and adjust the slider, you may then eliminate these annoying edges.

**Alpha Threshold = On**

## Correcting Character’s Hair for Toon Shader, and NPR Post Effect

- Each character’s hair contains Opacity textures, which may cause incorrect Toon Shader or NPR results. By activating the **Alpha Threshold** box of the hair, the visual artifacts can be removed.

**Alpha Threshold = Off**

**Alpha Threshold = On**
Using Shadow Casters (New for V7.0)

Emissive lighting (Material Glow / Self Illumination and Particle effects) along with point lights do not cast shadows. Now you can pair up Shadow Caster with these types of shadowless lighting to better their authenticity.

Directional Shadow effect

Spot Shadow effect

Directional Shadow & Spot Shadow Comparison
Creating Shadow Caster
You can create two types of shadow caster from Create menu > Shadow Caster > Directional Shadow or Spot Shadow.

After the shadow caster is created, you can see the aster under the Light group in the Scene Manager.

Note:
Both the Directional Shadow and SpotShadow nodes contain Darkness slider to increase the intensity of its cast shadows.
What is LUT (New for v7.0)

Lookup Table, or “LUT” for short, is a way to use a mapping texture to swap out on-screen pixel color swatch. Simply put, LUTs are color value mapping tables. No matter if the color value is observable or not, all values can be mapped out. The principle mechanism of LUT is to turn an RGB image to grayscale and then map the grayscale values to other RGB color values.

LUTs' advantages include more convenient image conversion with better performance and more professional results. You can set the color mapping in a 2D solution such as Photoshop, Gimp, etc., for more precise control. Take the scene shown below as an example. With different LUT templates applied, you can create different feeling for that scene.

- The original scene:

![Original Scene](image1.png)

- The scene applied with different LUT templates:

![Scene with Different LUT Templates](image2.png)

Note:
For more details, feel free to read: [LUT on Wikipedia](https://en.wikipedia.org/wiki/Look-Up_Table)
The Introduction of LUT User Interface (New for v7.0)

1. **Activate**
   - Used to enable or disable Post Effect. When it is unchecked, all of the components under Post Effect will be disabled.

2. **Save**
   - Save the entire Effect List including timeline keys to an .iEffect file.

3. **Rename**
   - Change the name of the currently selected effect. Name of the timeline track will also be affected.

4. **Image Info and Image Size**
   - Displays the LUT image file name (not including the extension).
   - **Image Size** displays the dimensions of the LUT image in pixels.

5. **LUT Image**
   - Displays an image representation of the LUT data in the .iEffect file. Users can double click on the image or drag and drop a file to replace the LUT data.

6. **Adjust Color**
   - Make adjustments to the LUT image. Check out [here](#) for more detailed explanation.

7. **Save File**
   - Store the LUT image as an external file.

8. **Open File**
   - Open an external LUT image file. Current supported formats are PNG, TGA, BMP at resolutions of 256x16 and 1024x32.

9. **Launch Editor**
   - Send the LUT image to a 2D image editor.

10. **Blend Strength**
    - Adjust the effect contribution. LUT effect allows for multiple layers and, like IBL, can be keyed for animation.
Adjusting LUT Image (New for v7.0)

By adjusting the LUT image, the entire scene superimposed with the LUT effects can be customized to unlimited and unique styles.

Using Adjust Color Panel

Select the LUT image and click the Adjust Color button to open the Adjust Color panel. Then use the controls on the panel to do the modifications to the entire LUT image.

If you load an LUT image downloaded from website and use it, it can be sometimes vertically flipped, which caused an abnormal result.
You can use the **Flip Vertical** button on the **Adjust Color** panel to correct the aforementioned issue.

![Image showing Flip Vertical button]

**Note:**

You can create custom **LUT** images from scratch by first applying the **Neutral** template from the library and then edit it with any external image editor.
Superimposing LUT Effects (New for V7.0)
You are allowed to apply multiple LUT templates for getting a mixed-up effect from these templates.
LUT Animation (New for V7.0)
With multiple LUT effects applied, you are able to set keys to create LUT animation.
AO Effect (New for V7.0)

AO applies the HBAO+ technique, which is the enhanced HBAO tech for generating better details compared with iClone 6 AO effect. It increases the spatial feeling and the details of object surfaces. Click here to check out the differences.

Please refer to the following sections for more information:

- The User Interface Introduction for AO
- Using AO Effect
The User Interface Introduction of AO (New for V7.0)

The Exporting Alembic feature can be found in the File menu -> Export

To turn the AO effect on or off.

Choose one of the radio buttons to determine if the preview windows displays only the AO effect only or the result after the AO is blended onto the scene.

Set a value to determine the opacity when the AO is blended onto the scene.

Set the strength level of the AO

Determine the radius value of the spherical range for a certain point on a surface that generates AO effect. Only the surfaces that intersects into the range will generate AO effect. The unit is centimeter.

This value determine the sharpness of the edges for the overlapped front and back surfaces that are both blended with AO effects.

This value determines the angle of the spherical range for generating AO. The higher the value, the less AO effect will be generated within the spherical range.
Using AO Effect (New for V7.0)

For adding the AO effect onto an object, please follow the steps below:

1. Prepare a project with objects.

2. In the Visual panel > Atmosphere tab > Ambient Occlusion section, activate the Ambient Occlusion box.

3. Set the blending strength of the AO on the scene (The degree of blending for Visualize AO) by adjusting the Blend Intensity slider.

4. Change the Range to determine the size of the range that will detect the surfaces intersect into the range for generating AO.

5. Adjust the Sharpness to determine the edge sharpness for the AO effect.

   The Sharpness is increased from 0 to 50.

6. Adjust the Bias to change the offset of the AO result.

7. Switch back to Apply AO mode to view the result.
The Concept of DOF (New for v7.1)

DOF, also known as Depth of Field, adds extremely dramatic effects to the results. You can pick an object at a specific distance to be rendered clearer while all the others are blurred. The DOF can be set as a key on the Timeline to generate an even more stunning animation.

Please refer to the sections below for more information:

- The Concept of DOF
- The Introduction for DOF Related User Interface
- Setting Focus Distance
  - About Perfect Focus Range
- Enhancing Spatial Impression with Blur Effect
- Adjusting Blur Transition Regions
- Using bokeh effects
- Creating DOF Animation
- Fixing Visual Defects of Out-of-focus Objects
- Known Issues
The Concept of DOF (New for v7.1)

In iClone, the DOF can be defined by 5 zones as shown below:

- **Pure Red Zone**: The perfectly focused region. All objects in this region display clearly.
- **Pure Green Zone**: The out-of-focus region beyond the Red Zone. Objects in this region are blurry.
- **Pure Blue Zone**: The out-of-focus region between camera and the Red Zone. Objects in this region are blurry.
- **Violet Zone**: The region for the transition of blurriness between the Red and Blue Zones.
- **Orange Zone**: The region for transition of blurriness between the Red and Green Zones.

These zones are divided by four red frames in iClone illustrated below (these frames can only be seen from the side view of the camera whose DOF and View DOF Regions features are both activated).
If you want to observe with the **DOF Region** colors, then you must do it through the view of the camera whose **DOF** feature is turned on.

- **Pure Red Zone**: The perfectly focused region. All objects in this region display clearly.
- **Pure Green Zone**: The out-of-focus region beyond the **Red Zone**. Objects in this region are blurry.
- **Pure Blue Zone**: The out-of-focus region between camera and the **Red Zone**. Objects in this region are blurry.
- **Violet Zone**: The region for the transition of blurriness between the **Red and Blue Zones**.
- **Orange Zone**: The region for transition of blurriness between the **Red and Green Zones**.

The **DOF** result:

Note:

Please keep in mind that unlike the camera in the real world, **DOF** in **iClone** is not generated by means of the camera lens.
The Introduction for DOF Related User Interface (New for v7.1)

Modify Panel

1. **Activate** Check this box to activate the DOF effect.

2. **Focus Settings**
   - **Pick Target**: Push this button and click on the surface on the view port to determine the target mesh to be focused. It will automatically set the value of the **Focus Distance**.
   - **Focus Distance**: You can use this value to fine-tune the focus distance to a part that cannot be selected from the view port, such as the leaves of speed trees.
   - **Perfect Focus Range**: Set a range that will be clearly focused. The value times two defines the perfect focus range. Every object within this range will be free of blurriness.

3. **Blur (De-focus) Settings**: Use these sliders to determine the width of the near and far **transition regions** and the blur levels, for the completely de-focused near and far regions.

4. **Blur Edge Sample Scale**: This value is used to fixed some sharp-edge imperfection of the objects in the de-focused or transition regions.

5. **Bokeh Type**: This drop-down list can be used to determine the glowing shapes for the highlights in the blur or transition regions.

6. **View DOF Regions**: Activate this checkbox in order to view the different regions in their representative colors.
Open the **Preference** panel (Shortcut: Ctrl + P), in the Real-time Render Options section, you can find the DOF related settings. They are used to visibly render the DOF in the viewport. Please keep in mind that for exported media, the settings are always **ON** even if they are deactivated in the **Preference** panel.

1. **Depth of Field**: These two settings can have the most accurate DOF real-time render effect. However, they also consume a lot of system resources. You can consider turning them **OFF** for lower-end system devices because it will not influence the final rendered result (always **ON**).
   - **Soften Edge**: Activate this checkbox to have Blur Edge Sample Scale value (4th item in the previous table) take effect in the viewport.
   - **Correct Transparency**: Enable to correctly render out of focus objects behind semi-transparent materials.
Setting Focus Distance (New for v7.1)

The **Focus Distance** is the distance between the camera and the focused object. You can set the value by using the **Pick Target** feature or by entering a certain value.

**Note:**

The unit of the value for **Focus Distance** is **cm** (centimeter); and the default value is **1000** which is 10 meters.

Picking the Target

Picking between multiple objects

Hit the **Pick Target** button and click on the object you want to focus, the point on the surface you click will be used to measure the **Focus Distance** value.
Picking Certain Surface Point of One Large Object

With the Pick Target feature, you are able to set the focus on a certain surface point of a large object.

Because the DOF is now surface-based instead of pivot-based (traditional iClone method), any point on the mesh of an object can be picked as the focus center (FD in the illustration stands for Focus Distance).

Manually Setting Focus Distance

In addition to use Pick Target method to set the Focus Distance, you are allowed to manually type in a value. This helps you to set the distance especially when you want to focus on something that can not be picked, such as the leaves of speed trees.

1. Hit the Pick Target button and click on the stem or the root of the speed tree that you want to focus.
2. Manually adjust the Focus Distance value in order to focus on the leaves instead of the stem of the plant.
About Perfect Focus Range (New for v7.1)

The **Perfect Focus Range** is a region in which everything looks clear in the camera view.

You can set the width of the Perfect Focus Range in terms of distance (**centimeter**):

This value actually defines the far and near boundary distances offsetting from the focus center (defined by the **Focus Distance**). Therefore, the value times 2 is the real width of the range. In the illustration below, the **N** is the value we see on the Perfect Focus Range field.
Through the camera with DOF on, the diagram looks like the illustration below:

Note:

The unit of the value for Perfect Focus Range is centimeter.
Enhancing Spatial Impression with Blur Effect
(New for v7.1)

In order to increase the spatial impression of your project like the photos taking in the real world, you can use the DOF effects. By adjusting the blurriness of different (far and near) regions, the impression can be enhanced drastically.

Given a project as shown below: the depth of the scene is not obvious due to the angle of the camera.

You can activate the DOF effect and set the Focus Distance with Pick Target or manually enter a value:

Setting Blur Strength

The Blur Strength can be used to increase or decrease the blurriness for the de-focused region.

1. Make sure the DOF effect is turned on as shown in the previous illustration.
2. Select the camera whose DOF is turned on. Open the Modify Panel
3. Scroll to the Depth of Field section; in the Blur Settings group, drag the Near Blur Strength slider around.

Because the Lock Near and Far Effect checkbox is activated, the Far Blur Strength is disabled and its value will be auto-set along with the value of Near Blur Strength.

4. If you want to respectively modify the blurriness for the near and far blur regions, then deactivate the Lock Near and Far Effect checkbox.

5. Respectively adjust the value for the Near Blur Strength and Far Blur Strength.

In this case, the Far Blur Strength is increased to make the object in this region more blurry while the Near Blur Strength is decreased to show the objects within this region more clearly.
Adjusting Blur Transition Regions (New for v7.1)

In iClone earlier version, the DOF has only three regions, the Perfect Focus Region, Near Blur Region and Far Blur Region. However, this design will causes sharp boundaries between the focus and out-of-focus regions.

In iClone 7.1, two new region, Near Transition Region and Far Transition Region, are added to solve this issue.

Setting Length of Transition Regions

The Transition Regions can be used to increase or decrease the length of the regions from the perfect focus area to the completely blurry areas.

1. Make sure the DOF effect is turned on as shown in the previous illustration.
2. Select the camera whose DOF is turned on. Open the Modify Panel.
3. Scroll to the **Depth of Field** section; in the **Blur Settings** group, drag the **Near Transition Region** slider around.

Because the **Lock Near and Far Effect** box is activated, the **Far Transition Region** is disabled and its value will be auto-set along with the value of **Near Transition Region**.

4. The sharp boundaries between the perfect focused area and the completely blurry areas are eliminated.

**Note:**

If you want to separately modify the blurriness for the near and far blur regions, then deactivate the **Lock Near and Far Effect** box.
Using Bokeh Effects (New for v7.1)

Bokeh, in photography, can be defined as the way in which the lens renders out-of-focus points of light. In iClone, the DOF effect also provides the Bokeh feature with different shapes.

Using Bokeh Effect

1. Prepare a project in which the background contains highlights, mid-tones and dark areas.

2. Select a camera, open the Modify Panel and turn on the DOF effect.
3. Scroll to the **Depth of Field** section and choose a shape from the **Bokeh Type** drop-down list.

Different bokeh type can have different effects on the highlights in the blurry regions.

**Note:**

The higher the blur strength is, the stronger and clearer the **Bokeh** shapes will become.
Creating DOF Animation (New for v7.1)

By setting DOF keys in different time frame, you can also create DOF animation in order to draw the audiences’ attention to follow certain objects in the scene.

Open the DOF track of the custom camera to set keys in order to generate DOF animation.

The results shown below:
Fixing Visual Defects of Out-of-focus Objects (New for v7.1)

Fixing Sharp Edges for Objects in Blur Region

When the DOF is turned on, there maybe some objects in the blurry regions that erroneously retain sharp edges.

1. Open the **Preference** panel.
2. In the **Real-Time Render Options** section, activate the **Soften Edge** checkbox in the **Depth of Field** group.

3. Make sure the camera is selected and open the **Modify Panel**
4. In the **Depth of Field** section, increase the slider value for **Blur Edge Sample Scale**. The sharp edges of the blurry object will also become blurry.
Fixing Blurriness behind Semi-transparent Object

When the blurry region falls behind any semi-transparent objects, the blurry effect will be turned off as shown below (the camera focus is set on the painting on the glass):

1. Open the Preference panel.
2. In the Real-Time Render Options section, activate the Correct Transparency box in the Depth of Field group.
3. The objects behind the semi-transparent objects correctly display the out-of-focus effect, as well as the transition regions effect.

Note:

- These two settings in the Preference panel only affect the real-time rendering result of the view port, for the final rendering, they are always activated.
- These features consume considerably more system resources.
Known Issues for DOF (New for v7.1)
Although DOF can increase the visual quality, however, there are still some known issues with the DOF effect.

Highlight Flickering in View Port
When the project is played, the objects with high reflectivity (Roughness image is close to black) will have flickering visual defects. Once DOF is enabled, the defects becomes even more serious.

Solution for Final Rendering: When you want to export image or video from the project of this kind, please apply Super Sampling - 3x3 setting to decrease the flicking issue.

TAA and DOF
When TAA and DOF are both turned on, the object with high reflectivity in the blurry region flickers.

Note:
The flickering issue only shows in the real-time view port and does not happen for the final rendering.
Interference Between Near and Far Blur Regions

When the objects in the **Near Blur Region** enter the **Far Blur Region** on the view port, the adjusting of the **Far Blur Strength** influences the blurriness of these objects in the **Near Blur Region**.

![Image of objects in different blur regions](image)

**Far Blur Strength** = 0.4
The edges of the objects, the bush, in the **Near Blur Region** are sharpened.

**Far Blur Strength** = 1.8
The edges of the objects, the bush, in the **Near Blur Region** are blurred.

DOF and Edges of Object in Near Blur Region

If you have turned on **DOF** effect and turn up the **Far Blur Strength** value, the near objects in the **Perfect Focus Range** occasionally display parallel lines around the edges of the object as shown below:

![Image of DOF effect with parallel lines](image)

**Note**: Currently, there is no solution for this issue.
Blur Edge Sample Scale Influence Transition Region Effects

When you are creating DOF animation, turning up the Blur Edge Sample Scale value will degrade the transition effects of the Near and Far Transition Regions.

Semi-Transparent Object Layering Issue

When there are other semi-transparent objects that sit behind other semi-transparent objects that are in focus, the following defects will occur:

Note: There is currently no solution for this issue. Try your best to avoid this type of scenario.
Using Effects
With enhanced post-FX rendering options, you can render and create key-able visual effects like blur lens, sketch or black & white. This allows for a wide range of amazing post effects that transform any 3D animation into top-notch, studio art motions.

Applying Effects from the Effect Library
1. Prepare a project.

2. Switch to the "Stage" tab in the Content Manager. You will see several built-in templates in the Effect library.

3. Double-click on one of the templates.

4. Preview the rendering result by pressing the Current Frame Preview button (Shortcut: F10) in case you’ve turned off some effects for the sake of system loading.
Modifying Current Effects

Each applied effect contains one or more adjustable sliders for you to define the weight or strength of the effect.

1. Switch to the Effect tab in the Visual Settings panel.
2. Select a template in the Effect List.

3. Under the list pane, drag the slider to adjust one or more parameters provided by the effect.

Effect: NPR (Non-photorealistic Rendering)

Paint Weight = 100
Colorful = 20

Paint Weight = 40
Colorful = 6
Mix-using Effects

- If you apply more than one effect, then the result will be the accumulation of these effects. You can combine these various effects to create unique visuals.

- The order of some effects in the list can cause different result since the effects are layer-based filters. The outcome of an effect is produced according to the effect on the lower layer in the list.

Note:

You may use the ↑, ↓, ↑, and ↓ buttons to arrange the order in the list.
Setting Keys for Effect
The parameters provided with each effect are all keyable, which means you can increase or decrease the intensity of each effect as your project plays on.

1. Apply an effect from the library. (Lens Bur for example)
2. In the first frame, set the strength of the effect to 0 (no effect).

3. Go to another frame and increase the strength.

4. Go to another frame and decrease the strength to 0 again.

5. Play back to gradually see the effect changes.
Particles

iClone is exploding with new immersive features including Particle effects which make it possible to create elemental effects like smoke, fire and blizzard. Expand your imagination and create magic-casting effects for avatars and scenes. Particles are completely customizable and savable to a custom library.

iClone produces the particle effect as a layer and merges this layer onto the scene to create an image containing moving particles.

Please read the following sections for more details:

- Structure of particle system
- Generating particles
- Adjusting particles
- Adjusting emitters
- Moving, rotating emitters
Structure of Particle System

1. Particle
   The image objects ejected from the emitter. By means of adjusting the attributes of the particles, such as the image sizes, the blend methods, and so on, you can create sandstorms, fires, smoke and lots more in your scene.

2. Volume of Emitters
   An invisible cube consisting of emitters. You may change the volume by adjusting the size of the container or offset it from the pivot.

3. Gizmo
   The gizmo is the real location of the particle set. You can pick, move or rotate it at different times to generate moving particle effects. You can use the gizmo to link or attach the particle set to another object, or have it move along a specific path.

Generating particles
Adjusting particles
Moving, rotating emitter
Back to Particle menu

Note:
The default showing of the particle is off. For you to adjust each element please enable show in the scene manager to see both the gizmo and invisible cube of the particle.
Generating Particles

iClone provides several categories of particles for you. You may apply them and then modify the parameters to change the result.

1. Switch to the Set tab and the Particle library in the Content Manager. Double-click on any one template in these categories and your project generates particles accordingly.

2. Play back the project to see the result.

As for the other parameters for adjustment, please read the next section:

- Adjusting Particles
- Adjusting Emitters
- Moving, Rotating Emitters
Adjusting Particles

We will explain the usage of all the parameters for the particles in this section. Please visit the official web site for the particle introduction.

**Particle Settings**

<table>
<thead>
<tr>
<th>Texture</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diffuse</strong></td>
<td>You can change the color or image for each particle.</td>
</tr>
<tr>
<td><strong>Opacity</strong></td>
<td>This parameter decides the shape and the transparency of your particles.</td>
</tr>
</tbody>
</table>

Please refer to Multiple Channel Texture Mapping for more details.

**Blend Mode**

The three radio buttons in this group define how the particles are to be blended with the background.

- **Alpha** - You may see the original color of the image for each particle.
- **Addition** - The RGB color of the image for each particle will be added onto the color of the background. This parameter is useful especially when you want to create glowing particles in your projects.
- **Subtraction** - The RGB color of the image for each particle will be subtracted from the color of the background.
**Particle Key**

iClone provides each particle with four keys for the duration of its life. Every particle key stores the **Color**, **Opacity**, and **Size** data, which will allow you to create **Fade In/Fade Out** effect for individual particles.

- Click one of the four keys to change the **Color**, **Opacity**, and **Size** data in the key.
- You may drag the middle two keys to redefine the timings of these two keys during the particle’s life.

**Color** - Define a color to be blended with the image you load for the particles when they are generated / eliminated.

- **Opacity** - Set the transparency for particles as they are generated / eliminated. Set 0 to make it totally transparent and 255 for opaque.

- **Size** - The size of each particle can be modified via the settings in this group so it transforms gradually and linearly within its life span.
Rotate

The particles rotate as long as you modify the settings in this group.

- **InitialAngle** - By setting the value in this box, each particle tilts clockwise in the angle of this value as being generated. The range is from 0 to 359 degrees.
- **AngularVelocity** - These settings keep each particle rotating individually in different velocity. You may set the range from 359 degrees to 359 degrees. A positive / negative number constrains the particles to rotate clockwise / counterclockwise. The larger the number is, the faster the particles rotate.

The relationship of the Min and the Max follows the formula:

Min \(\leq\) Max

Softness

Drag the slider to decrease the seams as the particles intersect with other objects in the scene, which improves the realism of the particles.

Softness Strength

Ori-entation

Basically, each particle is a matted billboard that will be facing the current camera all the time. However, if you want the camera to view above or beneath the particle, you will need the Orientation feature to get desired result.

- **Face Cam** - This option is suitable for non-directional particles such as fire, fog or storm.
- **Vertical** - This option aligns the particles to the Y axis, which is suitable for vertically directional particles such as raindrops.
- **Horizontal** - This option aligns the particles to the floor, which is suitable for horizontally directional particles such as ripples.

Life (frame)

The parameters define how long each particle lives. You can make your particles disappear at random ages from Min to Max frames.

- **Min** - The least number of frames for each particle to live. The value can be set from 0 to Max.
- **Max** - The highest number of frames for each particle to live. The value can be set from Min to 99999.

Force
**Gravity**
- It creates a force field to pull particles in a fixed direction specified by three parameters. The strength of the field increases as the values move up. The speed of the particles are accelerating per unit of time.
- **X** - Particles are pulled along the X-axis. The range is from -99999 to 99999.
- **Y** - Particles are pulled along the Y-axis. The range is from -99999 to 99999.
- **Z** - Particles are pulled along the Z-axis. The range is from -99999 to 99999.

**Wind**
- It simulates the effect of wind on the particles. The particles increase their velocity along the direction you set. However, the speed is constant instead of accelerating per unit of time.
- **X** - Particles are blown along the X-axis. The range is from -99999 to 99999.
- **Y** - Particles are blown along the Y-axis. The range is from -99999 to 99999.
- **Z** - Particles are blown along the Z-axis. The range is from -99999 to 99999.

If you are already familiar with how the settings influence the particles, click the link below for next section:
- [Adjusting Emitters](#)
Adjusting Emitters
If you totally understand how the emitter links to its parent, please read the following section for further adjustments to the emitter itself.
Please visit the official web site for the particle introduction.

Emitter Settings

- **Quota** - This defines how many particles are provided when the project plays back. Once the amount of the particle alive hits the number of Quota, the emitter pauses to send off particles.
- **EmitRate** - This enforces the emitter to eject a specified number of particles per second.
- **EmitVolume** - There are three parameters which modify the dimension of the container. Since the emitters spread averagely within this container, they can create an illusion that the volume of the particles is increased.
- **Position** - These X-Y-Z parameters move the cube of emitters to a specific position in your project.

**Direction**
With the idea of a longitude and latitude system, the emitter obtains the direction for sending off the particles. Please notice that the effect can be observed when the Velocity parameter increases.

- **Longitude** - This value decides the degree of the angle on the floor. 0 degree sets the direction along the positive X-axis. The range is from -180 to 180 degrees.
- **Latitude** - This value lifts up / push down the direction to the north / south pole. The range is from -90 to 90 degrees in which 90 degrees set the direction to up.
To understand these two parameters, you must think of a pyramid in your mind first. The top of the pyramid is the position for the emitter and it ejects particles straight to the bottom of the pyramid.

- **Spread** - This value decides the angle of the two opposite sides (the red and green lines in the illustration as **Diagonal** equals to 0) of the pyramid. The range is from 0 to 180.
- **Diagonal** - This value specifies the rotation angle of the diagonal line (the blue line in the illustration) of the pyramid bottom. The range is also from 0 to 180. Please notice that the area will be maximized when the **Diagonal** is set to 45 and 135 degrees.

**Velocity & Direction Randomness**

- **Velocity** - This value assigns the speed to each particle for moving. The range is from 0 to 99999.

- **Diagonal value changes from 0 to 90 degrees**
- **DirectionRandomness**: Initially, each particle moves along a path of a fixed straight line. This attribute distorts this line so the particles move individually along different distorted lines. The range is from 0 to 359. Each particle slightly changes its direction randomly in accordance with the angle from x, y and z axis. It is useful when you want the particles to imitate the motion of the snow or falling leaves.

Direction Randomness = 0
Direction Randomness = 30

Please refer to the [Moving, Rotating Emitters](#) section for more information.
Moving, Rotating Emitters
There are methods to transforming a particle set:

**Using Transform Data**
1. Go to the start frame when the particle set begins to move or rotate. Select the pivot of the particle set.
2. In the **Modify** panel, change the **Move/Rotate** values in the **Transform** section. A new key is added to store the transform status of the set. You may also drag the gizmo by using the Gizmo tool or transform Gizmo to set a key for the particle set.
3. Go to another frame when the set stops transforming. Change the **Transform** values again.

**Moving along a Path**
1. Go to the start frame when the set of particle begins move along a path. Select the pivot of the particle set.
2. Click the **Pick Path** button in the **Path** section and click on the desired position of the target path.
3. Go to another frame where the particle set stops moving along with the path.
4. Click the **Pick Path** button and click on another position of the target path where the particle set stops moving.

Note:

Please refer to the **Path** section for more information.
Utilizing HDR Effect

The HDR (High Dynamic Range) effect in iClone accurately represents the wide range of intensity levels found in real life high contrast scenes as result from direct sunlight and shadows.

Please visit USC - Institute for Creative Technologies Graphic Labs web site for more HDR resources.

**Global HDR Effect**

The HDR effect in iClone globally processes the light and shade strengths using two simple parameters, Brightness Threshold and Bloom Scale.

- **Brightness Threshold**: Defines the areas to be rendered with HDR effect by brightness.
- **Bloom Scale**: It causes the bright areas to glare (become edge-blurred) to imitate the light spreading from the areas. The higher the value, the wider the spreading range.
Fine-tuning with Tone Map
The high dynamic range image is passed to a tone mapping operator that transforms the image into a low dynamic range image suitable for viewing on regular displays. The strong contrast reduction phenomenon is resolved while the image details and color appearance are preserved. After you turn on the HDR feature, you may also fine tune the result to increase the dramatic effect by specifying the Gaussian Scale and the Exposure in the Tone Map section.

- **Gaussian Scale**: Though this parameter usually defines the radiation smoothness for the HDR image, you may increase its value to see more details in the bright areas of the preview window.
- **Exposure**: This parameter defines the global exposure level of the preview window. Increase this value to see more details in the dark areas of the preview window.

![Gaussian Scale](image1.png) ![Exposure](image2.png)

**Adaption Speed**: This parameter defines the adjustment speed of the pupils when the eyes encounter a severe change of the lighting strength.

Using Glare
You can use the **Glare** feature to apply various lens effects to the project.
1. Select a **Glare Type** from the drop-down list.
2. Adjust the **Scale** slider to define the span of the selected glare effect.

Note:
- You may optionally adjust the values described above to prevent over-exposure of your scenes.
- Please note that the parameters with green names are key-able in different time frames.

HDR as Texture
If you have HDR images at hand, you may also load them into the texture channels (**Reflection**, especially) to create higher contrast and more impressive effects.

![Prop with reflection parameter only](image3.png) ![Prop using Reflection channel with HDR image](image4.png)
HDR Enhancements (New for V7.0)
Because of the algorithm adjustments, loading the legacy iClone 6 HDR effect project into iClone 7 might have different visual results (e.g., no red halo, different brightness). You can still modify in accordance with your needs.

Red Halo Issue
The red halo issue is fixed up, even though the blooming effect is increased. Please click [Here](#) to view the differences.

Flickering Issue
The flare-flickering issue is also suppressed in iClone 7.

- Before:

  ![Before](image)

- After:

  ![After](image)
Enhanced Bloom Settings (New for V7.2)

In iClone 7, the blooming effect from HDR can be optimized manually to increase the visual effect for the entire scene.
Fog

The Fog effect surrounds your scene with fog to create different atmospheres for your stories. When you choose to use the fog feature in iClone, the program generates color of depth so that every 3D object in the scene is blended with the color you have defined. Thus the fog effect is created.

In the following sections, you will learn more about how this new feature.

Adding fog
Adjusting fog
Adding Fog
It is simple to add fog to your project. Please follow the steps listed below:

1. Create a custom project.

2. Open the Visual panel (Shortcut F7) and scroll to the Fog Settings section.
3. Activate the Fog On box to turn on the fog.

4. The project will be appended with Fog effect.

The sky in the scene is not affected by the fog effect currently.
5. Activate the **Affect to Sky** box in the section.

**Note:**

The **Affect to Sky** is synchronized to the **Fog Influence** setting in the **Sky** section of the **Modify** panel for **Sky** object.

As for the other parameters for adjustment, please read the next section, **Adjusting fog**.
Adjusting Fog
There are three parameters to set to create fog in your scene. After the Fog on box is activated, these three settings will be enabled.

- **Fog Color**: Pick a color for your fog. Different fogs can create different atmospheres.
Chemical Gas Leakage

- **Distance Start** This value defines the distance from the camera to where the fog starts. Everything within this distance is clear without fog effect.
- **Distance End** value to decide the length from the camera that the fog ends.

The **Fog** effect only takes place within the range defined by the **Near** and **Far** values.
Using Toon Shader

To roto 3D animation in iClone, you may use the Toon Shader feature. This feature traces the color of every object (Sky, 2D Background and Textures of the 8 channels on objects are excluded), and converts them into cartoon styles. Cartoon rendering and cell shading allows animators to create a flat-looking 3D image with a cartoonish look, typically exemplified in artistically animated movies. You may then profile objects with outlines and blend the Diffuse, Ambient and Specular colors of each object with the color settings of the Toon Shader to convert these objects into three color levels: Light, Midtone and Shade.

Profiling Outline of Objects

With the Toon Shader feature, you are able to trace the outline of objects, and define the color and the width of the outline.

Enabling the Toon Shader

1. Switch to the Toon Shader tab in the Visual Settings panel.
2. Enable the Toon Shader box.

![Toon Shader Enable](image)

Toon Shader = Off

![Toon Shader Enable](image)

Toon Shader = On
Modifying the Edge

- The width and strength of the edges on objects can be modified to create more artistic projects.

![Edge Width](image1.png)

**Edge Width = 1**

![Edge Intensity](image2.png)

**Edge Intensity = 20**

![Color Picker](image3.png)

**Silhouette Edge = Red, Green and Blue**

- The edges can be defined to a solid color or use the color-swatch or the colors of the adjacent faces.

- By adjusting the value of **Normal Threshold**, the edge lines are drawn according to the angle formed by two adjacent faces. The higher the threshold value is, the fewer edges are traced.

![Threshold](image4.png)

**Threshold = 0**

![Threshold](image5.png)

**Threshold = 100**
Because the normal directions of some polygons, from same or different objects, can be identical, the edge lines will be vague or even ignored when the objects are hindered by each other. Turn on the **Visible Intersection Lines** and the edge lines will be forced to appear.

- **Visible Intersection Lines = Off**
- **A**: The line is vague.
- **B**: The line is totally eliminated.

**Defining the Range of Three Color Levels**
The **Toon Shader** feature uses three color levels to present the 3-dimensional sensations of objects. You may make the range of each level to set the objects brighter or darker. The ranges of the levels are as described as in the illustrations below:

- You may drag the two anchors to adjust the range of each level.
- You may also adjust the two colors by clicking the color-swatch. The gradient color of the three levels between these two colors will be automatically generated.

Adjust the two colors. The midtone color will be auto-generated.
Toon Shader and Texture
The purpose of the Toon Shader is to make your work look like a cartoon. However, if the objects within the project contain textures then the Toon Shader effect and the textures will be blended together.

Blended Toon Shader and Texture
When the Toon Shader works with textures, the result can be inadequate. It depends on the result shown on the screen. You may sometimes do some modifications to get the best appearance. Please note that the Bump and Displacement texture effects can not be seen when the Toon Shader is ON.

Blended Toon Shader and Colors
The Toon Shader covers three levels of colors onto all objects, and once the colors are set, the Diffuse, Ambient and Specular colors of objects will be blended with the three-level gradient colors.
You may drag the two anchors to adjust the range of each level.
Sketching the 3D Scene

The Toon Shader empowers you to sketch up your 3D scenes, which help you produce cartoon-like animations from a 3D world.

1. Create a 3D scene.

2. You may optionally remove partial or all the textures in the scene.

3. Turn on the Toon Shader.

4. You can turn the outline off by setting the Edge Width to 0, and customizing the 3 level colors by setting the two colors.

5. Increase the Edge Width

6. Change both the two colors to the same color to make your 3D world turn completely into a sketch.

The two colors of Toon Shader are set to gray. Change the Silhouette Edge color to create a blueprint.
Multiple Channel Texture Mapping

iClone supports the following Texture Mapping effects: Diffuse Opacity Glow Bump (Normal included) Specular Reflection Blend and Displacement. All or some of these texture mapping effects can be applied to the following iClone items: Head Hair Upper body Lower body Gloves Shoes Skin Accessories and Props.

The following sections describe each of the Texture Mapping effects.

- The Maps for Objects
- Types of maps
- Modifying Texture Settings
- Modifying Material Settings
- Adjusting Colors on Eight Texture Channels
- Texture Channel UV Offset and Tiling
- Synchronizing UV Changes to Channels
- UV Reference
- Replacing and re-generating Model UV
- Model Mapping Method
- Texture Channel UV vs. Model UV Setting
- Mapping Method for Multi-Material Object
- Load and Save Materials
- Retrieving Material Settings
- Editing Multiple Materials
- External Texture and Material Sharing
- Material Key and Material Key Frame Animation
- Saving Keys to Material Template
## The Maps for Objects

iClone provides several texture mapping effects, however, certain objects only possess some, but not all, texture mapping types.

<table>
<thead>
<tr>
<th>Image Layer</th>
<th>Diffuse Map</th>
<th>Opacity Map</th>
<th>Glow Map</th>
<th>Specular Map</th>
<th>Bump Map</th>
<th>Reflection Map</th>
<th>Blend Map</th>
<th>Displacement Map</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

- **Head**
- **Eyes**
- **Oral**
- **Hair**
- **Skin**
- **Upper Body**
- **Lower Body**
- **Gloves**
- **Shoes**
- **Accessories**

---

Image Layer
Props
Grass
Particle
Water
Sky
Head
Eyes
Oral
Hair
Skin
Upper Body
Lower Body
Gloves
Shoes
Accessories
Types of Maps
Each material can have up to 8 map channels that collaborate with each other to form the texture of the object the material is applied. You may go to the Texture Settings section in the Modify >> Material tab to see these channels.

Diffuse map
- The most frequently used texture mapping method. It wraps the bitmap image onto the 3D geometry surface while displaying its original pixel color.
- Any bitmap image, such as scanned images or images captured by digital camera, can be used as diffuse map to represent photo realistic quality.
- Users can also use image software to make pre-rendered texture effects such as shadow, bevel, bump, lighting or weathering effects. This approach can effectively simulate real-world 3D effects while greatly saving system resources and rendering time.

Opacity map
- Make transparency and cut-out effects from grayscale images. The black part will get cut out; the white part will be fully displayed; the gray values determine the transparency (alpha) level of the object.
- Use bright gray RGB(253,253,253) on the Opacity map to make 2-sided 3D Surface from Plane mesh.
**Bump map**
- When you import an image to the **Bump** channel, a dialog will pop up to ask you the format of the image. Choose the **Bump** radio one if the image you want to import is in a **grayscale** one.

![Import Bump Map Dialog](image)

- Bump mapping uses the grayscale values of an image map to create variations in the shading of the surface to which the map is applied. It adds details to 3D models without increasing the number of polygons. In **iClone**, white areas of a bump map are shown as high and black areas are shown as low.
- By moving around the light source we can see how the angular light projection changes the bump look. If the light is facing the surface from a straight 90 degrees angle it the bump effects are the least noticeable.

![Prop with diffuse map only](image) ![Bump - the edge blur from the bump source image causes a softer bevel effect](image)

**Normal map**
- When you import an image to the **Bump** channel, a dialog will pop up to ask you the format of the image. Choose the **Normal** radio one if the image you want to import is in a **normal-based** one.

![Import Bump Map Dialog](image)

- A **Normal map** is made from a high polygon model. Its color representation will affect surfaces like a regular bump map while providing higher degrees of detail.
- **iClone** can import normal maps created in **ZBrush** or **3D Studio Max**. By using **Normal Maps** you can make simple low-poly models appear as highly detailed 3D objects.
- If the image you are loading is not a specially designed **normal map**, then the result will not be as good.

![Prop with diffuse map only](image) ![Normal bump](image)
Specular Map
This texture mapping method allows parts of an object to have a Specular (light-reflecting) effect.

![Prop with diffuse and bump maps](image1.png)

![Specular map determines the areas that reflect the light](image2.png)

Glow map
- This texture mapping technique allows users to control the glow shape, color and strength.
- Glow maps will blend with your original diffuse maps, so the lighter the diffuse color (or glow color), the stronger the glow effect.
- A bright diffuse map in combination with a bright glow map might cause overexposure.

![Prop without any texture maps](image3.png)

![A Glow map is applied](image4.png)

Tip to create a subtle and effective glow effect:
- Choose a diffuse image which could ideally glow in the real world.
- Prepare the glow map, pattern and color design
- Start by testing from a darker glow map, then increase the brightness step by step to see the best brightness setting
- Decrease the overall ambient light

Reflection Map
Reflection map is also referred to as environment map. The image map is projected onto a 3D surface to represent a fake reflection of the environment.

![Prop with diffuse map only](image5.png)

![Reflection image is projected onto the object](image6.png)

Note:

To create good Reflective effects you should start by using an object that has high specular highlight and gloss values. Then apply black or darker images as the Diffuse map to help making the surface work like a mirror which can fully reflect the reflective map content. If the diffuse map itself is too bright the front light plus reflective setting could cause the result to be overexposed.

- Most 3D Blocks items are preset with a non-glossy material setting. To achieve high gloss and specular objects, check the Props\Gloss folder
- Adjust the camera and light direction to see the natural changes to the reflective surface.

Sample: Combining Several Texture Effects - Semi-transparent and reflective surface
Blend Map
You may add any kind of images as the **Blend** map to blend with the **Diffuse** map, which increases the details and subtleties of the object. iClone also provides three methods: **Multiply**, **Addition** and **Overlay** for blending.

Displacement Map
You can create monochrome image maps with popular image-editing tools such as Photoshop. By using grayscale height maps, you can push and pull the surface of a 3D model to achieve the ideal look you desire.

Using a vector-based displacement map can produce undercut details on your model. Unlike the height displacement map (monochrome) simply stretches out geometry, vector displacement produces refined curves and edges, creating an unparalleled sense of detail to your model.
Adjusting Colors on Eight Texture Channels

Adjust Color

With iClone, you can now adjust the color of any selected channel. This powerful feature allows you to change the texture color or opacity/bump patterns without the need to open external image editing software.

By adjusting Brightness, Contrast, Hue, and Saturation, you can create countless texture effects of your 3D models. In this table you can see how the adjustments affect each texture channel.

<table>
<thead>
<tr>
<th></th>
<th>Diffuse</th>
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<th>Bump</th>
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<tr>
<td>Brightness</td>
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<td>Effective</td>
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<td>Effective</td>
</tr>
<tr>
<td>Contrast</td>
<td>Effective</td>
<td>Effective</td>
<td>Effective</td>
<td>Effective</td>
<td>Effective</td>
<td>Effective</td>
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<td>Effective</td>
</tr>
<tr>
<td>Hue</td>
<td>Effective</td>
<td>Less Effective</td>
<td>Less Effective</td>
<td>Less Effective</td>
<td>Effective</td>
<td>Effective</td>
<td>Effective</td>
<td>Less Effective</td>
</tr>
<tr>
<td>Saturation</td>
<td>Effective</td>
<td>Less Effective</td>
<td>Less Effective</td>
<td>Less Effective</td>
<td>Effective</td>
<td>Effective</td>
<td>Effective</td>
<td>Less Effective</td>
</tr>
</tbody>
</table>

An item listed as Less Effective means that there will be no visible effect at all or that the effect is not obvious.

**Diffuse**

By adjusting the Diffuse image, the 3D model can take on a variety of appearances.

- Brightness = 100 (Over Exposure)
  - Contrast = 80
  - Hue = 17
  - Saturation = 0

- Brightness = 0 (Original Texture)
  - Contrast = 0
  - Hue = 17
  - Saturation = -20

**Opacity**

By adjusting the Contrast of the opacity texture, you can define the level of the face to be masked out. In the following example, the model is mapped with a gradient image shown in this illustration.

- Brightness = 27
  - Contrast = -3

- Brightness = 0
  - Contrast = 100
Bump
When you adjust the **Contrast** setting of the **Bump** channel, you are defining the smoothness or bumpiness of the face.

![Contrast = -90](image1.png)  ![Contrast = 100](image2.png)

**Specular**
The **Specular** setting is very useful when you want to create a damp or oily effect on your object.

![Brightness = 0](image3.png)  ![Brightness = 100](image4.png)

**Glow**
Adjust the **Glow** map to change the intensity of the glowing effect of your objects.

![Saturation = 0](image5.png)  ![Saturation = 100](image6.png)

*Note: The glow texture is modified.*

**Blend**
To adjust details or subtleties blending to the **Diffuse** map, modify the **Blend** map instead of launching an external image editor to edit the diffuse texture.

![Blend Mode: Overlay](image7.png)  ![Blend Mode: Overlay](image8.png)

Note:
- These features in the **Adjust Color** section will not set animation keys on the timeline.
- Please refer to Types of maps for more information.
- Please also refer to Material Key and Material Key Frame Animation for more information about texture animation.
- Please refer to Synchronizing UV Changes to Channels for more information.
Enhanced Glow Settings (New for V7.2)

In iClone 7, the blooming effect from Glow Effect can be optimized manually to increase the visual effect for the object with Glow texture.
Using Adjust color Panel (New for v7.0)

Texture maps adjustments now come in the form of a dock-able panel for more convenient access. In addition, you can directly drag a texture map to their corresponding thumbnail to apply that texture.

In the past, Color Section was placed at the bottom of the Modify Panel which forced the user to scroll up and down for color adjustment. It was both time-consuming and cumbersome.

However, the new Adjust Color interface unified all color adjustment parameters so one can simply click on the desired texture channel and modify it immediately.

This user interface is available under the texture channels for the following assets: iProp, iAvatar, iAccessory, Sky IBL, and Terrain.

Note:

There are two methods to open and close the Adjust Color panel:

- Select the desired texture channel and click the Adjust Color button aforementioned.
- Double-click on the desired texture channel with right mouse button.
Adjust Color Panel Introduction

A Texture  The texture channel that is currently focused upon. Any modification will be applied to this specific texture channel.

B Flipping  Horizontal and Vertical flipping.

C Softness  Softness applies a blur effect.
Modifying Texture Settings
We will take a Prop as example to describe the method of modifying texture settings of the eight channels.

Basic Settings
1. Pick the prop in the project.

2. In the prop's modify panel, switch to the Material tab and scroll to the Texture Settings section. Select one of the texture channels and click the Launch button to open the texture image with your predefined image editor.
You may set your favorite image editing software as the default texture editor in the Preference panel.

- The **Strength** slider defines the display weight of the channel as it is mapped to the object.

3. Modify the image in the texture editor. Remember to **Save** the image after you finish adjusting the image.

4. Go back to iClone. The prop will update its texture automatically.

**Note:**

- You can select an image file directly to replace the texture by clicking the **Load** button.
- If you save the texture as another image file, you have to use the **Load** button to load the image.
- If you want to keep the texture for further use on another object, click the **Save** button for each channel of the textures.
- Click this button to adjust the selected texture image with **Adjust Color** panel.
- Click this button to edit the select texture image with external image editor.
- If you want to remove the texture, click the **Delete** button.
- Press the **UV** button to launch the image editing software opening the UV image of the selected object; you can paint the texture based on the UV position.
Using sRGB (Standard RGB) to Correct Images (New for v7.0)

Use sRGB can be used to evaluate images loaded into the texture channels in sRGB color space.

There are two aspects to Use sRGB, according to the image file you want to load:

- **HDR EXR** for the IBL or any image whose Gamma value is set to 1 in any image editor. Activating the Use sRGB box can cause the image to brighten or darken. Therefore, if the loaded image is of this type, please **DO NOT** activate this feature (it is deactivated by default).

- The gamma values of the common Jpeg, Jpg, BMP, PNG, TGA, GIF images are mostly non-linear. Therefore, when the image of this kind is loaded, the **Use sRGB box MUST BE Activated** (by default). Otherwise, the result will be brighter than it is supposed to be in the real world.
Theory of Gamma and Images

Basically, the color space of the real world is defined as Linear one. And the parameter for defining it is Gamma. Therefore, the Gamma Value for the color space of the real world is set to 1. Linear gamma curve illustrated below:

Because of the hardware limitation of the monitor and for optimizing the image files (defined by sRGB), the Gamma values of them are non-linear (2.2 and 0.45).

Note:

Mostly, the image files with non-linear gamma values are jpeg jpg bmp gif png and tga

However, the image displayed on the monitor will finally shows a linear color space because the complemented gamma curves of the image and the monitor.

PBR Color Space and sRGB

In PBR Color Space mode, images for the base color or diffuse are demanded to be linear in order to show the most correct result of PBR. It basically assumes that each image loaded into the Base Color or Diffuse channel is of 1 gamma value.

In order to complement the gamma value of the monitor (2.2), the PBR Color Space increases the gamma value of the loaded image to show the shader result as you see in the real world.

However, if the gamma value of the loaded image file is non-linear, then the PBR result of the texture will be brighter than the true color.
Modifying Material Settings

**Refraction and Reflection**

These two settings allow users to have the environment reflected by the objects. Please be advised that darker base colors provide clearer **Reflection** and **Refraction** effects.

![Refraction = 0](image1)
![Reflection = 0](image2)

**Refraction = 50**
**Reflection = 0**

![Refraction = 0](image3)
![Reflection = 50](image4)

**Refraction = 50**
**Reflection = 50**

**Effect of Bump to Refraction/Reflection**

Combining **Bump** maps with **Refraction** brings high levels of realism.

![Refraction without Bump](image5)
![Refraction with Bump](image6)

![Reflection without Bump](image7)
![Reflection with Bump](image8)

**Diffuse, Ambient and Specular Colors**

- **A. Diffuse Color.** The **Diffuse** color defines the overall color that is reflected from an object when the light hits it.

- **B. Ambient Color.** The **Ambient** color refers to the illumination surrounding a subject or scene.

- **C. Specular Color.** The **Specular** color only defines the color of the highlighted area of an object. Therefore, you must decrease the **Diffuse** color to see the effect.
Diffuse Color = □
Ambient Color = □

Diffuse Color = □
Ambient Color = □

Diffuse Color = □
Ambient Color = □

A. Specular: The Specular value defines the strength of the highlighted area of an object.
B. Glossiness: The Glossiness value defines the range of the specular to simulate the type of the material.

You may utilize the two sliders, Specular and Glossiness, to create metallic or plastic objects.

Plastic
Specular Value = 35
Glossiness Value = 15

Metal
Specular Value = 200
Glossiness Value = 10

Opacity
Both Opacity and Refraction can turn an object transparent; however there is still something different between them. The scene behind the transparent object distorts when Refraction is on, but no such real life distortion appears when using Opacity.

Transparency by Refraction

Transparency by Opacity
Self-illumination
Increasing the **Self-illumination** value of an object will decrease the ambient lighting or ambient color effects. The shadow on an object will decrease as well. You may use this feature to create a sky dome or cartoon-like 3D models.

![Initial appearance](image1)
![Self-illumination = 100](image2)

Optimization for Diffuse Color, Ambient Color and Specular Color
If you intend to have your models be more impressive and solid, please set the **Diffuse Color**, **Ambient Color** and **Specular Color** to **Pale** Dark and **White**

![Diffuse Color](image3)
![Ambient Color](image4)
![Specular Color](image5)

Diffuse Color: ![Diffuse Color](image6)
Ambient Color: ![Ambient Color](image7)
Specular Color: ![Specular Color](image8)

Tip for the Opacity Keys
When you use the **Opacity** setting to fade out an object, you may find that the specularity or reflection remains even when the opacity value is 1. If you intend to have a crystal effect on an object, keep the **Specular** channel (or value) and the **Reflection** channel (or value) along with the **Opacity** value.

![The original look of the model.](image9)
![Opacity decreased.](image10)
![Reflection decreased.](image11)
![Specular and Glossiness adjusted.](image12)
Retrieving Material Settings

For compound models or models with multiple textures or material settings, it is tedious to search for the target material through the Material List section. Though you can use the up / down arrow keys to browse through all materials if you wish. Applying multiple textures to the target mesh can make a simple model look ultra-realistic.

(As the illustration above shows, SketchUp names all materials that only have a color assignment as Color Material, so their names look the same in the Material List section. It is easier to identify textured materials by their jpeg file names.)

Parameters Stored in a Material Template

In addition to retrieving the images of the six channels, the parameters of the channels are also retrieved. Please refer to the Loading and Saving Materials section for more information:

- The Strength of the textures,
- The Refraction and Reflection settings,
- The Diffuse Ambient and Specular colors,
- The Opacity, Self-Illumination, Specular and Glossiness strength,
- The 2-sided status.
Retrieving and Modifying Materials with Material Picker.

1. Select the model with the texture you wish to modify.

2. Press the **Pick** tool above the list.

3. Click on the face with the desired material in the 3D viewer.

4. The material of the face is retrieved. You may then modify the settings to change the texture.

The glass of the car is mapped with reflection and opacity images.

5. Repeat the steps until all materials of the model are adjusted.
Shortcut to Modify Actors' Skin Texture

With the material picker, you can also quickly modify any actor's skin texture, including the facial texture, instead of evoking the dialog box.

1. Pick the actor for modifying.

2. Utilize the **Pick** tool to click on the body parts to retrieve its material.

3. You can then modify the images of the eight channels in the **Texture Settings** section to change the look of the actor's skin.
4. With the **Material Picker**, you may easily select the textures of the upper / lower body as well.
Editing Multiple Materials
When an object contains more than one material and you want these materials to be adjusted at the same time, then you may follow the descriptions in this page.

What Settings Can be Involved?
There are only some of the settings of the materials can be adjust together, and they are:

- All settings in the **Material Settings** section. These settings simultaneously influence all the picked materials.

- All settings in the **Adjust Color** section. These settings simultaneously influence picked channels across the selected materials.
• All settings in the **Color Balance** section. These settings simultaneously influence picked channels across the selected materials.

![Color Balance Section](image)

• The UV style re-generated from the **UV Settings** section. These settings influence the entire UV coordination of the materials.

![UV Settings Section](image)
**Editing Multiple Materials**

1. Select an object (in this case, a G5 character).

2. Select the materials you want to edit from the material list.
   
   **Note:**
   
   There are two methods to selecting multiple materials:
   
   - Hold the Ctrl key and click on different materials in the list. This method is suitable for selecting materials with different material names.
   
   ![Material List](image1.png)

   - Select one of the material and then activate the **Affect all materials with the same name**. This method only adjust the material with identical material names.
   
   ![Material List](image2.png)

   * These two methods are exclusive to each other.*

3. Adjust the settings as the previous section described. The selected materials or the materials with same name will be adjusted together.

   **Note:**
   
   In this case, the skin texture color for the face, upper body and hands will be adjusted together.
Loading and Saving Materials
The material library in iClone provides multiple texture channels and seamless tiling capability with which it can easily turn low polygon 3D models into highly detailed 3D props.

Loading Material
1. Select the target 3D object for material change.

Note:
The object can be divided into three types according to the materials being applied.

- **3D Objects with a single material ID.**

- **Compound Objects with several Material IDs**

- **Objects with UV layout settings**
Most of the 3D Blocks embedded in iClone contain a predefined UV layout.
2. Select the target Material you want to replace from the list in the Material List section within the Modify >> Material tab.

![Material List](image)

3. Click the Load button above the list.

![Load button](image)

4. Select a prepared material template to replace the one you have picked in previous step.

![Material Templates](image)

Compound model with multiple material IDs. Various material templates applied to individual material IDs.

Note:

- iClone provides a material library in which templates with texture settings are optimized and ready for use. The extension of material templates is .iMtl. (You may find them in C:\Users\Public\Documents\Realusion\Template\iClone 6 Template\Clone Template\Materials Lib)
Saving Material
Saving modified material settings as a new material template may help you to reuse it repetitively without spending time for re-generating the same one.

Saving as Material Template
1. Select the object and then use the Pick tool to pick the material from which you want to save the texture settings as material template.
2. Click the Save button.
3. Browse to the destination folder to store the custom template.
What is included in a Material Template?

A. Each setting in the **Texture Settings** section, except the status of the **Lock Ratio** and **Affect All Channels** boxes, will be saved into the material template.

B. Each setting in the **Material Settings**, **Substance** and **Tessellation** sections will be saved; in other words, the values for the settings will be kept.

C. The result by the settings in the **Adjust Color**, **Color Balance** and **UV Settings** sections will be merged into the maps of the channels. That is, the values of the settings will **NOT** be kept; only the result is.
External Texture and Material Sharing

In iClone, there are several ways to have multiple objects share one same texture or material (consists of various textures), which may decrease the size of the project if the textures need to be reused repetitively.

External Texture

1. Prepare two objects in iClone, and one image as the texture image for the objects.

2. Access the **File >> Import Settings >> External Texture** command on the menu bar.

3. Double click on any one of the channels for one object. Load the image as one of the textures.

4. Repeat step 2 and 3 for the other object.

These two objects thus share the same image file as their texture. iClone skips compacting the image file when you save the project but instead records the path of the external file, which keeps it from increasing the project size.

- **External-File Methodology in iClone**
  - The file size (gray area) increases a little.
  - If you modify the image file by means of any image editor, the textures for all the objects that share it update altogether.
  - Please note that Video files are always applied using the external method.

- **Compacting-File Methodology before iClone 3**
  - The file size (gray area) increases a lot.
Material Sharing

In iClone, you may also define different objects to use the same material by using the Paint tool in the Material List section.

1. Select one object from which you want to share the material.

2. Click the Pick button and click on the face of the material for sharing. The texture images for the channels are thus retrieved. Alternatively, you may select the material in the material list.

3. Click the Paint button and start to click on the target faces of other objects.
4. Repeat step 3 till all the target faces are sharing the same material (press ESC to cancel the Paint mode).

All the faces now share the same material data as the first object in step one.

**Material Sync-Editing**

Since these objects are using the same material, once you modify the texture channel settings in the Adjust Color section, the other faces sharing the same material will be altered instantly.
Material Keys and Material Key Frame Animation

iClone allows you to set keys of specific parameters for the eight material channels. Thus, you may generate texture animation to enrich the look of your projects.

**Saving Material Template VS. Material Keys**

The parameters that can be saved in the Material Templates and Material keys are slightly different as described in the following table.

<table>
<thead>
<tr>
<th>Material Templates (.iMtl file)</th>
<th>Saved</th>
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<th>Saved</th>
<th>Saved</th>
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<th>Saved</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Material Keys (Material Track)</td>
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<td>Saved</td>
<td>Saved</td>
<td>Saved</td>
<td>Saved</td>
<td>Not Saved</td>
</tr>
</tbody>
</table>

**Material keys and the Settings**

The Material keys store material data in the three sub tracks under the Material main track:

**Material Settings Track**

- The Material Color: Please refer to the Modifying Material Settings section for more information.
  - A: The Diffuse color.
  - B: The Ambient color.
  - C: The Specular color.

- The value of Opacity: The values affect the selected material only while the other faces applied with other materials can not be influenced.

- The material responding to light: Please refer to the Modifying Material Settings section for more information.
  - A: The value of Specular
  - B: The value of Glossiness

- The value of Self-Illumination

**Texture UV Track**

- The value of Texture Channel UV.

**Texture Strength Track**

- The Strength for each texture channel.
- The values of Refraction and Reflection

**Note:**

- Material keys cannot be set to Grass, Particle Water and Sky (Texture UV).
- Once you right-click on the object and select Remove Object Animation, all the material keys for the object will be deleted. Clicking the Animation >> Remove Object Animation on the menu bar will also have the same result.
Saving Keys to Material Template

Saving your material setting as Material Template files can greatly save you time when you want to apply the same material to different targets.

Suppose we want to have the same neon glow effect (using the Glow channel) applied to several models, it would be really tedious to add keys for the glow texture to one model after another.

The look before adjusting textures.

1. Pick the texture for creating the glow effect of the model.

2. Add keys to create a shimmering effect of glowing.

3. Click the Save button to save the settings and Keys.
4. Select another model and pick its texture for the glow effect.

5. Click the Load button to load the file saved in step 3.
Real-time Render Options Section (New for V7.1)

iClone provides render options for users to quickly switch to their desired preview method. Refer to the Render Quality of 3D Viewer section for more information.

- **The Quick Mode** render option produces an efficient real-time render with most 3D effects disabled for faster performance.
- **The Medium** render option disables some of the 3D effects for a mid-level of visual quality.
- **The High** render option allows you to view all of the 3D effects, including Displacement, Bump / Normal, Glow, Reflection Map, Realtime Smooth, Substance, HDR, Environment Reflection, Refraction effect, Anti-alias, Mipmap and Tessellation shadow, and more options in the Advanced settings. Turning these options on increases the visual quality but eats up system resources.
- **The Custom** render option allows users to save their desired render settings for later usage.

**TAA (for Real-time Rendering only)**

An advanced anti-alias technique (Temporal Anti-Aliasing) for the view port can minimize jagged edges and pixilated areas. Check the box to turn on TAA. Real-time anti-aliasing starts to calculate only when the viewport is standing still. During playback, TAA will be forced OFF.

**Mipmap**

The Mipmap is used for gradually reducing texture quality as the object strays from the camera.
**Tessellation Shadow**

The shape of shadow do not follow the contour of the tessellated or displaced objects, unless, **Tessellation Shadow** is on. However, the performance of the system may degrade.

![Tessellation Shadow OFF](image1)
![Tessellation Shadow ON](image2)

**Viewport GI**

When the **GI** main switch is turned on and the performance is negatively impacted, the **Viewport GI Switch** can be turned off temporarily to regain crucial framerates. Toggling the view-port **GI** switch does not affect the **GI** for final rendering.

You can also click the middle button on the **GI Toolbar** for turning on or off the view port **GI** effect.

![Viewport GI OFF](image3)
![Viewport GI ON](image4)
Depth of Field
This group contains two settings that can be used to remedy some rendering artifacts in the 3D view port for DOF. However, activating them increases the consumption of the system resources. Please refer to the Fixing Visual Defects of Out-of-focus Objects section for more information.

Anisotropic Filtering and Mipmap
As the camera angle becomes too oblique, MipMap feature may cause some surfaces that are near the camera to blur. To compensate for this, you may increase the Anisotropic Filtering value to regain some texture quality.

Max Texture Size
Your textures may look blurry when you apply them to large objects or view them close-up. This could be a result of the maximum allowable texture size setting.

The default texture size setting for iClone is 512 x 512. This setting determines the maximum allowable texture size. Therefore, if any texture is larger than 512 x 512, after you apply it to a 3D object, the texture size will be scaled down to 512 x 512 (pixel as unit), which results in the blurry look of your texture.

Users can define the maximum allowable texture size applied to 3D objects from the Max Texture Size drop-down list. If you have high-resolution textures, you can set the texture size higher (from 1,024 x 1,024 to 16,384 x 16,384) to maintain your original texture quality. Since texture images take your graphics card memory, please consider the overall texture budget for the optimized visual quality.

LOD (Level of Detail)
You may activate the Level of Detail box to increase the real-time rendering performance. Users can adjust the Performance / Quality slider to determine the camera distance for starting the LOD effect, which is especially useful when you want to preserve close-up details, while saving system resources by reducing the distant details.

LOD Off

All details are rendered during real-time playback, which increases the load on your system resources.

LOD On

The details on far surfaces are rendered with lower detail in order to achieve faster real-time playback and editing.
UV Reference

Relationship between UV Reference Map and Diffuse Map

When you apply a texture to any existing iClone object, iClone uses the predefined mapping coordinates to precisely map the image onto the 3D surface. To find the relationship between diffuse map and UV Reference, press the corresponding launch buttons to open both image files in your image editor.

We will use a surfboard as an example to describe the UV reference.

1. Select the prop in the current project.

   ![Surfboard Image](image)

2. Select the Diffuse channel and click the and buttons to open the diffuse and UV Reference images at the same time.

   ![Diffuse and UV Reference Images](image)

You will notice that the texture orientation (left illustration) is based on the texture coordinate definition of the UV map (right illustration).

Resolution of UV-reference based Texture Map

The default size of a UV reference images is 512 x 512 pixels. If you use the same resolution for your diffuse maps, the allocated pixel for each 3D surface is relatively small because they share the same image dimensions. Although this will save texture memory resources, objects will appear less detailed when they are zoomed-in on.

If you intend on using high-detail objects, you need to increase the texture resolution proportionally (e.g. 1024x1024, 2048x2048, or 4096x4096) and keep the layout as indicated by the UV map. To increase the diffuse map size while keeping the same ratio, multiply the size of the UV texture first and then paint it according to the layout of the UV reference map.
Texture Channel UV Offset and Tiling

Mapping Issues from Google SketchUp and 3D Warehouse
We can easily download SketchUp (SKP) 3D models and convert them into iClone. In iClone, we can further alter the material settings, even apply multiple texturing effects to make the model look more realistic.

However, if the original model from Google SketchUp has no prior texture assignment (purely with default color material), when you apply texture in iClone, the result may not be what you expected.

In the sample above, the solid blue color is made by massive grainy texture tile on this model (with the default 1x1 UV tiling settings in iClone). If the model in Google SketchUp has no prior texture assigned to it, the default UV tiling value is way too small for further texturing works.

Custom UV Offset and Tiling
iClone provides Texture Channel UV Offset and Tiling features to solve this problem. You may then customize the offset and tiling values to each texture channel without changing the original Global UV Settings. You may use this feature to best align a texture map to the target faces as well.

Note:
- Hold the up/down controls of the UV Offset Tiling values to see the texture changes in the 3D viewer immediately.
- Please refer to Synchronizing UV Changes to Channels for more information.
How to fix the grainy texture tiling issue

1. Select a prop (in this case, some faces contain no texture) converted by 3DXchange from SketchUp.

2. Press the Picker and click on the face without any texture to retrieve its material and texture settings.

3. Select the Diffuse channel and click the buttons to load an image as the diffuse texture. The massive grainy texture tile makes it look like a solid color in the illustration below.

4. Adjust the Tiling value to make the texture show an appropriate mapping result. In most SketchUp cases, it is a small value such as:
   Tiling U = 0.010
   Tiling V = 0.010
Adjusting Individual Texture Channels

By means of altering the values of Offset and Tiling to different texture channels, we can create all possible multi-texturing effects on SketchUp models.

Opacity

Bump

Specular

Glow

<table>
<thead>
<tr>
<th>Texture Type</th>
<th>Tiling U</th>
<th>Tiling V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opacity</td>
<td>0.050</td>
<td>0.010</td>
</tr>
<tr>
<td>Bump</td>
<td>0.010</td>
<td>0.020</td>
</tr>
<tr>
<td>Specular</td>
<td>0.010</td>
<td>0.010</td>
</tr>
<tr>
<td>Glow</td>
<td>0.040</td>
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1. Select a prop (in this case, some faces contain no texture) converted by 3DXchange from SketchUp.

2. Press the Picker and click on the face without any texture to retrieve its material and texture settings.

3. Select the Diffuse channel and click the buttons to load an image as the diffuse texture. The massive grainy texture tile makes it look like a solid color in the illustration below.

4. Adjust the Tiling value to make the texture show an appropriate mapping result. In most SketchUp cases, it is a small value such as:
   Tiling U = 0.010
   Tiling V = 0.010
Adjusting Individual Texture Channels

By means of altering the values of **Offset** and **Tiling** to different texture channels, we can create all possible multi-texturing effects on **SketchUp** models.

**Opacity**

**Bump**

**Specular**

**Glow**
Synchronizing Texture UV Changes to All Channels

A material with multiple textures presents a higher realism of texturing results, however, as the UV offset or tiling values are adjusted, all related channels must have the identical UV values to maintain the correct mapping result.

iClone provides two features to reduce the efforts to synchronize the UV values between multiple texture channels.

**Lock Ratio**
Check the **Lock Ratio** box to simultaneously adjust the U and V values in the latest UV tiling ratio.

**Effect All Channels**
When this option is checked, any change of the UV offset or tiling value will also be applied to the other texture channels - **Diffuse**, **Bump**, **Opacity**, **Specular**, **Glow**, **Displacement**, while only the reflection map remains unchanged. We will take **Diffuse** and **Bump** maps as example.

**Current Channel** Diffuse:
**Effect All Channels** unchecked.
Adjust **Offset U** from 0 to 0.5.
Only the **Diffuse** map moves.

**Current Channel** Diffuse:
**Effect All Channels** checked.
Adjust **Tiling U** from 0 to 0.5.
**Bump** map moves simultaneously.
Replacing and Regenerating Model UV

Objects in iClone may or may not include UV reference. However, we can always replace the original UV ref. or create a new UV ref. for an object.

Generating UV Reference
The easiest way to generate UV reference for an object is to:
1. Pick any Channel.
2. Click the button. Edit the image corresponding to the channel.
3. Save the image.
iClone assigns a UV reference map for the object automatically.

Replacing / Regenerating UV Reference
With the mapping method, you can define the UV reference for objects which have no UV reference data attached so you can enable the entire map setting controls of the object for further editing. Even objects that already contain UV reference data can be assigned with new ones.
1. Go to the UV Settings section under the Material tab in the Modify panel.
2. Select a desired UV Type radio button.
3. Select a desired Align radio button.
4. Optionally adjust the Offset Tiling or Rotate value.
5. Click the Apply button.
iClone will then assign a new UV reference to the selected object in accordance with your settings. The original UV reference will be replaced.
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5. Click the Apply button.

iClone will then assign a new UV reference to the selected object in accordance with your settings. The original UV reference will be replaced.

Original

Defined by iClone
UV Type: Planar
Align: Z

New polygonal UV reference map assigned to the ball by iClone
(UV reference map expanded)

Image mapping result
(Based on the new UV reference map)
Mapping Method for Multi-Material Object

If you have a compounded model where each component model has its own material or texture, re-generating UV will be done by the following rules. We will take Box UV Settings X Tiling (U, V) = (1.00, 1.00) as the mapping method as example.

(When you do material assignment or texture mapping to individual faces in SketchUp, it generates a compound model with several material settings.)

Single Model, Single Image as Texture

When you have a single model with its faces mapped by one single image and you apply the UV settings as described above, the result will be like the illustrations below.

Single Model, Multi Images as Textures

When you have a single model with its faces mapped by several individual images and you apply the UV settings as described above, the result will be like the illustrations below.

Compounded Model, Multi Images as Textures

With the concept above, if you have a compounded model with multiple textures, once you apply the UV settings, they will affect all individual components, which differ from the traditional mapping method.
**What is Substance**

Substance is a hyper material that embeds as many channels as necessary, such as diffuse, height, normal, specular, etc. It is dynamic, multi-layered combinations of texture maps. It can be modified and adjusted in real-time. In the following illustration shows the graph of how a substance material is made by Substance Designer.

It is very lightweight, and can help you to save the space of your hard drive while delivering exquisite and realistic texture effects to your project.

The best part is, the substance material (*.sbsar) can be shared between 3Ds Max, Maya, Unity, Unreal and many more applications for creating realistic texture for objects in CG industry.

On the Allegorithmic web site, you may find a database containing tones of ready-to-use substance material templates.
iClone Substance Libraries

iClone provide one category of the substance family. This category is specifically designed by Reallusion, which gives multi-purpose aging effects for 3D entities. The libraries related to this category can be found in the Prop and Material libraries. You may either apply the primitive 3D prop objects that have been applied with Substance material, or apply the Substance templates from the Material library to 3D objects, such as props, accessories, characters and so on.

With the substance libraries and their contents, you are able to convert your ordinary scene, especially built with props with simple texture or no texture at all, into a realistic one.

Note:

- Please note that all embedded templates, including the prop and material ones, that are related to Substance material, will be marked with a red ‘S’ at the bottom left corner on the icon.

Refer to the sections below for more information:
- Substance 3D Blocks
- Using Substance 3D Blocks
- Substance Materials
About Substance 3D Blocks

To find the props applied with substance material, you may follow the steps below:

1. Switch to the Set tab in the Content Manager.

2. Open the Set Template >> Props >> 3D Blocks (Substance) folder.

3. You may find the embedded props of this kind in different sub folders.

Note:
The path of the folder is (by default):
C:\Users\Public\Documents\Reallusion\Template\Clone 6 Template\Clone Template\Props\3D block (Substance)
4. After apply the props from the substance library, you may freely share the substance material to any other object that supports this type of material.

Note:

- The advantages and disadvantage of sharing the substance material on substance 3D blocks to other models are:
  
  **Advantage**
  You may adjust the complete parameters of the substance material from the substance prop.
  
  **Disadvantage**
  The UV coordination of the objects could be different from the substance props, therefore, the result of the substance material applied on them may be expected.

- For more information about adjusting the substance material applied on the substance 3D blocks, please refer to the Using Substance 3D Blocks section.
- If you want the custom model to have correct mapping result, four unique maps (UV dependent) are required to make it fully compatible. They are Normal, Curvature Map, WS Normal, and AO. These four maps must be load to the four channels under Substance >> Source Maps. You are able to bake those maps by using Substance Designer.
iClone Substance Materials on 3D Blocks

An iClone substance material on any substance 3D block is composed of multiple layers; the basic adjustments for each layer can be individually done. Besides, each layer can be designated with different Diffuse, Normal, and Specular channels in iClone.

The layers form the substance material, and the substance material result is passed to the eight channels.

Benefits of Using Substance 3D Blocks

By adjusting the parameters of the layers, including the density and masking method, the looks of the layers are altered and passed to the texture channels of an object, which create a realistic texture for the 3D object.

The parameters for the layers can all be keyed, which means you are able to generate dynamic weathering, erosion, scratching, or mossing animation for the object.
Using Substance 3D Blocks
After applying a Substance Prop, you are able to share the substance with complete parameters to another props, adjust the initial texture appearance of the prop, and setting keys to generate Substance Material Animations.

Layers of iClone Substance Material and Related Parameters

<table>
<thead>
<tr>
<th>Layer Name</th>
<th>Layer Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADirt</td>
<td>This layer is the topmost layer which covers dirt or dust to the other material layer.</td>
</tr>
<tr>
<td>BPaint</td>
<td>This layer sets the paint covers on the object.</td>
</tr>
<tr>
<td>CMaterial</td>
<td>This layer gives the basic material layer below Erosion some erosion rust or moss effects.</td>
</tr>
<tr>
<td>DBase Material</td>
<td>This layer determines the base texture such as wood, rock or metal. When the other three layers above it are completely or partially removed, the basic material reveals.</td>
</tr>
</tbody>
</table>

You can find all substance related parameters in the Modify >> Material >> Substance section.

Layer Related Parameter Sections

Note:

The Source Maps sub-section contains data to describe the shapes of the 3D blocks and how the material is applied to them. Unless you are familiar with the creating and algorithm of the substance material, you do not suggested to adjust the settings in the section.
Basic Usage for Substance Props

1. Apply a Substance prop from the default prop library.

2. Go to the Modify (panel) >> Material (tab) >> Substance section.

3. Select one of the presets from the list (in this case, the 06 Wood is taken as an example).

The 3D prop will instantly change its texture look.

Note:

These presets are actually the combinations of different status of the four layers mentioned in the previous section.
4. Adjust the slider parameters in the sub-sections within the **Substance** section to adjust the look of the prop.

- **Paint Layer**: Color - light blue; Coverage - 0.35
- **Dirt Layer**: Amount - 0
- **Material Erosion Layer**: Amount - 0
- **Base Material Layer**: Not changed

**Advanced Usage for Substance Props**

In the basic method, you simply adjust the sliders to change the status of the four layers. However, the texture images for the layers are by default. However, you are allowed to apply prepared images to change the texture images for the four layers. The **Paint Layer** of the example in the previous section is taken for the advanced adjustments for the layers.

**Changing Texture of Layer**

1. Use the prop adjusted in the previous section.

2. Decrease the **Amount** value for the cracks of the paint to 0 (in the **Paint Cracks** sub-section).

3. In the **Cover Paint** sub-section, find three channels (**Diffuse Normal** and **Specular**) at the bottom of it.
4. Double click on the **Diffuse** channel to load a prepared image in order to replace the default paint diffuse image.

A prepared image is applied to the **Diffuse** channel of the **Paint Layer**.

5. Adjust the sliders to change the style of the paint.

The coverage, saturation, pattern and so on of the paint layer is adjusted.

6. Apply a normal map to the **Normal** channel of this layer.

You may apply a normal map to the **Normal** channel for and only for this layer to give the layer some vein effect.

7. Optionally apply an image to the **Specular** channel for this layer.
**Substance Material Templates**

iClone provides Substance Materials templates, in addition to the Substance 3D Blocks. You are freely to apply it to any 3D object you want without considering the UV coordination. However, you can only adjust partial parameters to this type of substance materials.

1. **Switch to the Media tab in the Content Manager**

![Content Manager](image)

2. **Open the Set Template >> Props >> 3D Blocks (Substance) folder.**

![Content Manager](image)

3. **You may find the embedded Substance templates.**

![Substance Templates](image)

**Note:**

The path of the folder is (by default):

C:\Users\Public\Documents\Reallusion\Template\iClone 6 Template\iClone Template\Materials Lib\Substance
4. You can freely apply one of these templates to the objects you want.

A character with default material settings

A Substance material is applied to the skin

**Note:**

**Advantage**
You don't need to care the UV coordination of the target object because the material will be applied in accordance with the original UV style of the object.

**Disadvantage**
For the embedded substance templates, only limited parameters can be adjusted for the substance materials.

5. If you know how to create a substance file with external **Substance Authoring Tools**, then you can load the substance file by clicking the **Load** button under the **Substance** section.
About Substance 3D Blocks

To find the props applied with substance material, you may follow the steps below:

1. Switch to the **Set** tab in the **Content Manager**.

2. Open the **Set Template >> Props >> 3D Blocks (Substance)** folder.

3. You may find the embedded props of this kind in different sub folders.

**Note:**

The path of the folder is (by default):
\Users\Public\Documents\Reallusion\Template\iClone 6 Template\iClone Template\Props\3D block (Substance)
4. After apply the props from the substance library, you may freely share the substance material to any other object that supports this type of material.

Note:
- The advantages and disadvantage of sharing the substance material on substance 3D blocks to other models are:
  - **Advantage**
    - You may adjust the **complete parameters** of the substance material from the substance prop.
  - **Disadvantage**
    - The UV coordination of the objects could be different from the substance props, therefore, the result of the substance material applied on them may be expected.

- For more information about adjusting the substance material applied on the substance 3D blocks, please refer to the Using Substance 3D Blocks section.
- If you want the custom model to have correct mapping result, four unique maps (UV dependent) are required to make it fully compatible. They are Normal, Curvature Map, WS Normal, and AO. These four maps must be load to the four channels under **Substance >> Source Maps**.

You are able to bake those maps by using **Substance Designer**.
**iClone Substance Materials on 3D Blocks**

An iClone substance material on any substance 3D block is composed of multiple layers; the basic adjustments for each layer can be individually done. Besides, each layer can be designated with different **Diffuse**, **Normal** and **Specular** channels in iClone.

The layers form the substance material; and the substance material result is passed to the eight channels.

**Benefits of Using Substance 3D Blocks**

By adjusting the parameters of the layers, including the density and masking method, the looks of the layers are altered and passed to the texture channels of an object, which create a realistic texture for the 3D object.

The parameters for the layers can all be keyed, which means you are able to generate dynamic weathering, erosion, scratching, or mossing animation for the object.
Baking Textures

Baking Substance Texture to Eight Channels
If you like the results created by the Substance Material and you do not want to adjust them afterward, then please follow the steps below to bake it to the material of the prop:

1. Select one of the eight channels of the prop to which you want to bake the texture from the Substance Material.

2. Click the Bake Substance Texture button.

The red 'S' mark of the channel will be removed, which indicates that the texture from the substance material is baked to the prop.

Note:

Adjusting the slider values does not influence the texture after this step.

3. If you want to adjust the texture by the substance parameters again, then activate the Use Substance Graph box before further modifications.

MadCap:mediastyle="@media print { min-width: 40%; min-height: auto; }"
Tessellation for Objects

Real-time surface smoothing is a technology that enhances the look of 3D entities in your scene without sacrificing system performance. Real-time used to be synonymous with low polygon count, but by utilizing latent resources from your computer’s GPU, iClone is able to enhance polygon count in real-time, resulting in a smoother and more detailed surface appearance for low-poly objects.

In computer graphics, tessellation is used to manage vertex sets of objects in a scene and divide them into suitable structures for rendering. Especially for the real-time surface smoothing, data is tessellated into triangles, for example in DirectX 11 and OpenGL.

In iClone, the tessellation method leads to two aspects:

- **Basic Tessellation - Real-time Smooth**
- **Advanced Tessellation - Tessellation and Displacement**

**The Benefit of Tessellation**

Utilizing the Tessellation technique has some benefit for using iClone.

- **Rendering** It provides better and smoother rendering results for the real-time preview or exported media.

![The Original zigzag silhouette and surfaces of the object. Tessellation smoothes out the visual imperfections of the meshes.](image1)

- **3D Entities** It smoothen the 3D entities without changing the main shape.

![The Original shape. After being tessellated, the surfaces are smoothed while the main shape is kept.](image2)

- **Project Size** It ensures the visual quality without increasing the size of the saved project (*iproject*).
- **LOD Effect** It can gradually decrease the number of the faces presenting objects for LOD (Level of Detail) feature, which avoids the sudden changes of objects in 3D scene when the camera zooms in or out.
- **Displacement Effect** Tessellation can also be used in combination with displacement maps for implementing exquisite details on the surfaces of objects.

![3D Entity without displacement and tessellation.](image3)

![Tessellation applied without displacement.](image4)

![Displacement mapped without tessellation.](image5)

![Both Displacement and tessellation applied.](image6)

Note:

Please refer to the Tessellation and Displacement for Objects section for more information.
Basic Tessellation in iClone - Real-time Smooth
The basic tessellation in iClone can be turned on to individual 3D entities. It assists you to enhance the main objects appearances in your scene to lure the attention of the audiences. Please follow the steps below:
1. Select one of the 3D objects you want to apply the Tessellation feature.

2. Switch to Modify >> Attribute tab. Activate the Realtime Smooth box in the Prop section.

3. Alternatively, you may use the Edit - Realtime Smooth command.

4. The object is smoothed while the others remain coarse appearance.

Note:
The real-time smooth in iClone tessellates each triangle by adding two more vertices between original two adjacent ones.
Tessellation and Displacement for Objects

In a real-time environment, it's difficult to create detailed surfaces without raising polygon count significantly. With tessellation technology, your GPU can dynamically generate mesh details by applying a displacement value from height or vector displacement maps. This means that you can physically manipulate the geometry of your low-poly model to give it a greater sense of depth and detail without increasing the polygon count.

A low polygon 3D object. After being applied with Displacement map. The faces are pulled up or pushed down.

Tessellated the object to add more faces for presenting better details. The low-poly object turns to an exquisite one.

Please refer to the following sections for more information:

- Using Grayscale Images for Displacement
- Using Vector Displacement Maps
Using Grayscale Images for Displacement

You can create monochrome image maps with popular image-editing tools such as Photoshop or GIMP. By using grayscale height maps, you can push and pull the surface of a 3D model to achieve the ideal look you desire.

A low polygon 3D plane. Diffuse map applied. After being applied with Displacement map. The faces are pulled up or pushed down.

Using Grayscale Images for Displacement

1. Prepare an object.

Note:

The object can be characters, accessories, or props.

2. Make sure the object is selected and switch to Modify >> Material >> Texture Settings (in this case, the object has already applied with Diffuse and Blend textures).
3. Double click the **Displacement** channel and load a grayscale image. You will be asked to set the type of the loaded image.

![Import Displacement Map](image)

4. Choose the **Height Map (Grayscale)** radio button and click **OK** to load the image.

![Height Map](image)

The object’s shape will thus be sculpted. You may need to adjust the **UV Tiling** values to best fit the displacement image to the object.

![Displacement Texture](image)

The displacement texture is imported. UV tiling values are adjusted.

**Note:**
- The displacement channel pushes and pulls the mesh up or down according to the level of the grayness. The white means to pull up while the black means to push down.
• When you import a grayscale image into the Displacement channel, iClone also load it into the Bump channel as well. Because although the Displacement channel sculpts the meshes, iClone still take it as the original mesh, which leads to no shading generated. Therefore, without the Bump texture (not suggested), the fold of the object can not be seen.

• By importing the grayscale to the Bump channel, the shading of the object can be shown to increase the visual conviction.

5. In accordance to the rule described in the note box above, the black area concaves the mesh, which can cause the original shape to be thinner and the connecting lines broken.

6. Go to the Tessellation section.
- Increase the **Tessellation** value to add more details for the faces.

  ![The original topology.](image1)

  ![Tessellation value increased (more details are shown).](image2)

- The **Multiplier** slider is able to increase or decrease the drops between the ups and downs. In another word, to determine the distances between the high and low vertices.

  ![Multiplier = 1.](image3)

  ![Multiplier = 2.5.](image4)

- The **Gray-scale Base Value** takes a color within the grayscale image as the base of the mesh. The vertices covered by the colors above the base will be pulled up, while the other will be pushed down.

  ![The default value is 50 which takes the middle color of the grayscale image (127, 127, 127) as the base.](image5)

  ![Set the Gray-scale Base Value to 0 so that every vertex will be raised up, this ensure the object intact without breaks or holes.](image6)

  The vertices covered with the color darker than the base will be pushed down, causing the broken issue described above.

  7. Adjust the three sliders to optimize the silhouette appearance of the object.

**Animating Displacement Effect by UV Adjustments**

In addition to create still displacement object, you are able to animate the **UV** settings of the displacement channel to create displacement animations.

1. Prepare an object (in this case, a pipe between two connectors).
2. Follow the steps in the previous section to apply a grayscale image to the **Displacement** channel of the object.

![Image of grayscale image applied to object]

3. Go to the first frame of the project, set the **UV Offset** value of the **Displacement** channel to move the texture so that the extrude area is moved to one side of the prop.

![Image of texture moved to one side]

4. Go to another time frame and set the **UV Offset** value again to move the texture so that the extrude area is moved to the other side of the prop.

![Image of texture moved to the other side]

You will see two keys shown in the **Material >> Texture UV** track of the prop.

![Material UV track with two keys]

5. Copy and paste these two keys repetitively so that the extrude area will keep moving from one side to the other.

![Material UV track with repeated keys]

6. Play back to view the result.

![Image of result with moving extrude area]
Using Vector Displacement Maps

Vector displacement technology allows artists and developers to start off by creating detailed models in programs such as zBrush, Mudbox, or 3D Coat, and then extract displacement maps to later be applied to a simple geometric shape. This process is ideal for real-time engines like iClone, and produce results that are incredibly similar to your actual model. One of the huge advantages of vector displacement is the ability to produce undercut details on your model. While height displacement with grayscale images simply stretches out geometry, vector displacement produces refined curves and edges, creating an unparalleled sense of detail to your model.

View the Video

1. Create and sculpt a model in a 3D modeling software that is able to export Vector-based images (in this case, ZBrush).

2. Export low-poly model and vector image from the tool.

Note:
- It is strongly recommended that you export the model in FBX format.
- The best exporting format for the vector-based image is EXR.
- An EXR format file can include arbitrary channels, specular, diffuse, alpha, RGB, normals, and various other types of channels in it.

3. Convert the model through 3DXchange into iClone

The converted model is also in low-poly status.
4. Select the material of the model for importing the corresponding vector image (in this case, the accessories on the left shoulder).

5. Double click on the Displacement channel and load the prepared vector image. You will be asked to set the type of the loaded image.

6. Choose the Vector Displacement radio button and click the OK button to load the prepared vector image.

Note:
- Please note that the Bump channel will be automatically given a normal map extracted from the EXR file.
- If you have better and optimized normal map, then you may freely imported it to replace the auto-generated one.

7. Adjust the Tessellation parameters to optimize the visual quality of the model.
8. Repeat the same steps until every material in the list is applied with the vector-based displacement image exported from the 3D tool, and remember to increase the tessellation value.

9. Apply more images to the other channels (such as diffuse, specular or blend) to optimize the look of the model.

The model without displacement maps is flat and less exquisite.
**Video**

**iClone** allows you to insert videos as textures for specific objects, which may enrich the textures with dynamic appearance instead of static looks.

- Applying Videos into Texture Channels
- Utilizing popVideo
Applying Videos into Texture Channels

In iClone, you may insert videos into texture channels in the same manners as inserting images.

Formats
The supported video formats are:

- AVI, WMV, MPEG
- FLV, iWidget, popVideo
- Any video that can be played with corresponding video codec on your computer.

Applying Methods
The methods to apply videos are:

- **Drag-and-drop**: You may drag a video onto target face of one object (terrain and image layer excluded) in the preview window to replace its image of Diffuse channel.
- **Drag-and-drop with Right Mouse Button**: A menu will pop up for you to apply the video to a specific channel.
- **Loading from Channels**: If you want to apply videos into either channel, you may double-click on the channel and locate the desired video. Please note that for the Image Layer object, you can only use this method to replace its diffuse texture.

Video applied to the Diffuse channel.

Video applied to the Opacity channel.

Video applied to the Bump channel.

Please note that Normal Bump Videos present correct bump result if you want to have a dynamic bump effect with video.

Video applied to the Glow channel.
Video applied to the Blend channel.

Note:

- The videos loaded here are always taken as external files in order to reduce the size of the project. Therefore, if you move the project elsewhere, please also move the videos along in the same path relationship when the project is saved.
- Please note that you must have K-Lite codec pack or similar installed on your system before FLV videos can be played.
- You **CANNOT** apply videos to Tree and Grass.
Utilizing popVideo

*popVideo* is a video with alpha-channel data. You can import it into *iClone* as a board with mask so objects behind it can be seen.

Although you can achieve the same result by manually applying a video to the *Diffuse* channel and masked video to *Opacity* channel, utilizing *popVideo* file ensures you have a 100% synchronized video the *popVideo* already contains the data for both channels.

Please refer to the [popVideo Converter Online Help](#) for more information about creating custom *popVideos*.

Apply *popVideo*

- Select any object that contains a *Diffuse* channel. Double-click on the channel and select a *popVideo* file.

Alternatively, you can drag the *popVideo* file from the explorer onto the surface of a target object. The *popVideo* will be loaded into the *Diffuse* channel as well as the *Opacity* channel.

- In the explorer, with the Ctrl key pressed and held, drag a *popVideo* file onto the preview window of *iClone* to generate a board with the *popVideo* automatically loaded (with mask).
User Interface for Exporting FBX (New for V7.0)

The newly added Export FBX inside iClone 7 allows an adjusted project to be exported to another mainstream 3D tool. No longer does one have to rely on 3DXchange to individually export parts of the project, speeding up the workflow significantly.

You can open the Export FBX panel from the File menu > Export > Export to Fbx

Export FBX Panel

- **A Target Tool Preset**: Select the target software
- **B FPS**: Set the Export Animation FPS
- **C Export Range**
  - T-Pose and Reset Transform: Don’t export any kind of animations, pose the avatar in T-pose, and move the avatar to the coordinate origin of (0,0,0).
  - Current Frame: Export the current motion pose.
  - All: Export the Project timeline motion.
  - Range: Export a select set of animation frames.
- **D Embed Textures**: Whether or not to embed the textures into the Fbx file itself. If unselected then the textures will exported into a folder at the same location as the exported file. However, PBR textures will always export into a separate folder (called Texture), therefore, can not be embedded.
- **E Max Image Size**: Set the maximum resolution size for individual texture maps. If unselected, then the exporter will default to the resolution size of the images themselves.
- **F Convert Image Format to**: Whether or not to convert the texture maps into different formats. If unselected, then the exporter will default to the Jpg format.
- **G Merge Opacity to Diffuse Texture**: Merging Opacity and Diffuse textures will let the Diffuse map carry an opacity alpha channel. This setting only has usage when saving in Png, Bmp, Tiff, and Tga formats.
- **H Delete Unused Morphs**: Delete all morph data that has not been keyed. (includes Facial and Custom morphs)
Exporting FBX from iClone (New for v7.0)

Select a single or multiple object (prop, avatar, accessory, camera) then execute **Menu > File > Export > Export Fbx...** to begin the export process.

If Constraint keys (Link, Look At, Attach, Path, Reach) have been used and you would like to export them together, then check enable **Menu > Animation > Motion Setting Options > Bake Constraint Key**.

**Note:**

3DXchange 7’s ability to export FBX files has been extended to iClone, making it possible to directly export FBX files without leaving iClone. However, the export FBX feature has a few key differences in the data structure:

<table>
<thead>
<tr>
<th>Exportable Content</th>
<th>Export FBX</th>
<th>iClone</th>
<th>3DXchange</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avatar</td>
<td>Animation included (Animation, Animation, Animation, Animation)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Props</td>
<td>Animation included (Animation, Animation, Animation, Animation)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Accessory (with Avatar)</td>
<td>Animation included (Animation, Animation, Animation, Animation)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Camera</td>
<td>Camera</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Light</td>
<td>Light</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>PBR Data (ICT)</td>
<td>Materials, Roughness Textures</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Morph Animation</td>
<td>Facial Expression (ICT), Custom Morph Animation (from Morph Creator) (ICT)</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

**Usage Behavior**

<table>
<thead>
<tr>
<th>Multi-selection for Export FBX (disabled for iClone proprietary formats)</th>
<th>iClone</th>
<th>3DXchange</th>
</tr>
</thead>
</table>

**Target tool**

- **iClone Export FBX** will export according to the timeline animations.
- **3DXchange** will export FBX according to the Perform List. When the Perform List has multiple animation tracks, the FBX will export with multiple takes.

The objects in the following formats are not supported for exporting FBX: **iLight, iEffect, iParticle, iTree, iGrass, iTerrain, iWater, iSky, aml, iTalk, iPath**. Please note that only the iTerrain that is made of heightmap is not supported since its inception from iClone 5.
What is Panorama Videos

It is the video recordings of a real-world panorama, where the view in every direction is recorded at the same time, using an omni-directional camera or a collection of cameras. During playback, the viewer has control of the viewing direction to form a virtual reality.

A panorama video is also known as Immersive Video, 360 Video, 360 Degree Video, Spherical Video, and VR-360 Video.

Please see the links below for more information:
- The Theory of Panorama Videos
- The User Introduction of Exporting Panorama Videos
- Viewing panorama videos
- The Notices
The Theory of Panorama Videos

When the Exporting Panorama feature is turned on, iClone auto-generates 5 more cameras facing 5 different directions to shoot videos simultaneously; the concept is illustrated in the following figures.

The original camera and its view before the Exporting Panorama feature is turned on

5 more cameras facing different directions will be auto-generated after the Exporting Panorama feature is turned on

The videos shot from the 6 cameras will thus be stitch in order to form a panorama video with full environment data.

The views shot from the 6 cameras

The panorama video created by stitching the 6 views
The User Interface Introduction of Exporting Panorama Videos

The Exporting Panorama video feature is simple and can be found in the Render panel.

- **Enable 360-degree Panorama**
  - Activate this box if you want to export a Panorama Video.
  - For supported VR devices, please refer to the Viewing Panorama Videos section for more information.
  - The format for Panorama Videos on the device can be MP4, AVI, or WMV.

- **360-enabled for Youtube and Facebook**
  - Activate this box to include the Google 360 Video Metadata to the exported video.
  - This box must be activated when you plan to play the video on Youtube or Facebook.
  - The format for Panorama on Youtube or Facebook is MP4 only.
Viewing Panorama Videos

The Panorama Videos can be viewed in two methods:

- With Hardware Devices
- On Platforms

With Hardware Devices
The supported and popular hardware devices currently are:

- HTC Vive
- Google Cardboard
- Oculus Rift
- Samsung Gear

On Platforms
You can also view the Panorama with regular display devices on YouTube or Facebook.

- You will see a navigation icon on the upper-left corner of the video on YouTube, which indicates that the video is a Panorama Video

- When the video is played, you can drag on the video to rotate the camera to different perspectives for viewing the video.
The Notices
There are some notices you need to know when you wish to export Panorama Videos.

The Changes of Camera View
When the Exporting Panorama feature is turned on, the camera view will be automatically changed to square view in order to be correctly stitched.

The original camera resolution before the Exporting Panorama feature is turned on
Each of the cameras in the project will be set to Wide-Angle (12 mm focal length) when the Exporting Panorama feature is turned on.

The original camera lens before the Exporting Panorama feature is turned on
The camera lens is automatically changed to 12mm after the Exporting Panorama feature is turned on.

Note:
The value of the camera lens for Panorama Videos is strict. Therefore, you are not allowed to customize this value when the Exporting Panorama feature is turned on.
Limitations

There are also some limitations when you wish to export a Panorama Video.

- **Output Suggestions**
  - You can turn on the Super Sampling feature to eliminate the fuzzy quality when the Exporting Panorama feature is turned on.
  - Turning the Super Sampling feature is a trade off for better quality vs. the rendering time.
    e.g. A 4K project with 3,000 frames:
    - Super Sampling = 4 hours + Better Quality
    - non-Super Sampling = 1.5 hours + Normal Quality

- **Repetitive Items** The Image Layer and 2D Background will be repetitive because each of the 6 camera views renders them before being stitched.

- **Seam Issues** If you apply special effects, such as HDR - Tone Map, HDR - Glare, SpeedTree with LOD, Shadows, and Toon Shader, the seams where the 6 camera views where stitched will be very obvious. (The example below is a project applied with the HDR-Tone Map.)
- **Exclusive with Stereo Video Output** The Exporting Panorama feature cannot be applied in collaboration with 3D Stereo output.
What is Alembic

ALEMBIC is an interchange file format for computer graphics used by visual effects and animation professionals. It was announced at SIGGRAPH 2011, and has been widely adopted across the industry. Its primary focus is the interchange of geometry (models) between different groups working on the same shots or same assets. This is often within different departments in the same company or different studios working on the same projects. Alembic supports the common geometric representations used in the industry including polygon meshes, subdivision surface, parametric curves, NURBS patches and particles. Alembic also has support for transform hierarchies and cameras. With the latest version comes initial support for materials and lights as well. Alembic is specifically NOT concerned with storing the complex dependency graph of procedural tools but instead stores the "baked" results.

Alembic was developed as an open source library primarily by Sony Pictures Imageworks and Lucasfilm.

What Does It Do?

- To bake sophisticated iClone animated results into compressed Alembic point cache format for reusing in other 3D tools.
- To render iClone animation in Maya Max Octane LightWave Cinema4D, etc.
- To export your iClone works to professional compositing tools like Fusion Nuke Isotropix, etc.
- To create static meshes from simulated soft cloth physics, or export them for 3D printing.
- To bake soft cloth physics in order to upload them to SketchFab.

Benefits Using Alembic

- Export Soft Cloth animations that cannot be done by FBX
- Export vertex and mesh animation data in OBJ-level. The data can be from single frame, the entire project or part of the original animation.
- Create reusable animations for sharing between different 3D applications.
The Main Concept of Using Alembic

The main concept of using Alembic file involves two aspects, animations and textures. You need to individually export animations (in .abc format) and textures, and then composite them together in your favorite 3D tools such as 3ds Max, Maya, HitFilm, and so on.

The reason to do so is so that an ABC file contains only animation data of vertex and meshes, without packing the necessary textures in order to ensure the minimum size of itself.

Step 1: Exporting ABC file

In iClone, select the desired object whose animations is about to be exported, then export the sequenced and posed "clay statues" made by the vertex and meshes frame by frame into a single file (*.abc).
Step 2: Acquiring Textures

Use 3DXchange to export FBX and FBM of the selected objects because FBX contains the material details.

Note:

Although you can get the texture images when you export the ABC file from iClone, there is no material details, which makes it hard when you need to create materials again in external 3D tools. By using FBX, you can get the complete material information and the relationships with the textures.
Step 3: Integrating ABC with Textures
Mapping the textures to the animated meshes of Alembic in the 3D editors.

Note:
The texture-mapping methods are somewhat different in accordance with the characteristics of each 3D tool. Please refer to the links below for more information about the pipelines of using Alembic in some of the popular 3D tools.

- [Pipelines of Using Alembic in HitFilm](#)
- [Pipelines of Using Alembic in Maya](#)
The User Interface Introduction of Exporting Alembic

The Exporting Alembic feature can be found in the File menu >> Export

1. **File Format**
   - Use the drop-down list to determine the format for exporting Alembic.
   - **HDF5**: This format is for Maya 2013 or earlier versions only.
   - **Ogawa and HDF5**: For Maya 2014 or later version, and any other 3D tools that support Alembic, please select Ogawa or HDF5.

2. **Export Range**
   - Choose one of the radio buttons to determine that the exported Alembic is from one frame, all frames or partial project frames.

3. **Sample Frame**
   - Set a value to determine the sample times per frames. The higher the value is, the rougher the animation of the Alembic will be.

4. **World Space**
   - Activate this box in order to include the transformation data of the selected object when it is exported into Alembic file.

5. **Export Texture**
   - If you want to export the texture images along with the Alembic file in the same folder, then activate this box.

6. **Merge Opacity to Diffuse (PNG)**
   - Some 3D tools do not support Opacity texture, such as HitFilm. Therefore, you need to merge the Diffuse and Opacity textures into a PNG image with Alpha information to correctly re-build the transparent results in the tool.
Setting Export Range

When you export objects with animations or motions into Alembic file, then you can determine if you want to export the status of the object in one single frame, the motions or animations of the entire project, or just a specified range of animations or motions of the objects.

Remember that setting the export range is best suit for soft clothes.

Current Frame

Because iClone does not support building, morphing or sculpting objects, especially fabric types, then you can use the Soft Cloth object to generate random shapes by physics simulation and then export your favorite shape of the object as an Alembic file.

This Alembic file thus can be used as a static prop, or a morphing target in other 3D tools.

1. Given an object with soft cloth animation.

2. Go to the time frame when the shape of the object is ideal.

3. Select the object and then execute the File >> Export Alembic command.


5. Export the object of the current shape into an Alembic file.
6. Load the file into a 3D tool (in this case, Maya). It turns into a static prop with a desired shape.

Optionally apply materials for the object.

**All**
If an object (soft cloth, especially) has a certain shape already, and you want it to start the soft cloth simulation by the shape it has, then you can choose the **All** radio button to store the animation of it into an **Alembic** file.

1. Given an object that is set as soft cloth with a certain shape already (in this case, the curtain).
2. Simulate the soft-cloth animation.

3. Select the object and then execute the **File >> Export Alembic** command.
4. Choose the **All** radio button in the **Export Range** group.

5. Export the object with its animation into an **Alembic** file.
6. Load the file into a 3D tool (in this case, Maya). The entire animation will thus be imported for rendering.

Apply material for the object.

**Range**

Sometimes, the start frames of a soft cloth do not meet your need because of the shape. Then you can export the desired part of the animation as an Alembic file.

1. Given a flat 3D surface for creating a table shape with soft cloth simulation.

2. Drag the play head and keep in mind the time range to exclude the free-falling of the object.

3. Select the object and then execute the **File >> Export Alembic** command.
4. Choose the **Range** radio button in the **Export Range** group.

   ![Export Range](image)

   Enter the start and stop frame that you have kept in Step 2.

5. Export the object, with its animation, into an **Alembic** file.

6. Load the file into a 3D tool (in this case, **Maya**). Only the animation within the range will be extracted for rendering.

   ![Object](image)

   Apply material to the object.
Setting Sample Frame

The Sample Frame determines how iClone will sample the transform data or pose within specified frames. The recommended rate, by default, is 1 for exporting a precise animation into Alembic format.

Given an animation or a motion file, the transform status and the pose in 13 frames (1 ~ 13) are shown as the illustrations below:

The transform data in 13 frames.

The poses in 13 frames.

If you set a sampling frame to 2, for example, then iClone samples the transform data or pose every other frames; which will generate a precise (but value 1 is the most precise) animation or motion.

Lower Sample Frame number is specified. The new animation is almost the same as the original one.

As you increase the Sample Frame number (in this case, 6), iClone spans more frames before it extracts transform data or poses from the original animation or motion, which can decrease the correctness of the result.

Only three transform data are extracted from the original animation and the rest ones are ignored.

The Alembic result (with lost results).

Only three poses are extracted from the original motion and the rest are ignored.

The Alembic result (with lost results).
Including Transformation with World Space
When you export animations of a specific object, you cannot only export the animations or motions of it, but also include the transformation data. The transformation data can be RTS, path, look at, reach, link, or any constrain keys of the object. In other words, you can export both the Clip-based and the Key-Switch-based data simultaneously into an Alembic file.

Alembic with Transform Keys
When an object is having clip-based animations or motions at a certain location in iClone, then you can include the location information into an Alembic file to prevent it from re-locating to the original position in other 3D tools.

1. Create a motion of an object (in this case, a character) with RTS (rotation, transformation, scale) data.

2. Export the static scenery into an FBX file through 3DXchange for use in other 3D tools.

3. Go back to iClone, select the animated object and execute File >> Export Alembic.

4. In the coming panel, activate the World Space box.

5. Click the Export button to save the clip-based data of the character with the path keys into an Alembic file.

Note:
If this box is not activated, then only the clip-based data will be included within the *Alembic* file.

6. Load the scene in **FBX** format exported from **3DXchange**

7. Load the **Alembic** file into any other 3D tool (in this case, **Maya**) and apply a material to it.

8. Render to create the video.

Note:

If this box is not activated, then you have to manually re-locate the object before rendering the entire project in the 3D tool.
Alembic with Constrain Keys

Given an object with constrain keys in iClone, you can include the key effects into Alembic in order to re-build the effect in other 3D tools.

1. Create a motion of a character with transformation data (in this case, path keys).

2. Select the character and execute File >> Export Alembic

3. In the coming panel, activate the World Space box.

4. Click the Export button to save the clip-based data of the character with the path keys into an Alembic file.

Note:
5. Load the **Alembic** file into any other 3D tool (in this case, **Maya**).

6. Render to create the video.
Pipeline for HitFilm

When the target 3D tool you want to use for importing the Alembic files is HitFilm, then please follow the steps below:

Exporting Base OBJ and Alembic Files
Firstly, you need to export a model to be the base for applying the Alembic animations of the object in HitFilm.

Exporting Base OBJ File
1. Select the object whose animation you plan to export as an Alembic file.
2. Save this object into the Content Manager.
3. Load this object into 3DXchange.
4. Export the object as an OBJ file with the settings shown below.

The object and its textures are exported into OBJ and PNG files.

Exporting Alembic File

1. Go back to iClone, select the object and then execute the File >> Export Alembic command.
2. According to your needs, choose one of the three radio buttons in the Export Range group (in this case, Range, because the start status of the object is stiff).
3. Export the animation of the object into an Alembic file.

Integrating Base OBJ and Alembic Files in HitFilm

1. Launch HitFilm.
2. In the Media tab, right-click and execute the Import 3D Model... command and load the base model (*.obj).
3. Right-click in the Media tab again and execute the Import 3D Model Animation... command, and load the Alembic file.
4. Drag and drop the imported OBJ item in the Editor.

You will see a auto-generated tab of the object's name. Switch to this tab.

5. Drag and drop the imported Alembic item into the sub-node, Animation, under the item you have added in the previous step.

6. Playback to view the result.
Pipeline for Maya

When the target 3D tool you want to use for importing the Alembic files is Maya, then follow the steps below:

Exporting Alembic File from iClone
Firstly, you need to export the animation of a model into Alembic file.

1. Create an object with animation (in this case, a girl with motion).

2. Select the object and execute the File >> Export Alembic... command.

3. According to your needs, choose one of the three radio buttons in the Export Range group.
4. The animation is then exported into an Alembic file.

Exporting FBX File through 3DXchange

In order to get the relationships of the textures and the meshes of the model, you need the material information, because a material is a combination of different textures and also describes how these textures are to be mapped onto the meshes of the target model. The material information is stored in the FBX file when the model is exported from the 3DXchange; therefore, exporting the model as an FBX file is ideal for keeping these information and using afterwards in Maya.

1. Select the object.

2. Save this object into the Content Manager

3. Load this object into 3DXchange
4. Export the object as an FBX file with the settings shown below.

The object and its materials are exported into FBX file.

Integrating Materials and Alembic File in Maya
1. Launch Maya.
2. Import the FBX file.
3. In the **Hypershade** panel, you will see that the relevant materials are automatically generated.

4. Delete the model, meshes, bones, or handles in the **Outliner** panel because you will not need them any longer.

   However, make sure that the material balls are left within the **HyperShade** panel untouched.
5. Import the Alembic file by drag and drop it onto the working area. The object will then be totally grayed after it is imported.

6. Drag and drop the material balls with the middle-mouse button from the HyperShade panel onto its corresponding meshes of the model.

   Repeat this step until all materials are correctly assigned onto the object.

7. Playback to view the result.
Pipeline with Material Mapping Table File

By adding an FBX export to carry packaged material information, you can save three to four times the effort by assigning numerous textures to the texture-less Alembic file.

Exporting Alembic, Textures and Material-to-Mesh Mapping Table Files from iClone

1. Create an object with animation (in this case, a flying kite).

2. Select the object and execute the File >> Export Alembic... command.

3. According to your needs, choose one of the three radio buttons in the Export Range group.

Make sure you also activate the Export Texture box to export all the textures you need.
4. The object, animation and a material mapping table is then exported into Alembic, Texture Image and .ini files.

Note:

The .ini file describes the mesh-material-mapping statuses and the relationships for material and texture images as shown below:

Integrating Materials and Alembic File with Plug-in for 3D Tools

1. Launch your favorite 3D tool.
2. Launch the plug-in specially scripted for importing Alembic file.
3. Assign the Alembic Folder with Texture and the .ini to the corresponding field of the plug-in.

Note:

For developers with the plug-in design capabilities, the .ini file provides the Materials-to-Mesh Mapping Table allowing them to reduce a 50-step assigning process into a simple, one-click Alembic material assignment.

4. Click OK to re-create the object with its animation in your 3D tool.
The Notices

There are some notices you need to know when you want to export Alembic files.

Software Version

The versions for exporting Alembic file are listed below:

Reallusion Products

- iClone Pro 6.5 or above.
- 3DXchange Pipeline 6.5 or above.

Compatible Main 3D Tools for Alembic

- Maya 2012 or above.
- 3DS Max 2016 or above.
- HitFilm Pro 4 or above.
- LightWave 3D 11.6 or above.
- Octane Render 1.5 or above.

Note: Please refer to the Alembic (Wikipedia page) for more information.

Exportable Contents

Licenses for Exporting iClone Contents

- Character iContent License
- Motion iContent License
- Props, Accessories Export License
Editing Props in 3DXchange (New for 6.1)

For single-meshed, bone-skinned or structured props, that you wish to reduce the draw call times, set the spring effect, smooth out the seam lines on the surface or flip the faces when they appear to have holes, edit the perform list, turn them into a character, and sculpt the meshes, which cannot be done in iClone, then you need to edit the props in 3DXchange.

Instead of saving the target prop first in iClone and then sending it to 3DXchange for further editing, you can simply click a button to instantly send it to 3DXchange.

1. Apply a prop (in this case, a bone-skinned one), make sure it is selected.

2. Click the **Edit in 3DXchange** button in the **Modify >> Edit tab >> 3DXchange** section.

3. The prop will be sent to 3DXchange for further editing.

<table>
<thead>
<tr>
<th>Single-Mesh Props</th>
<th>Bone-Skinned or Structured Props</th>
<th>Reducing Draw Calls (Merge Identical)</th>
<th>Setting Spring Effects</th>
<th>Smoothing Surface</th>
<th>Flipping Faces</th>
<th>Adjusting Per-Form List</th>
<th>Characterization</th>
<th>Sculpting Meshes</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>(16 bones at least)</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
Motion Retargetting (New for V7.0)

- In iClone, the human motions can be applied to any standard and non-standard character; it is because they are constructed with identical bone structure.
- This characteristic allows you to search the abundant motion templates from library to quickly create ideal motions for the characters.
- The character's sizes and proportions can be very different from character to character; however, iClone applies Real-Time Motion Retargetting technique, which makes the characters of different size can be applied with same motions, while the motions still be performed with rational results.
Rendering

iClone now offers the convenient feature of exporting your project into multimedia formats that are compatible with a wide range of devices. For instance, you can now convert your work to an AVI file with DVD and HD quality. You can also convert it into still or sequenced image files.

Click the Render button on the Project toolbar to access the Render panel.

### Format Section
In this section, you may choose the image, video and audio quality output.
- **Video**: Output AVI/WMV/MP4(H.264)/WAV files.
- **Image**: Output BMP/JPG/TGA(32-bit)/PNG(32-bit) files.
- Utilize the Format drop-down list to decide the format of the exported media.
- Drag the Video and/or Audio sliders to set the quality of the exported media.
- Use the Quality slider to adjust JPG quality.
- Export as Alpha Video in AVI (HD format included), WMV, Mp4 (H.264) or WAV.
- Determine if you want to export the image sequence or just one image. You may press F10 to preview the output image of the current frame.

Note:
- If you want to further edit the exported video with an external video editor, then please choose AVI RAW data for lossless post production; this maintains color fidelity for high quality production.
- If you want to export into a WMV file format, then you will need to first download and install the WMVEncoder9 from the Microsoft website.

### Output Size Section
Specify the resolution for the output frame. Please refer to the General Output Settings section for more information.

### 3D Stereo Section
Export your project as 3D stereo media. Please refer to the Exporting Stereo Vision Media section for more information.

### Render Quality Section
Please refer to the General Output Settings section for more information.

### Output Range Section
Please refer to the General Output Settings section for more information.
General Output Settings

The general output settings for Video and Image are described in this section.

The Benefits of Using 32-bit TGA and PNG
- The 32-bit TGA/PNG images containing Alpha channels are more suitable for image and video composition.

The Benefits of Using 64-bit WMV and MP4
- The 64-bit version media allow users to work with larger projects, containing more characters, scenes, or texture effects.
- Better quality with smaller file size - instead of exporting AVI RAW video for best quality but large file size, you are now able to export videos in WMV or MP4 64-bit format with high quality (resolution up to 1920*1080) but small file size.

Output Size Section

You can define the size of the exported image in the Output Size section. To define output size, you may select either a standard size from the Frame Size drop-down list or define a custom size by entering the height and width, in pixels, in the Output Size boxes.

Please note that if you activate the Lock Ratio box, you can only adjust the width of the project while the height is updated automatically in current ratio.

Render Quality Section

The render quality can be set to Preview or Final Render using the radio buttons. You may enable the Super Sampling and/or High Quality Shadow boxes to enhance the quality of the exported media.
Output Range Section

You can either export the entire video, or a specific range of frames. Select the output range using the radio buttons in the Output Range section.

- Choose the Range radio button if you only want to export a specific part of the project.
  You may also drag the Mark in/Mark out controls beneath the play bar (the red triangles in the illustrator below) to specify the range to be exported.

- Enter the desired frame rate, in frames per second, in the Frame Rate box.
Rendering View Port

When export media are larger than the resolution of the 3D view, such as HD or HD for 4K, what you get is not what you see for some effects in iClone 6.4 or earlier versions.

The effects that are influenced under this circumstance are listed below (the shadow and HDR are not influenced):

- DOF (Depth of Field)
- Ambient Occlusion
- Post Effects
- Toon Shader

Take the Ambient Occlusion as an example, what you see on the screen are shown in the illustrations below:

However, after exporting the project, especially at 4K HD format, the effect in the exported media turns to:

Solution

By rendering with the view port solution, you can get exactly the same media as you see in the view port, including the special effects listed above.

Simply select the Same as 3D view in the Frame Size drop-down list in the Render panel.

Note:

- The resolution or size of the output media is limited to the same as the one of the 3D view when this feature is applied.
- The maximum size of the media you can get with this feature is up to the lower resolution between your graphic card and display device.

<table>
<thead>
<tr>
<th>Graphic Card Max Resolution</th>
<th>Display Device Max Resolution</th>
<th>Rendered Media Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1280 x 1020</td>
<td>Ultra HD</td>
<td>640 x 480</td>
</tr>
<tr>
<td>2560 x 1600</td>
<td>640 x 480</td>
<td>640 x 480</td>
</tr>
</tbody>
</table>
Exporting 3D Stereo Vision Media

You may activate the Enable Stereo Vision Output to export your project in four types of 3D stereo formats: Anaglyph, Side by Side, Above/Below or Dual Stream.

### Anaglyph (Red/Cyan)
The left and right images will be superimposed into one single image to be viewed with red/cyan glasses.

![Anaglyph Example](image)

### Side by Side
The left and right images will be exported, side by side, into one single frame.

![Side by Side Example](image)
**Above/Below**
The left and right images will be exported, with the left image at the top and the right image at the bottom, into one single frame.

**Dual Stream**
The left and right images will be exported into two files.

---

Note:
- If you want to output a 3D stereo media, then please refer to the [Settings for Pop-out and Deep-in Effects](#) section for more information.
- The exported 3D file in **Anaglyph** format can be viewed with regular red/cyan glasses. The 3D files in other formats (**Side by Side**, **Above/Below**, **Dual Stream**), must be viewed with [specific prerequisites](#).
Creating a 3D Stereo Project

- The Concept of 3D Stereo Vision
- Settings for Pop-out and Deep-in Effects
- How to Create a Comfortable 3D Stereo Project
- Environment for viewing 3D Stereo Media
- Viewing Methods of 3D Stereo Media

Please visit our web site for Additional Video Demos and How-to Documents
The Concepts of 3D Stereo Vision

How is the 3D Stereo Sensation Generated?

Stereo vision is generated by two perceived views in our brains. Our brain combines the similarity of the two views, while the small differences between them lead our mind to sense the depth of space. As a result, these two views turn out to be a single three-dimensional stereo picture.

There are two primary factors to generate 3D stereo vision, **Convergence** and **Parallax**.

**Convergence**
The convergence is the angle formed by your eyes and the observed object. The higher the angle value is, the nearer the observed object is to your eyes, and vice versa.

Top View | Left-Eye View | Right-Eye View | Superimposed Result
---|---|---|---

High Convergence (Target object is near)
The objects in front of the convergence point appear with pop-out effect and the objects behind the convergence point appear with deep-in effect.

Low Convergence (Target object is far)

Please note that if the **Convergence** is higher than 6 degrees, then your eyes will feel uneasy as the object is too close. On the contrary, if the value is too small, then the object will seem too far away, thus losing the 3D stereo effect.
Parallax
The parallax images are the images passing through to your left and right eyes. All 3D stereo media contain a pair of parallax images that individually, and simultaneously, pass to both your eyes. This is to convince your brain that there is an existence of depth in the media.

Positive Parallax
When the target object offsets to the right in the left image, and offsets to the left in the right image, then your binocular focus is led to fall behind the display. This phenomenon is called Positive Parallax.

Zero Parallax
When the paired parallax images superimpose on the display, then your binocular focus is led to fall on the same display. This phenomenon is called the Zero Parallax.

Negative Parallax
When the target object offsets to the left in the left image, and offsets to the right in the right image, then your binocular focus is led to fall in front of the display. This phenomenon is called Negative Parallax.
Settings for Pop-out and Deep-in Effects

Determine the Pop-out and Deep-in Effect

The Convergence Distance (cm) defines the distance between your current camera and the convergence point (where the Zero Parallax Plane will be located).

To define the pop-out and deep-in effects in iClone, you only need to set the Convergence Distance value.

The default grid size is 100 cm x 100 cm. Therefore you may use the Top view of the camera to define the approximate Convergence Distance.

If you set the convergence distance to the "A" 3D text, then the other objects will appear with a deep-in effect.
If you set the convergence distance to the actor, then the "A" 3D text will pop-out and the "B" 3D text will appear with a deep-in effect.

If you set the convergence distance to the "B" 3D text, then the other objects will pop-out as they are in front of the Zero Parallax Plane.

Please note that when you export an anaglyph media, any object on the Zero Parallax Plane will not split while the pop-up objects split into cyan (left) and red (right) and the deep-in objects split into red (left) and cyan (right).
Calculating the Best Position for Viewing 3D Stereo Media

To find the best position for viewing in the real world, calculate the width of the Zero Parallax Plane (In this section, the actor in the above example is now taken as the target object).

Finding the Ratio in iClone

1. Use the top view to count the Distance value between the camera and the target object.

2. Switch to the frontal view and calculate the visible Width value (by counting the grid) where the target object is.

3. Use these two values to get a ratio. This ratio is unique for this project and will be later used in real world viewing.

4. Export the project as a 3D stereo media.
Best Position for Viewing in the Real World

1. Count the width of the display device that is playing the media.

2. Then decide the approximate viewing distance away from the display device in accordance with the ratio. This is the ideal distance position for viewing the best 3D sensation.

   \[ \frac{400}{350} = \frac{40}{35} \]

3. Viewers within this distance will experience a better 3D stereo effect while viewers outside of the distance will perceive a weak 3D stereo effect.

To experience the best 3D viewing results in the real world, arrange your display device and your viewing location to the similar ratio triangle in iClone.
How to Create a Comfortable 3D Stereo Projects

If you would like to create a project with the best 3D stereo results, then please follow the guidelines below. In the below example, the character is set to be the main target:

1. Adjust the **Preview Camera** to the perspective from which you want to view the scene.

2. Add a custom camera. By default, it will have the same settings as the preview camera.

3. In the **Preview Window**, switch the view to the **Preview Camera**.
4. Move the preview camera backwards to where you can see the **Custom Camera**.

5. Change to the **Top View** of the preview camera. (Hotkey: G)
6. Measure the distance value between the custom camera and the target object. This value will be the **Convergence Distance**.
7. Switch to the custom camera and measure the width value of the **Zero Parallax Plane**.

8. Go to the **Render** panel, and select any of the **Image** or **Video** radio buttons.
9. Enable the **3D Stereo Vision Output** box and choose the **Anaglyph (Red/Cyan) Side by Side Above/Below** or **DualStream** from the drop-down list.
10. Set the **Convergence Distance** to the number value measured in step 6.

11. Export the project as a 3D stereo media.
Strength the 3D Sensation: Object Arrangement and Camera Lens.

Object Arrangement
In order to generate believable 3D stereo content, it is recommended that you create a scene with objects in near perspective, middle perspective and far perspectives.

Camera Lens
The camera lens may increase or decrease the sensation of 3D stereo depth. Given a same project, a wide angle (low lens value) may provide a more pronounced 3D stereo sensation than a long-take angle (high lens value) may. The higher the lens value, the harder for your eyes to focus on the target object.

Note:
- Any 2D-based effects, such as 2D Backgrounds or Image Layers, may hinder the 3D sensation. It is recommended that you avoid these effects in your 3D stereo projects.
- Please refer to the How to... page for more information about how to create an appropriate 3D stereo media.
Environment for Viewing 3D Stereo Media

After exporting your 3D stereo content, you may need some specific viewing devices.

<table>
<thead>
<tr>
<th>Stereo Format Player</th>
<th>No 3D Device Required</th>
<th>3D Device Required</th>
<th>Shutter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Anaglyph (Red/Cyan)</td>
<td>Side by Side</td>
<td>Free</td>
</tr>
<tr>
<td></td>
<td>Any General Video Player</td>
<td>3D Player (Usually Bundled with 3D Displays)</td>
<td>Free</td>
</tr>
<tr>
<td></td>
<td><strong>Free</strong></td>
<td><strong>Paid</strong></td>
<td><strong>Paid</strong></td>
</tr>
</tbody>
</table>

- Stereo Movie Maker
- Stereo Movie Player
- nVidia 3D Vision Player
- DDD Player
- Stereoscopic

<table>
<thead>
<tr>
<th>Glasses</th>
<th>Red / Cyan Glasses</th>
<th>Polarization Glasses</th>
<th>Shutter Glasses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Free</strong></td>
<td><strong>3D Passive Glasses List</strong></td>
<td><strong>3D Active Shutter Glasses List</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Free</strong></td>
<td><strong>Free</strong></td>
<td><strong>Paid</strong></td>
</tr>
</tbody>
</table>

- 3D Passive Glasses List
- 3D Active Shutter Glasses List

<table>
<thead>
<tr>
<th>Display Graphic Card</th>
<th>General Display</th>
<th>3D Display (Polarization)</th>
<th>General Graphic Card</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Free</strong></td>
<td><strong>Paid</strong></td>
<td><strong>3D Display (Shutter)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>3D Display (Polarization)</strong></td>
<td><strong>3D Graphic Card (nVidia 9600 or above)</strong></td>
<td></td>
</tr>
</tbody>
</table>

For more information on available 3D products, please refer to the Available 3D Products page.
Also visit our web site: Additional Video Demos and How-to Documents.
Viewing Methods of 3D Stereo Media

- Viewing with Any Device
- Viewing with Specific External Devices
- Viewing with Bare Eyes
- Viewing on YouTube
Viewing with Any Device
If you would like to view your 3D stereo media with any common device, then you may export the media in Anaglyph format. The only equipment needed is a pair of Red-Cyan glasses.

Anaglyph (Red/Cyan) Method
This method employs anaglyph media and anaglyph filters. Anaglyph media can be videos or images made of two color layers. These two layers, containing differently filtered colored images for left and right eyes (as described above), superimpose in each frame (for video) or image.

In order to produce the sensation of depth, you must use two identical color filters (Red-Cyan glasses) to pass images separately to the left and right eyes. However, this method can result in color-loss issues due to the colored filters.
Viewing with Specific External Devices
If you would like to view your 3D stereo media without any color loss issue present in the anaglyph solution, then you may choose to export your media in **Side by Side, Above/Below** or **DualStream** formats. However, this method requires specific playback devices for viewing.

**Side by Side, Above/Below and DualStream Methods**
In order to have a better stereo vision experience, then it is recommend that users employ the following prerequisites:

1. "Side by side", "Above / Below", or "DualStream" media (exported from **iClone**).
2. Specialized player (for creating alternating-frame sequencing or superimposed video).
3. Specialized display.
4. Filtering devices (for separately filtering images to the left and right eyes).

The interval time to playback the left and right images are rather short. The human brain takes the paired images and synchronizes them together in order to generate the feeling of depth.

For more details about players, displays and filter devices, please refer to the **Environment for Viewing 3D Stereo Media** section.
Viewing with Bare Eyes

Side by Side Method - Without Equipment

This method utilizes media that consists of a pair of side-by-side offset frames (for video) or images. You do not need any special device to view this media; you only need to adjust the focus of your binocular vision so that the images from both sides overlap with each other.

In order to overlap the paired frames, or images, and sense the depth of the media, you may employ your bare eyes with the Parallel Viewing technique.

Parallel Viewing Method

You may need to practice in order to learn how to use this viewing technique:

1. Look at any far away object that is beyond your display device.
2. You may then notice that the two actors may double and appear as four.
3. Then adjust your eyes so that the two actors, in the middle, overlap with each other. Eventually you will see the 3D actor pop-out in front of you.
Viewing on YouTube

Uploading to YouTube

If your 3D stereo media is in Anaglyph format, then you may simply upload it to YouTube with any conventional method. If you would like to upload your 3D stereo media to YouTube in Side-by-Side 3D format, then follow the steps below:

1. Prepare your 3D stereo media.
2. Upload it to YouTube. In the Tag section, type in `yt3d:enable=true`.
3. Visitors may use YouTube as a 3D player by selecting the media type in the drop-down list.

Note:
- If the 3D result is not correct, you may add `yt3d:swap=true` to fix the issue.
- If you choose any type other than two-color methods in step 3, then you must have specific display devices to perceive the correct 3D stereo effect.
Exporting an Alpha Video

If you would like to export an alpha video in order to mask out other videos with external video editing tools, then please follow the steps below:

1. Prepare an iClone project. Remove the Sky and optionally remove the Terrain.

2. Click the Project Settings button on the play bar, disable the Activate Image box so that the background turns to a solid color.

3. In the Render panel, scroll to the 3D Stereo section and disable the Enable Stereo Vision Output box.

4. Leave the other settings in default. For more information, please refer to the General Output Settings section.

5. Scroll to the Format section, choose Video and enable the Export alpha video only box.

6. Click the Export button to export as an alpha video.
Using Alpha Videos in Video Editing Tools

The exported alpha video can be imported into any video editing tool to create frame or special overlaying effects. We will use Adobe Premiere as an example in the following case.

1. Drag and drop the background video into Video 1 track.

2. Drag and drop the alpha video into Video 2 track. Disable the Toggle Track Output box to make the video invisible.

3. Drag and drop the main video to apply the alpha video into Video 3 track.

4. Optionally, you may adjust the size of the main video.

5. Drag and drop the Channel/Set Matte in the Effect panel, onto the main video.

6. In the Effect Control panel, collapse the Set Matte effect and set the two settings as shown in the illustration below.

7. Export the video.
## Global Shortcuts

<table>
<thead>
<tr>
<th>File Operation</th>
<th>Shortcut</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Project</td>
<td>Ctrl + N</td>
<td>Create new project.</td>
</tr>
<tr>
<td>Open Project</td>
<td>Ctrl + O</td>
<td>Open existing project.</td>
</tr>
<tr>
<td>Save Project</td>
<td>Ctrl + S</td>
<td>Save current project.</td>
</tr>
<tr>
<td>Save Project As</td>
<td>Ctrl + Shift + S</td>
<td>Save current project as another file.</td>
</tr>
<tr>
<td>Import</td>
<td>Ctrl + I</td>
<td>Import files in supported formats.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>On-screen Display</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Show online help</td>
<td>F1</td>
<td>Show Online Help.</td>
</tr>
<tr>
<td>Show/Hide Timeline</td>
<td>F3</td>
<td>Show/hide Timeline panel.</td>
</tr>
<tr>
<td>Show/Hide Content Manager</td>
<td>F4</td>
<td>Show/hide Content Manager</td>
</tr>
<tr>
<td>Show/Hide Scene Manager</td>
<td>F5</td>
<td>Show/hide Scene Manager</td>
</tr>
<tr>
<td>Show/Hide Modify Panel</td>
<td>F6</td>
<td>Show/hide Modify Panel</td>
</tr>
<tr>
<td>Show/Hide Visual Settings Panel</td>
<td>F7</td>
<td>Show/hide Visual Settings panel.</td>
</tr>
<tr>
<td>Show/Hide Mini Viewport Panel</td>
<td>F8</td>
<td>Toggle Mini Viewport On/off.</td>
</tr>
<tr>
<td>Show/Hide Play Bar</td>
<td>F9</td>
<td>Show/hide Play Bar panel.</td>
</tr>
<tr>
<td>Show/Hide Preference Panel</td>
<td>Ctrl + P</td>
<td>Show/hide Preference panel.</td>
</tr>
<tr>
<td>Show/Hide Project Settings Panel</td>
<td>Ctrl + Shift + P</td>
<td>Show/hide Project Settings panel.</td>
</tr>
<tr>
<td>Show/Hide Edit Motion Layer Panel</td>
<td>N</td>
<td>Show/hide Edit Motion Layer panel for the selected actor, prop or accessory.</td>
</tr>
<tr>
<td>Show/Hide Gizmo</td>
<td>Ctrl + Q</td>
<td>Toggle Transform Gizmo Mode On/Off.</td>
</tr>
<tr>
<td>Show/Hide Grid</td>
<td>Ctrl + G</td>
<td>Toggle 3D Floor Grid On/Off.</td>
</tr>
<tr>
<td>Show/Hide FPS</td>
<td>Ctrl + F</td>
<td>Toggle Frame Rate (FPS) display On/Off.</td>
</tr>
<tr>
<td>Show/Hide Dummy Object</td>
<td>Ctrl + D</td>
<td>Show/hide Dummy props.</td>
</tr>
<tr>
<td>Show Pop-up Menu</td>
<td>Right Mouse Button</td>
<td>Show the Pop-up Menu.</td>
</tr>
<tr>
<td>Switch Render State</td>
<td>Ctrl + R</td>
<td>Switch between Wireframe/Normal render states of the selected object.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Layout Preset</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>Ctrl + 2</td>
<td></td>
</tr>
<tr>
<td>Animation</td>
<td>Ctrl + 3</td>
<td></td>
</tr>
<tr>
<td>Visual Effects</td>
<td>Ctrl + 4</td>
<td></td>
</tr>
<tr>
<td>Final Render</td>
<td>Ctrl + 5</td>
<td></td>
</tr>
<tr>
<td>All Panels</td>
<td>Ctrl + 6</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Working Area</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Undo</td>
<td>Ctrl + Z</td>
<td>Undo</td>
</tr>
<tr>
<td>Redo</td>
<td>Ctrl + Y</td>
<td>Redo</td>
</tr>
<tr>
<td>Command</td>
<td>Function</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>Play/Pause</td>
<td>Space bar</td>
<td></td>
</tr>
<tr>
<td>Left Arrow Key</td>
<td>Go to previous frame.</td>
<td></td>
</tr>
<tr>
<td>Right Arrow Key</td>
<td>Go to next frame.</td>
<td></td>
</tr>
<tr>
<td>Stop</td>
<td>Press down &quot;,&quot; key to stop playing and go back to the first time frame.</td>
<td></td>
</tr>
<tr>
<td>Current Frame Preview</td>
<td>F10</td>
<td></td>
</tr>
<tr>
<td>Toggle Angle Snap On/Off</td>
<td>Ctrl + E</td>
<td></td>
</tr>
<tr>
<td>Toggle Snap to Grid On/Off</td>
<td>Ctrl + W</td>
<td></td>
</tr>
<tr>
<td>Toggle Snap to Model On/Off</td>
<td>Ctrl + M</td>
<td></td>
</tr>
<tr>
<td>Copy</td>
<td>Ctrl + Move/Rotate/Scale</td>
<td></td>
</tr>
<tr>
<td>Delete Object</td>
<td>Delete</td>
<td></td>
</tr>
<tr>
<td>Selection</td>
<td>Ctrl + Left Mouse Button</td>
<td></td>
</tr>
<tr>
<td>Toggle to Select Tool</td>
<td>Q</td>
<td></td>
</tr>
<tr>
<td>Toggle to Move Tool</td>
<td>W</td>
<td></td>
</tr>
<tr>
<td>Toggle to Rotate Tool</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>Toggle to Scale Tool</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Move Tool (Gizmo hidden)</td>
<td>Left Mouse Button, Roll Mouse Wheel, Right Mouse Button, Both Mouse Buttons</td>
<td></td>
</tr>
<tr>
<td>Rotate Tool (Gizmo hidden)</td>
<td>Left Mouse Button, Right Mouse Button, Both Mouse Buttons</td>
<td></td>
</tr>
<tr>
<td>Scale Tool (Gizmo hidden)</td>
<td>Left Mouse Button, Right Mouse Button, Both Mouse Buttons</td>
<td></td>
</tr>
<tr>
<td>Align To</td>
<td>Ctrl + L</td>
<td></td>
</tr>
<tr>
<td>Pick Material</td>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>

**Generating Textured Object**

Dragging Texture to Space with Right Mouse Button

**Assign Textures to Desired Material Channels**

Dragging Textures to Objects (containing Eight Material Channels) with Right Mouse Button

---

**iClone** pops up a menu for you to determine the objects you can generate through this method.

---

**iClone** pops up a menu for you to determine to generate specific objects or the target channel of the object for loading the texture image.
Create Objects

Click on Space with Right Mouse Button

**iClone** pops up a menu for you to determine to generate lights, path, camera, or to remove the animations in the entire project.

Working Area - Camera and Light Manipulation

<table>
<thead>
<tr>
<th>Action</th>
<th>Keyboard/Buttons</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roll X-Z</td>
<td>Right Mouse Button</td>
<td>Press down and drag in the 3D viewer to roll the view on X-Z plane.</td>
</tr>
<tr>
<td>Zoom In/Out</td>
<td>Mouse wheel</td>
<td>Scroll the mouse wheel to zoom in/out the 3D viewer.</td>
</tr>
<tr>
<td>Speed Zoom In/Out</td>
<td>Right + Left Mouse Buttons</td>
<td>Press down both the right and left mouse buttons to speed up zooming of the 3D view.</td>
</tr>
<tr>
<td>Quick Camera</td>
<td>A - Left, S - Right, D - Back, F - Front, G - Top, J - Face, K - All, Home - 45 Degrees</td>
<td>Press <strong>F</strong> to view the selected object (character, accessory, prop) face front.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Press <strong>Home</strong> to snap the camera to a 45 degree perspective of the selected object (character, accessory, prop).</td>
</tr>
</tbody>
</table>
| Camera Manipulation Switch | Z - Zoom  
|                          | X - Pan   
|                          | C - Rotate X - Y  
|                          | V - Rotate X - Z | **Tips - Speed movement:**
|                          | Holding the **Shift** key while zooming, panning, rolling and rotating will increase the movement speed by 10x.

| Manipulate Camera in Object Editing Mode | Alt + Left mouse Button  
|                                        | Alt + Right Mouse Button  
|                                        | Alt + Both Mouse Buttons | Move Camera.  
|                                        |                           | Rotate Camera.  
|                                        |                           | Zoom Camera.  

| Combo camera switch | H | Switch between Preview and previous Cameras. |
| Camera & Object switch | U | Switch between current Camera and previous object. |
| Light & Object switch | / | Hold this key to rotate the last selected spotlight or directional light. If you have never selected any light, then the first light listed in the Scene Manager will be the target one for rotating. |

### Item Transform

<table>
<thead>
<tr>
<th>Move along X Axis</th>
<th>Alt + Right/Left Arrow Keys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Move along Y Axis</td>
<td>Alt + Up/Down Arrow Keys</td>
</tr>
<tr>
<td>Move along Z Axis</td>
<td>Ctrl + Up/Down Arrow Keys</td>
</tr>
<tr>
<td>Rotate by Z Axis</td>
<td>Ctrl + Left/Right Arrow Keys</td>
</tr>
<tr>
<td>Accelerate Movement</td>
<td>Combining Above Keys With Shift Key</td>
</tr>
</tbody>
</table>
# Shortcuts in Panels

## Content Manager

<table>
<thead>
<tr>
<th>Change View Mode</th>
<th>Ctrl + 1</th>
<th>Change the view of the Content Manager to Small Thumbnail, Large Thumbnail, or Details modes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rename</td>
<td>F2</td>
<td>Rename objects in Content Manager and Scene Manager</td>
</tr>
<tr>
<td>Multi-select continuously</td>
<td>Ctrl + Select</td>
<td></td>
</tr>
<tr>
<td>Back to previous folder</td>
<td>Back-space</td>
<td></td>
</tr>
</tbody>
</table>

## Modify Panel

<table>
<thead>
<tr>
<th>Action (Scroll to)</th>
<th>Hotkey</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attach Section</td>
<td>I</td>
<td>Scroll the Modify panel to the Attach section.</td>
</tr>
<tr>
<td>Look At Section</td>
<td>O</td>
<td>Scroll the Modify panel to the Look At section.</td>
</tr>
<tr>
<td>Path Section</td>
<td>P</td>
<td>Scroll the Modify panel to the Path section.</td>
</tr>
<tr>
<td>UV Settings Section</td>
<td>Ctrl + U</td>
<td>Scroll the Modify panel to the UV Settings section.</td>
</tr>
<tr>
<td>Transform Section</td>
<td>T</td>
<td>Scroll the Modify panel to the Transform section.</td>
</tr>
<tr>
<td>Texture Settings Section</td>
<td>Y</td>
<td>Scroll the Modify panel to the Texture Settings section.</td>
</tr>
<tr>
<td>Substance Section</td>
<td>M</td>
<td>Scroll the Modify panel to the Substance section.</td>
</tr>
<tr>
<td>Tessellation Section</td>
<td>Ctrl + T</td>
<td>Scroll the Modify panel to the Tessellation section.</td>
</tr>
<tr>
<td>Top Section</td>
<td>L</td>
<td>Scroll the Modify panel to the Topmost section.</td>
</tr>
<tr>
<td>Previous Section</td>
<td>Ctrl + Page Up</td>
<td>Scroll the Modify panel to the Previous section.</td>
</tr>
<tr>
<td>Next Section</td>
<td>Ctrl + Page Down</td>
<td>Scroll the Modify panel to the Next section.</td>
</tr>
<tr>
<td>Bottom Section</td>
<td>Ctrl + End</td>
<td>Scroll the Modify panel to the Bottom section.</td>
</tr>
<tr>
<td>Expand</td>
<td>Ctrl ++</td>
<td></td>
</tr>
<tr>
<td>All Sections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Collapse All Sections</td>
<td>Ctrl + -</td>
<td></td>
</tr>
</tbody>
</table>

**Puppet Panels (Motion / Direct / Face / Prop)**

<table>
<thead>
<tr>
<th>Start previewing</th>
<th>Space Bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start puppeteering and recording</td>
<td>Ctrl + Enter</td>
</tr>
<tr>
<td>Face Puppet Detail</td>
<td>Ctrl + F2</td>
</tr>
<tr>
<td>Face Puppet Profile</td>
<td>Number Keys (1, 2, 3 ...) Toggle profiles during <strong>Previewing</strong> or <strong>Recording</strong></td>
</tr>
<tr>
<td>Face Puppet Control</td>
<td>Q, W, E, R, T, Y Toggle between the <strong>Full Face Control</strong> templates during <strong>Previewing</strong> or <strong>Recording</strong></td>
</tr>
</tbody>
</table>
# Timeline Shortcuts

<table>
<thead>
<tr>
<th>Hotkey</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ctrl + C</td>
<td>Copy keys or clips.</td>
</tr>
<tr>
<td>Ctrl + X</td>
<td>Cut keys or clips.</td>
</tr>
<tr>
<td>Ctrl + V</td>
<td>Paste keys or clips.</td>
</tr>
<tr>
<td>Shift + Left mouse button click</td>
<td>Multi-select continuously.</td>
</tr>
<tr>
<td>Ctrl + Left mouse button click</td>
<td>Multi-select individually.</td>
</tr>
<tr>
<td>Ctrl + Drag</td>
<td>Copy keys or clips.</td>
</tr>
<tr>
<td>Delete</td>
<td>Delete keys or clips.</td>
</tr>
<tr>
<td>Home</td>
<td>Go to Start frame.</td>
</tr>
<tr>
<td>End</td>
<td>Go to End frame.</td>
</tr>
<tr>
<td>Left Arrow Key</td>
<td>Go to previous frame.</td>
</tr>
<tr>
<td>Right Arrow Key</td>
<td>Go to next frame.</td>
</tr>
<tr>
<td>Tab</td>
<td>Jump to next key or clip.</td>
</tr>
<tr>
<td>Shift + Tab</td>
<td>Jump to previous key or clip.</td>
</tr>
<tr>
<td>+</td>
<td>Zoom in the timeline.</td>
</tr>
<tr>
<td>-</td>
<td>Zoom out the timeline.</td>
</tr>
<tr>
<td>Ctrl + *</td>
<td>Fit to window.</td>
</tr>
<tr>
<td>Ctrl + /</td>
<td>Actual size.</td>
</tr>
<tr>
<td>Ctrl + B</td>
<td>Break motion clip.</td>
</tr>
<tr>
<td>Ctrl + Mouse Wheel</td>
<td>Pan the timeline view left or right.</td>
</tr>
<tr>
<td>Alt + Mouse Wheel</td>
<td>Zoom in or out the timeline view.</td>
</tr>
</tbody>
</table>
Troubleshooting

For the latest troubleshooting information, visit the support section of our web site at http://www.reallusion.com/support.asp
Frequently asked questions

Please visit our website for the complete FAQ contents: http://www.reallusion.com/icClone/ic_faq.asp
If you can't find the answer you desire, please fill in the form for further service: http://www.reallusion.com/CustomerSupport/user/QForm.aspx
Technical Support and Feedback

By purchasing iClone, you are eligible for premium support from our technical support team, should the need arise!

Please take a look at our support resources available from our website (http://www.reallusion.com/CustomerSupport/user/FAQList.aspx). In many cases this will be able to immediately answer your questions; if you have any comments or concerns about iClone, or you desire to contact our support team, please fill in the support form in www.reallusion.com/CustomerSupport/user/QForm.aspx.
Contacting Reallusion

Contact us:
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http://forum.reallusion.com/
Reallusion Developer Center:
http://developer.reallusion.com/

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