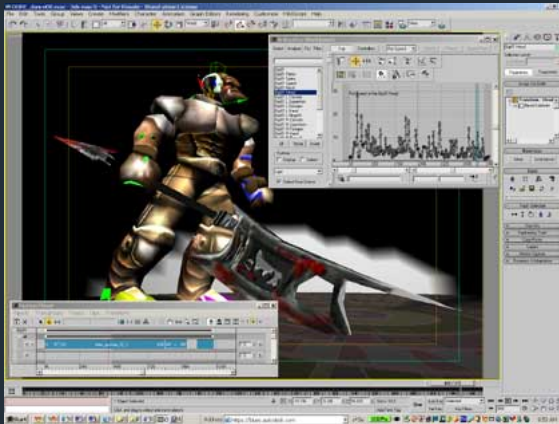


## Character Studio 4

by David Lightbown

### Introduction

Since its inception, Character Studio has proven to be a valuable tool with a diverse feature set. Due to the fact that creating a rig that is easy to use, flexible and has very quick-solving IK isn't always an easy task (especially with multiple characters in the scene) discreet's premiere character animation tool was created to make the lives of 3D artists more efficient.



Main interface (click image above to see larger version)

If the artist has an excellent character rig to animate that takes less time to prepare, they can focus on animating, which is the most important element of the final product. No one viewing the animation will know how easy the rig is to manipulate, how many specially scripted controllers there are or how perfectly the model deforms at specific fold points. All that the viewer sees is the final results and Character Studio helps make that happen faster and easier.

Only recently have other software companies added in pre-generated rigs out of the box, not to mention the fact that the auto-generated footsteps system, one of the things that make this product so unique, is protected by a patent and cannot be duplicated by any other company.

Character Studio has come a long way since its first version and, with the release of version 4, which is touted as a sort of renaissance for the product, discreet has added a host of new features that improve the way the product is used.



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### The New Biped

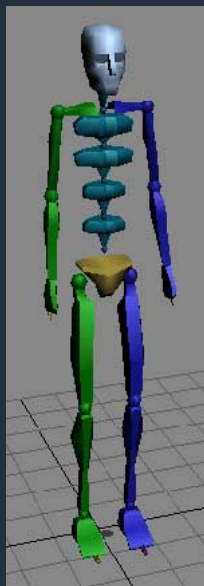
Character Studio 4 features a completely re-designed Biped model. The Biped is a default skeleton generated with the simple drag of the mouse, which includes many features such as pre-generated IK with rotation limits set to simulate normal human movement, which makes the IK solving much faster.

Those who have used Character Studio in the past will notice that the geometry of the Biped has been completely redesigned for a better look and better visual cues as to how it will move. In addition, new options have been added to the structure panel for more customization. However, the geometry can be toggled back to the old skeleton, if the user so chooses, but does not disallow the use of any of the new options.

A few of the new added features to this skeleton are head targeting, wrist twisting, and Props. Head targeting is what one would assume it to be: an object in the scene is linked as a point of interest, and the Biped's head will follow it. This kind of thing is easy to set up with a regular rig made of bones in max or any other package, but here it has been done for you with easy to access options.

Wrist twisting is something only artists who want advanced realistic skeletons will do if they're building a rig by hand. Generally with regular bones, the best method in which to accomplish this effect is to build two bones in the forearm. With the use of expressions, the rotation of the bone closest to the wrist has half the rotation value of the bone above it, simulating the crossing over of the ulna and radius bones. In Character Studio 4, this is done automatically and is an option that can be toggled on or off.

Finally, the Props are useful for objects needed to represent anything extra on the Biped, such as a weapon, a cane, an extra limb, etc... This is a great boon for those who want to copy the movement of one model over to another and not have to worry about having to add extra objects to both Biped. In addition, they can be included in motion capture, and can be given keyframes in world space, body space, hand space, etc... so that they can retarget other Biped, as it is with body motion, which is a time saving feature.



The new Biped

### Manipulation of the Biped

In relation to Prop objects, many artists using versions of Character Studio previous to 4 have attached bones to Biped when they needed more definition and flexibility in their rigs. However, saving out the animation to copy to another Biped became a complicated process, requiring saving the bones and re-importing their animation separately. Examples of this would be extra legs for an arachnid creature, multiple strands of dreadlocked hair or a facial animation bone structure. In Character Studio 4, attached bones are included in the animation data and considered as one single Biped object. Not only that, but if the data is imported onto another Biped, the extra bones can be automatically imported and added, and re-adjusted to fit the proportions of the target Biped.

Another excellent new feature is using controllers on Biped objects. Any regular 3ds max controller (such as Noise, AudioScale, Spring, etc...) can be added onto the Biped bones. This allows the ability to have "stretchable" bones, a feature many users asked for. When added to the Biped, these are called Sub Anims which can be blended with the current movement of the Biped, and can have their motion either collapsed into the bones or saved into the Biped file so they can be modified later.

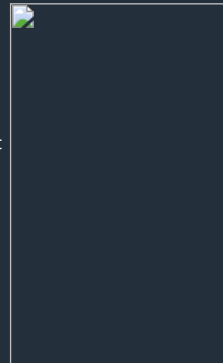
On the topic of controlling the Biped, the Move All Mode button adds a much needed feature to Character Studio: quickly and easily moving the entire model as one piece with worrying about some pieces being left behind or not translating properly, readjusting all targets and axes accordingly. It's very simple and straightforward to use, and users of previous version of Character Studios will be happy to see this addition.

Yet another new feature to the Character Studio toolbox is the Balance Factor. This is an animatable parameter which determines how the Biped will readjust its spine and hips to the position of the rest of body. This is a very nice addition, as it adds realism and a sensation of weight to the character that would normally have to be calculated and applied by hand.

### Copy / Paste

When a Biped is selected, one of the new sections in the Motion panel is labeled "Copy/Paste", which allows the artist to store and apply Postures, Poses and Tracks. Postures are sub-elements of the Biped such as the entire arm, or just one toe, while a Pose stores the entire Biped. Finally, Tracks represents the animation track from the selected Biped objects.

The user interface includes a small image so that the artist can quickly see what has been copied, which makes it very simple to cycle through a series of banked motions and paste them, with either regular or mirrored orientation, onto the selected Biped. Aside from immediate use for an animation, these poses can also be saved out and put into away for later use. A good example is different hand poses, which essentially don't change much from character to character, so they can be put into a Posture bank and re-used later.



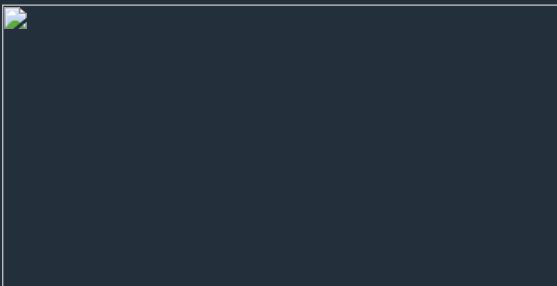
The new Copy/Paste tool.



Image courtesy of Blur Studios - [www.blur.com](http://www.blur.com)

### The Mixer and Workbench

One of the biggest additions to the toolset this time around is the Mixer. Although other software packages have had a mixer for a few years now, this one is built with a specific skeleton in mind, which makes it faster, easier to set-up and more powerful for blending animations. As most all characters that we see in animations are upright human forms, there are many features made especially for animating humanoids.



The Motion Mixer (click image above to see larger version)

As would be expected, the Mixer features non-linear animation and makes it very easy to scale, blend, trim, fade and transition motions. However, due to the fact that it is built to work with Biped makes it easy to filter out the motion on specific body parts or hierarchies, ensure that a character's feet do not slide when transitioning (a common error in many animations), and other time saving features geared towards solving problems quickly and without a lot of set up time.

Compared to the previous solution for mixing animation clips in previous versions of Character Studio, Motion Flow, the Mixer this is a huge leap forward in interactivity and ease of use, which bring 3ds max up to the same standards as other competing animation packages.

Another new improvement akin to the Mixer, the Workbench is a fantastic feature for those interested in the technical aspects of keyframe animation and also polishing motion to perfection. It offers a series of tools analyze and improve biped animation, such as the ability to flag unwanted motion (incorrect or sudden changes in speed, acceleration and jerking), based upon a series of parameters. Then, those keyframes can be corrected using a series of tools that offer effects like smoothing, blurring, key reduction, and more. This is great for cleaning up motion capture data, and long complex animations that would take hours to pick through frame by frame.

### Character Studio SDK

One of the main complaints many programmers have when writing plugins for 3ds max is that it is very difficult to get information from the Biped in Character Studio. With the advent of 3ds max 5 and Character Studio 4, this has all changed. The ability to retrieve and assign transformation data (including Tension Continuity Bias or TCB data) on Biped has been facilitated, making it much easier to write exporters for interactive games, as well as plugins that affect the Biped. Also, the inability of the Biped to interact with any expressions and script controllers has been fixed, a problem that has plagued many art teams with complex character rigs in previous versions of Character Studio. Finally, programmers can also add their own SDK behaviors to the Crowd system so that they can customize the logic and movement of crowd animations, a welcome addition for those interested in doing animations with an enormous number of characters.

### Conclusion

Character Studio 4 is a huge leap forward in terms of interactivity, ease of use, new features and improvements upon the previous system. Discreet have done an excellent job with this new version, as shown by the multitude of new Biped options, the Mixer and Workbench and the improvements to the SDK, amongst other things. Users who were frustrated or felt limited with older versions of Character Studio should check out this revision, as it addresses many of the requests and problems that older versions suffered from. If discreet keeps on this path, Character Studio will continue to improve exponentially and makes the lives of artist easier for years to come.

*David would like to thank Vincent Brisebois, Kelcey Privett and Iain Nies at Discreet for their help.*

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Rating: **4.5** Teapots

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