

Bringing Your Low Poly Characters to Life

(Part One: Setting Up the Mesh)

By J Moffatt Jones

Animating a 3d model is what gives it life. Animators are like Dr. Frankenstein, bringing life to his motionless creation, except that instead of throwing a giant switch, we use a mouse button. This tutorial explores how to use Character Studio to animate a low polygon mesh for use in a real time 3d game engine. The tools and functions of Character Studio used here can be used on high polygon models as well.

This tutorial uses 3d Studio Max R2.5 with Character Studio R2.1. This tutorial is moderately advanced. It assumes that you are comfortable in 3dsmax and have a bipedal model ready to animate.

We will start by quickly applying the Character Studio skeletal system, called 'Biped' to our model and then exploring different ways our model could be animated.

A bit of background.

Before we begin with our model, lets familiarize ourselves with just who this person is. This is a very important step in the process of animating a model as it lays down the framework for all the sequences that we will create. Often when working on a team you will be told just who this guy is and what his role in the game is. It is our job to emulate the personality of our character in his motion or 'body language'.

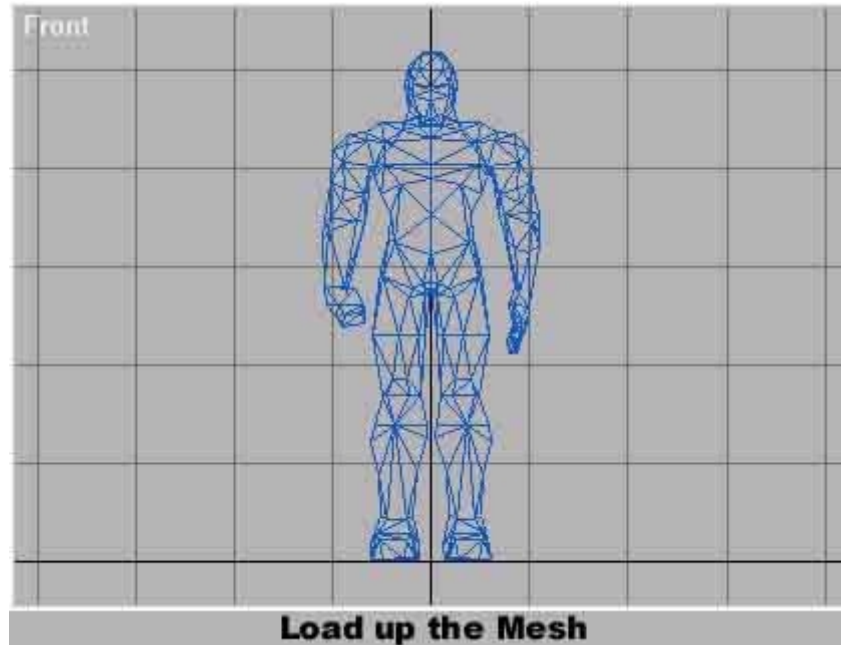
Who is Loa-Wong?

Loa-Wong is the name of our friend we will be bringing to life today. Born as Wong Lee with the Loa added later once he completed the ancient initiation rights of the third order Loa-Paw samurai sect. Loa-Wong is an intermediate level samurai who only wish's to serve his sect in the best way he can. He is a deadly adversary and usually works alone when required to leave the temple. Loa-Wong's only weakness is that his devotion to the sect sometimes causes him to overlook what is truly right or wrong.

Now that we know a bit about Loa-Wong we can begin thinking about how to animate him. We know that he is a skilled fighter and we will probably be seeing him in action so we will need to convey a look of combat readiness. He is obviously trained in some sort of martial arts and being a samurai I would bet he is damn good with a sword.

Creating the Skeleton ('Biped').

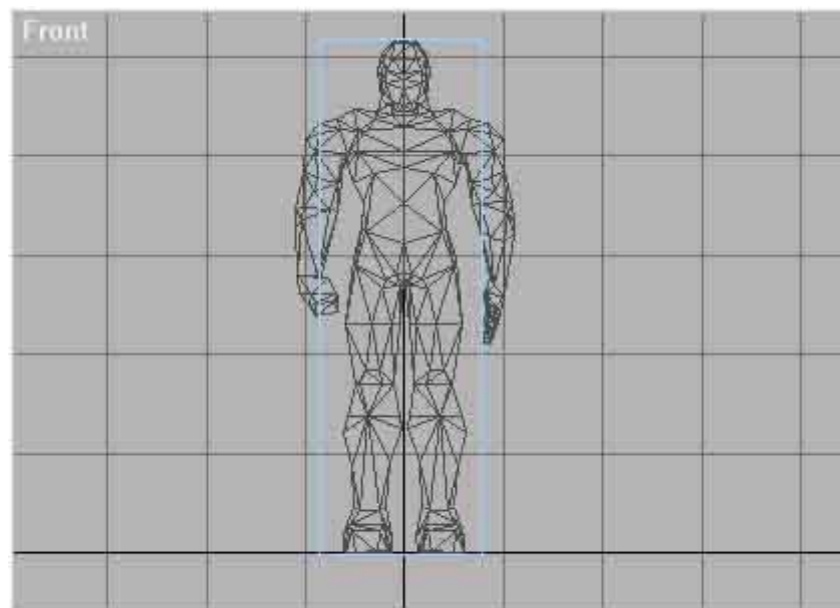
Before we start animating we will need to apply a skeleton to the mesh. Character Studio has a lot of features for applying influences to our model. Today though we are just going to be using a fairly quick and easy method. We will begin by loading up our mesh in 3dsMax.



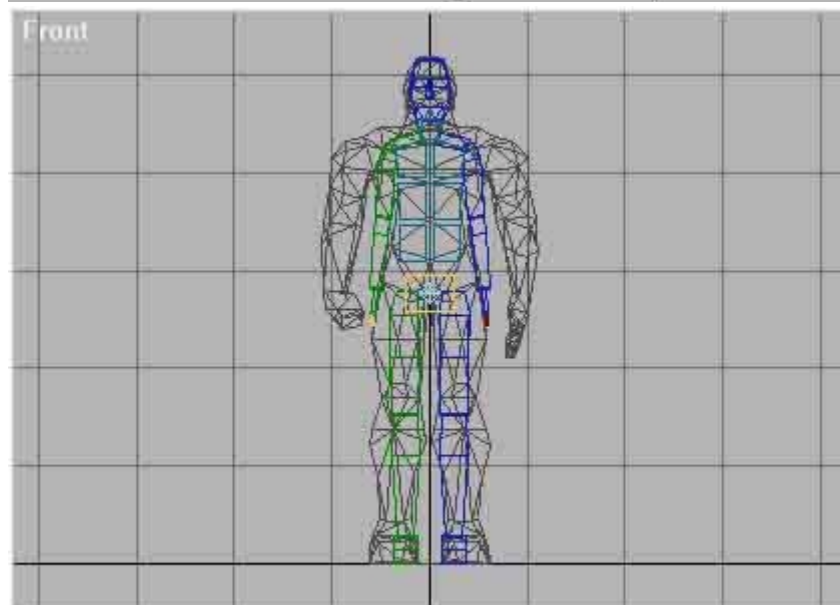
Next we place the mesh at the very center of the 3D environment. An easy way to do this is to select the mesh then right click on the move button bringing up the Move transform type-in dialog. In the absolute world fields type in 0.00 for each axis. Close the dialog and hit zoom extents all so we can see mesh in our viewport(s). Now that we have our mesh in place we will select and freeze him. Now go to Create/Systems command panel and click the button labeled Biped.



Place your cursor at our model's feet and click and drag to the top of our model's head. This will show a blue box as we drag and create a 'Biped' of that size when we let go.



Blue Box showing size of 'Biped'



'Biped' ready for Non-Uniform Scaling

You will notice at this point that our model is quite a bit more buff than the 'Biped' we just created, we will now fix this.

We will start by going into our motion command panel, then select one of the 'Biped' parts, say the leg. Once you have selected a part of the 'Biped' a series of dialog rollouts will appear in the Motion command rollout. Click the button with the little stick man on it.



We are now in 'Figure mode', this is where we adjust the proportions of our 'Biped' to fit our model. The purpose of 'Figure mode' is to provide a nice pose to attach our 'Biped' to our model.

Adjusting the 'Biped'.

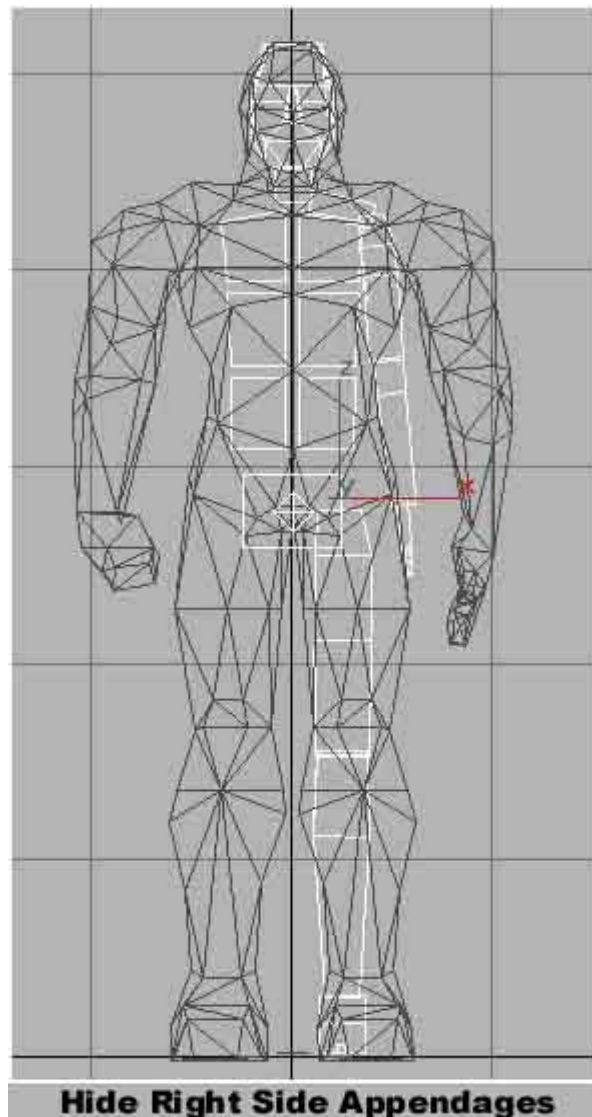
'Biped' comes with lots of useful digits, appendages etc. Since our model is fairly basic we won't need a lot of these, expand the structure rollout and change the following parameters:

Spine links to 3 Fingers to 1 Finger links to 2 Toes to 1 Toe links to 1

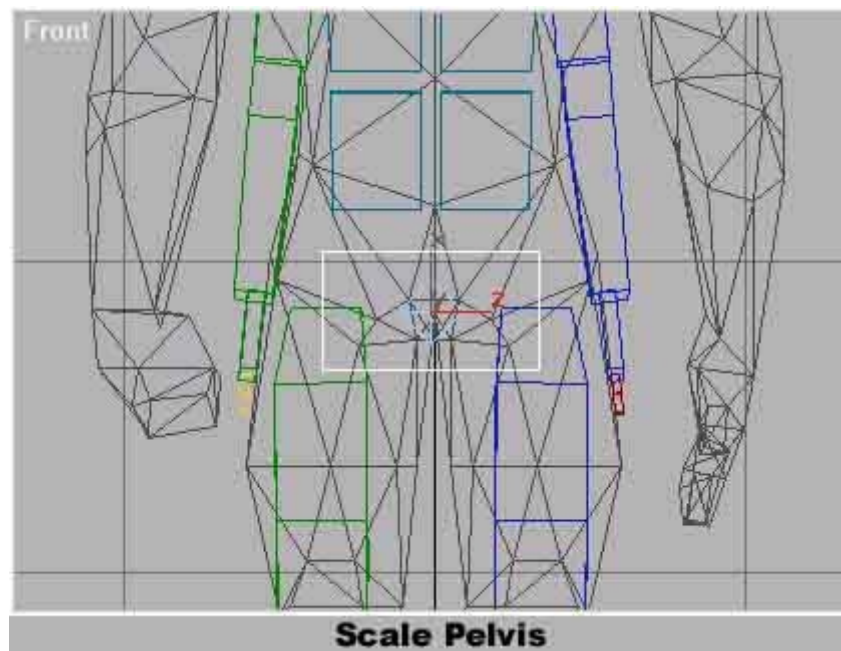


We don't necessarily need to do it exactly this way, we could have 4 spine links or maybe we will have a different model with a tail. For now though we will use

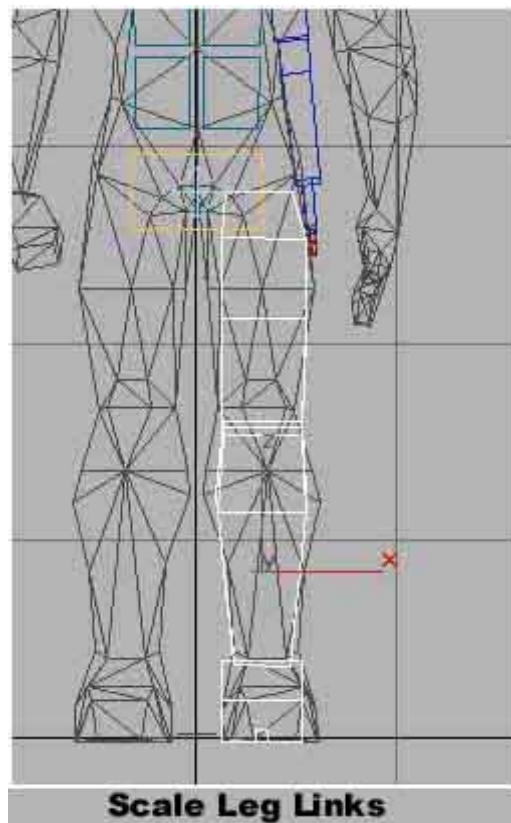
these settings. Now we are ready to start Non-Uniform scaling the various parts of our 'Biped' to match our model. First we will hide the right side appendages since we will use the paste posture opposite functions to copy over what we do to the left side.



Start by selecting the center of mass object, the little diamond shaped object in the center of the yellow pelvis box, and move it to the crotch area of our mesh. We will use the move transform type-in dialog again to make sure it is perfectly centered on the mesh. Next scale the yellow pelvis box along its local Z-axis until the edges of the box are almost center to the tops of the thighs.

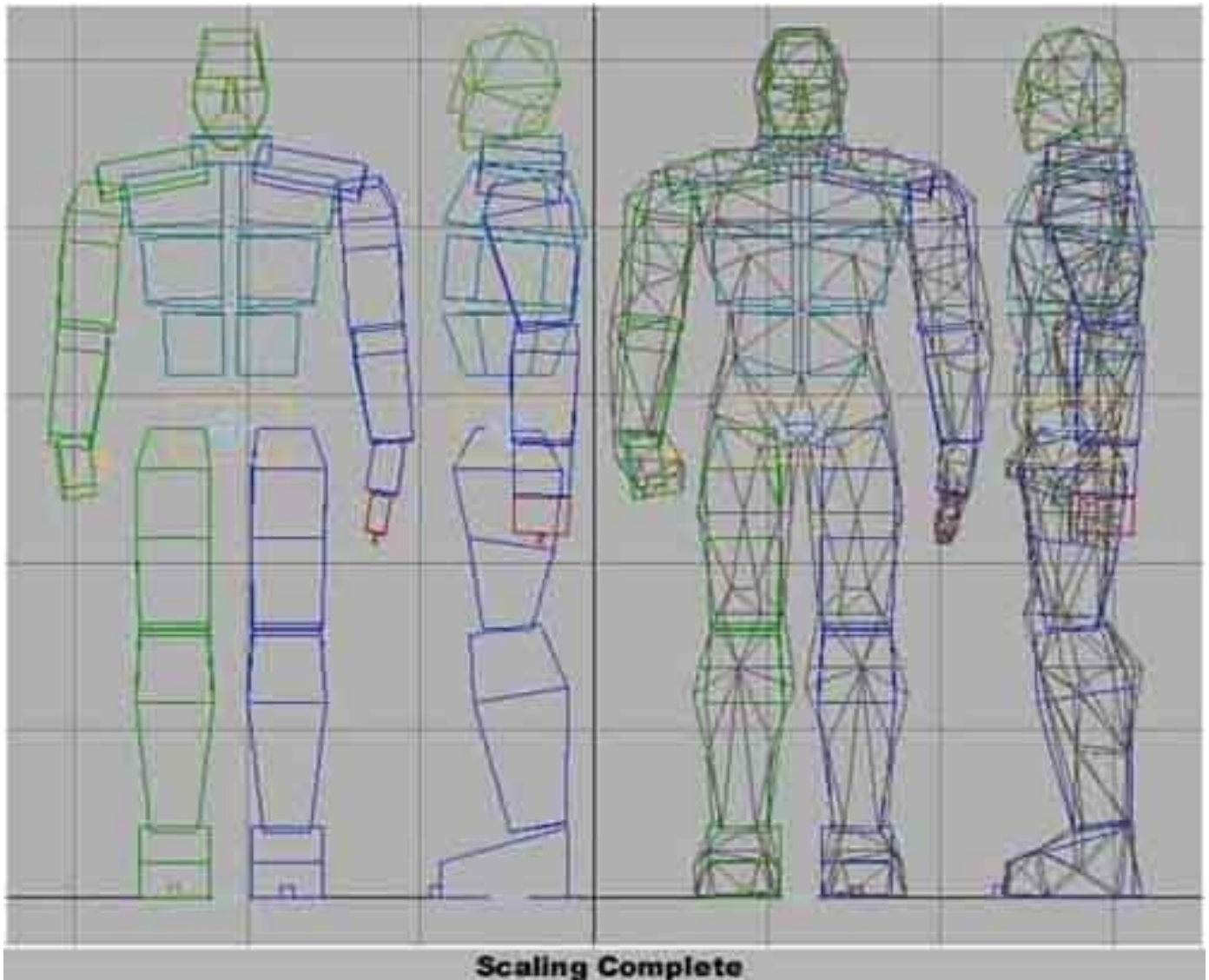


Now we may need to rotate the 'Biped' thigh object so it is at the same angle as our model's leg, then scale the 'Biped' thigh, calve, foot and toe to fit approximately to the shape of our model. Some things we will keep in mind while adjusting the leg is: Start with the hips and work our way down; we may need to adjust our mesh to fit the 'Biped' especially making the legs face forward a being straight; the 'Biped' object is fairly correct in human proportions and is a god way to tell if say models legs are to short; scale the model in the front viewport first and then do the side view.



Now that the leg is done we can do the rest of the 'Biped'. Once we have the torso, arm and head adjusted we can go ahead and unhide the other arm and

leg. Now we will mirror the scaling we did to the left appendages to the right ones. First select all pieces of the left appendages including the toe. Finger and don't forget the clavicle. Then in the motion command panel expand the keyframing roll-out, click the copy posture button then the paste posture opposite button and voila our 'Biped' should fit nicely inside our mesh.

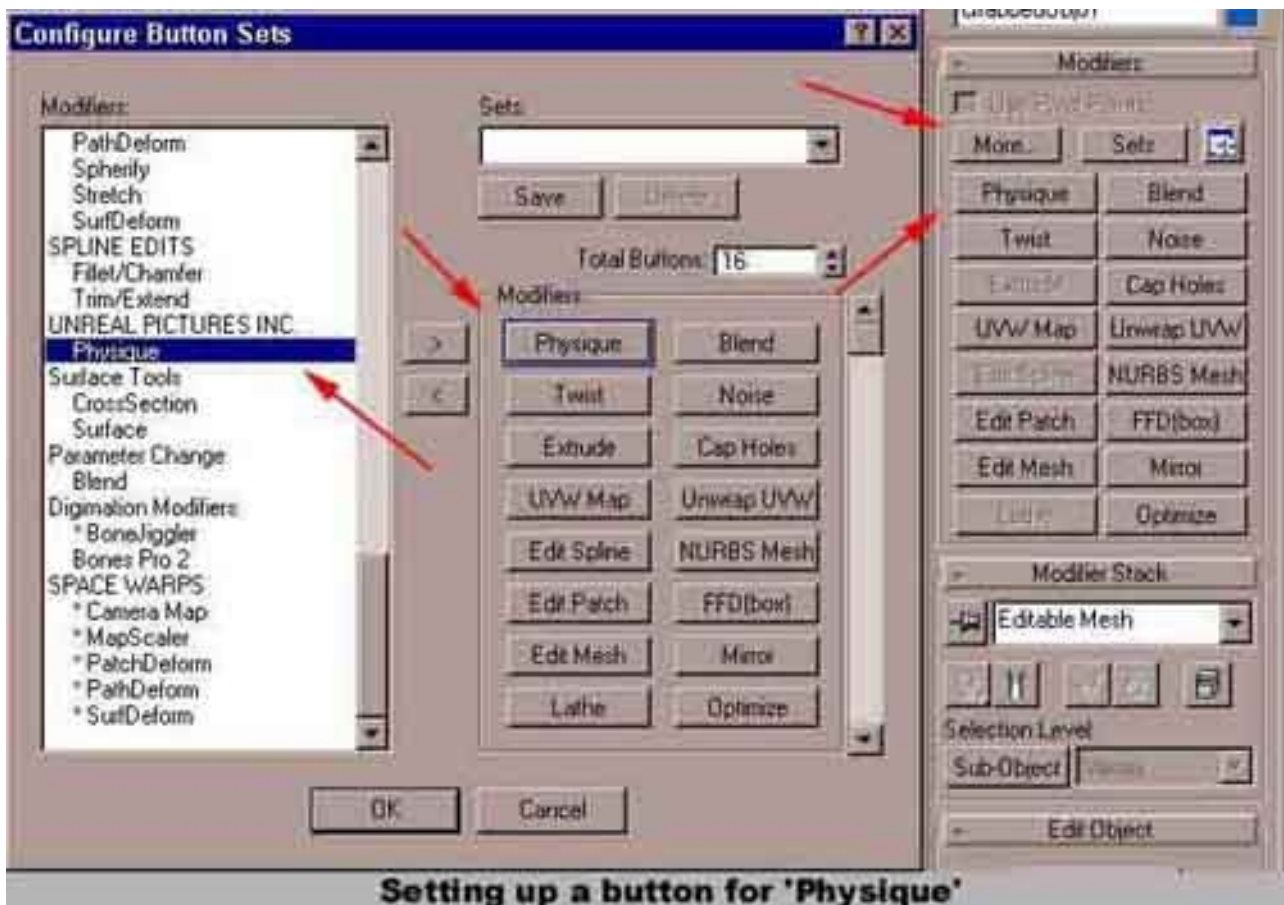


Now go back up to the general rollout and while still in 'Figure mode' hit the save file button. Pick a name and save the .fig file. We now have a backup of our 'Figure' just incase we somehow mess something up later like forgetting to turn off 'Figure mode' and start animating. On that note turn off figure mode and we move onto the next step.

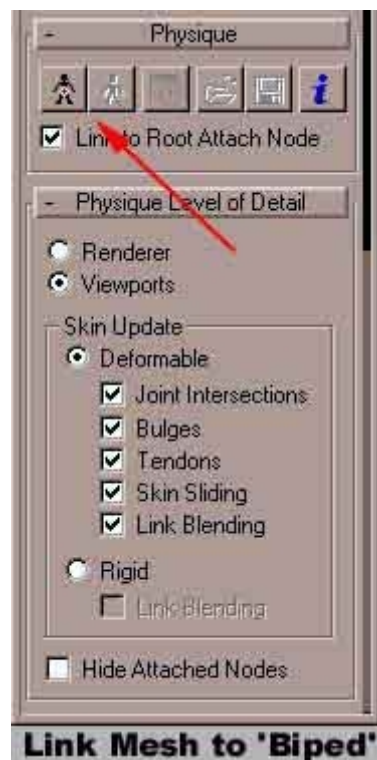


Applying 'Physique'.

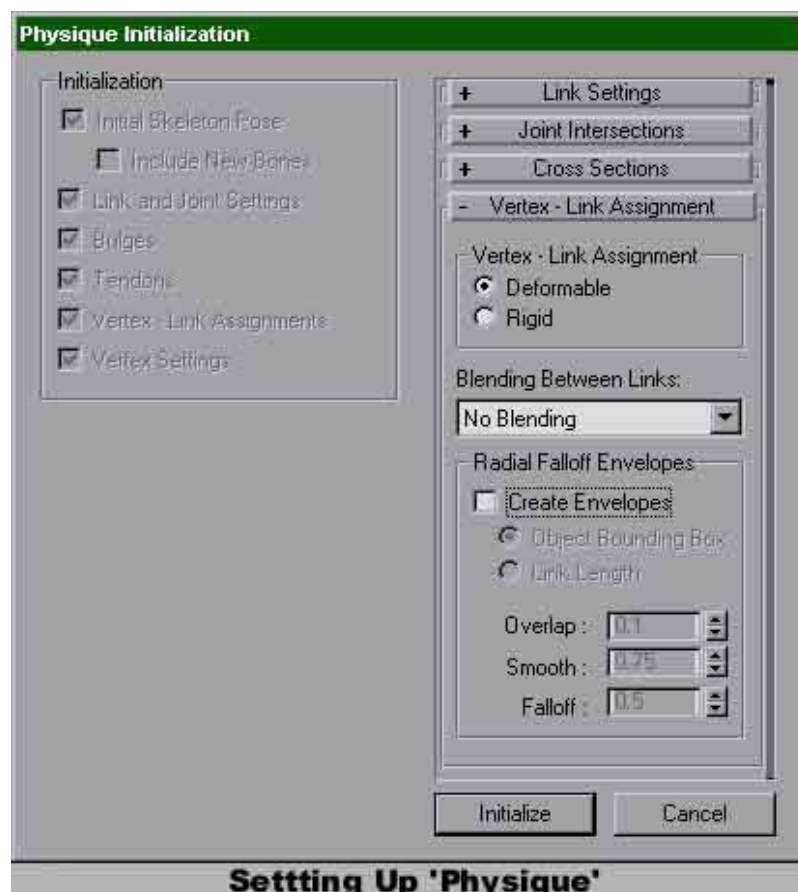
Now that we have our 'Biped' fitting nicely into our mesh we will need to somehow attach our mesh to the 'Biped'. This is where 'Physique' comes in. 'Physique' is the other half of Character Studio that handles all the relationships or influences between 'Biped' and our mesh. You will find 'Physique' in the modifier command panel. I have it set as one of my modifier buttons but it can also be found under the more list.



Ok lets get started. First select our mesh then apply the 'Physique' modifier to it. As I mentioned before this is done by simply hitting the button labeled 'Physique' in the modifier command panel or by hitting more and selecting 'Physique' from the list. Once you have this is done, the 'Physique' modifier will be added to our model's 'stack' and we will see the 'Physique' command panel. Now we will need to link our mesh to the center of mass of our 'Biped'. We do this by hitting the 'link to root node' button and the selecting the 'Biped' center of mass, that is the diamond shaped object in the middle of the yellow pelvis box.



Once this is done a window will pop up asking us how we want to set up our influences. For our purposes and to save time we will be using a very basic configuration. First turn the blending between links to 'No blending'. You can leave the envelopes box checked or unchecked if you like since we won't be using them for this tutorial. Now press initialize. 'Physique' will now try its best to link the vertices of our mesh to our 'Biped'.

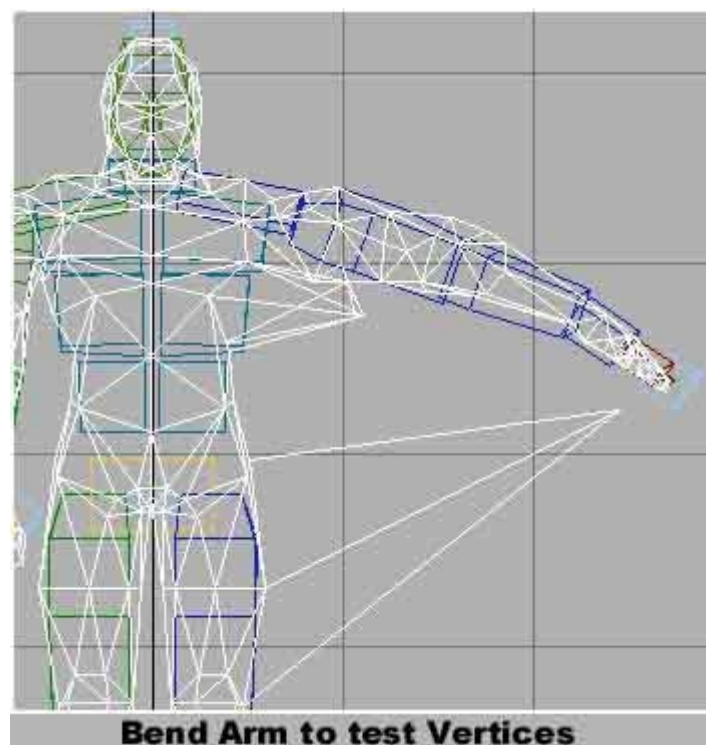


Before we get into tweaking the vertex assignments we need to explore a bit about how 'Physique' treats vertices. Start by hitting sub-object on the 'Physique' command panel and scroll down to vertex. Next press the 'select by link' button. Now if we look at our mesh we will notice that since we linked the root node it created a bunch of lines through our mesh. These lines follow the structure of our 'Biped' and are broken up into sections just like the 'Biped'. These sections are called links. With the 'select by link' button still pressed click on one of the links. All the vertices around the link you selected should now have changed color and are probably all red. Red vertices means they are deformable vertices and are mainly influenced by the link they are attached to but are also slightly influenced by the other links connected at the end(s). The closer the vertex is to the other link the greater the secondary influence will be. These Red vertices are good for organic meshes because the joints will bend more smoothly. The Green vertices are rigid vertices and are only influenced by the link they are attached to. This will give a very solid look and is good for inorganic matter like robotic limbs. The blue vertices are evil. Blue vertices are not are not influenced by any link at all and only follow the position of the root node or center of mass. Any blue vertices will need to be reassigned as reds or greens. It is rare that blue vertices appear with the newer 2.x versions of character studio but did appear often with the older 1.x versions.

Now that we have an idea of how these vertices work we will test out our influences and adjust any vertices that are not behaving the way we would like.

Tweaking the Influences.

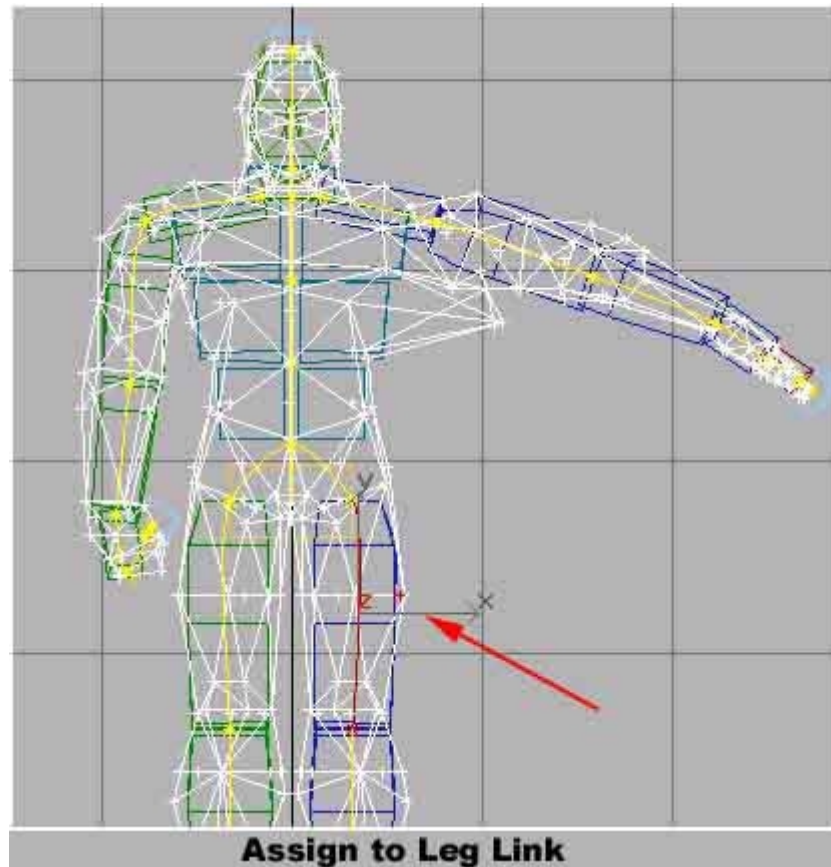
The first thing we will do is make sure we are not in sub-object vertex anymore then select a 'Biped' object like the calve and rotate it on its local Z-axis. While doing this we will look at how the vertices of our mesh react. Then we will do this for the other legs, arms and neck. We can see that the vertices on the thigh of the right leg got assigned to the arm's finger link.



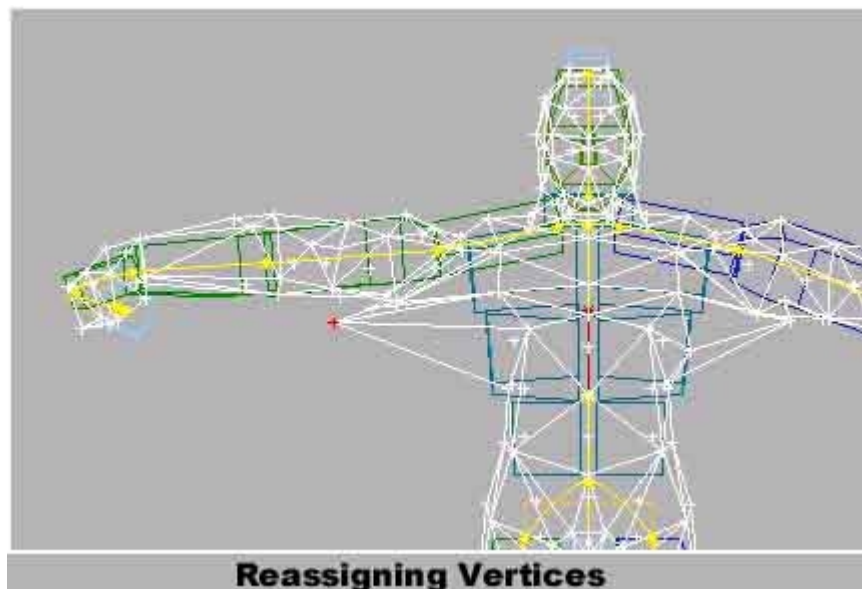
To fix this we will leave the arm bent so we can see which vertices are moving with the arm. Select the mesh and sub-object vertex again. Make sure that the 'select' button on the 'Physique' command panel is pressed and select only those vertices that are not being properly influenced by the leg. When selected these wayward vertices should display their color. Now we go back to the 'Physique' command panel and hit the 'Assign to link' button.



Then we click the link we want these vertices to be influenced by. This will be the thigh link on the right leg. Once you select the link the selected vertices will jump into the new influence.

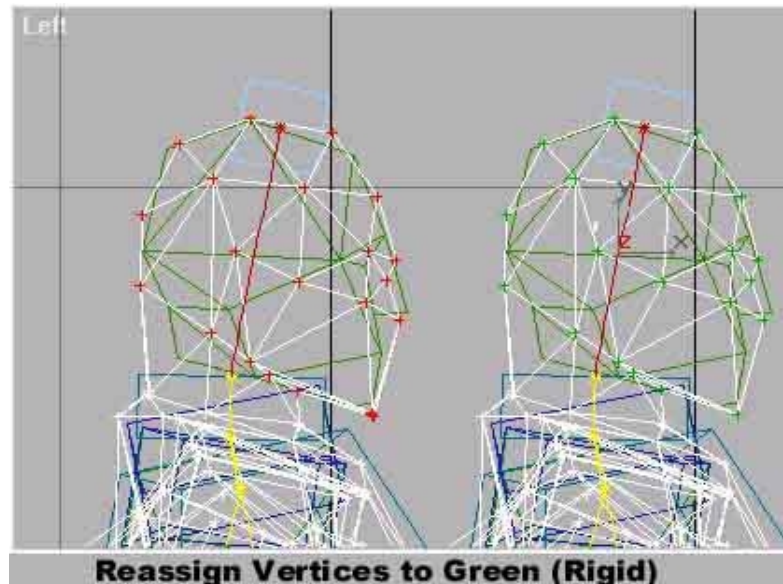


Now we will repeat this process for any other vertices we find behaving badly until everything is moving to our satisfaction.

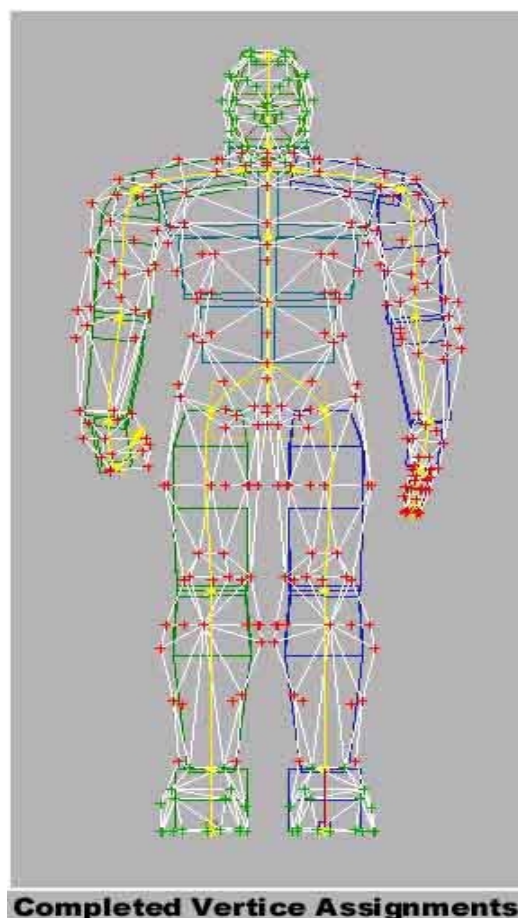


You may have noticed that all the vertices we have assigned are red (deformable). The head and feet may look a little odd if they deform a lot when animating. A skull really shouldn't change shape when the head turns and our guy seems to be wearing some pretty solid looking shoes. We will need to make some of those vertices on the head into the green rigid type vertices I mentioned before. We will do this by first selecting the vertices we want to reassign. Hit the 'select' button in the 'Physique' command panel and select the vertices where the skull would be. We won't select the vertices in the middle or bottom of the neck because we still want these to deform and twist when

animating. In the 'Physique' command panel we see there are three buttons in a row with representations of the three different colored vertices. Hit the 'assign to link' button and you will notice that the red vertex button is pressed. This means that any vertices we assign will be green (rigid). Since we already have the vertices we want to reassign selected we can go ahead and select the head link. Once we select the link all of our selected vertices will turn green.



Now repeat these steps for any other vertices we want to be rigid like the feet and we are done.



We can now go ahead and freeze our mesh and get ready to start animating.

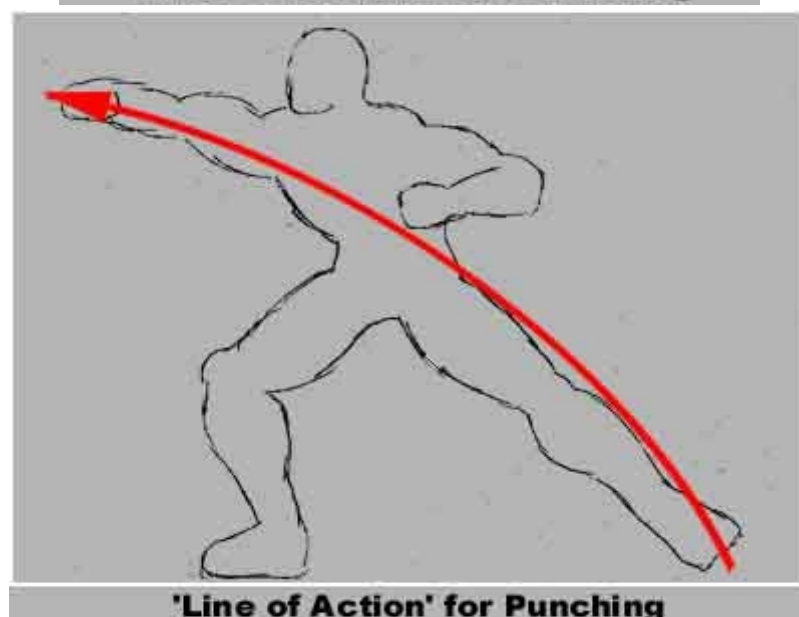
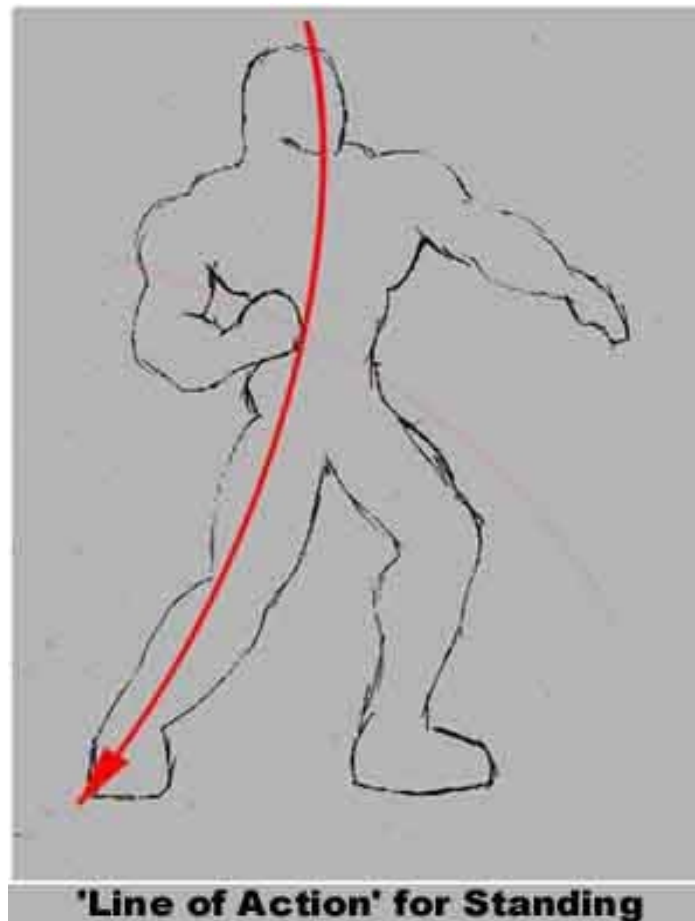
(Part Two: The Stance)

We are now ready to start animating our model. Since we are animating this guy for a game we will need to decide on the default pose. The default pose is what all the other animation sequences will be based on. For example: Our guy is standing around just breathing and holding his sword keeping watch, then he glances around to make sure everything is ok. If we were to do this in one sequence it would take up a lot of frames and always loop exactly the same. If we broke this into two sequences we could greatly save on the number of frames thus saving memory. First we will do a sequence of one breath. Then we will do a sequence where he glances around a bit, this we will call the 'spice' animation because it adds some spice to the regular breath animation. Once we are done these sequences the programmers will set it up in the game so that the breath loops continuously and every once and a while will insert the 'spice' animation. The breathe cycle will need to be a looping cycle which means the first and last frames need to flow into each other smoothly. The 'spice' animation will also need to flow from and into the breathe cycle smoothly. To do this we will need to decide on a single frame pose that all of our sequences will flow in and out of. There will be a few animations that will need a 'transition' sequence. An example of this would be when the model goes from a breathe loop into a walk loop we will need a few frames to smooth out the transition.

The rest of this tutorial will focus on making some of the various standard sequences required for most 3d games. These sequences we will be working on are the 'Idle' cycle, the 'spice', 'attack', 'pain' and the 'walk'.

The 'Idle' Sequence.

The 'breath' or 'Idle' cycle is probably the most important cycle since all the other cycles will be based on it. It is also the cycle that will likely be seen the most often. The first thing to do is the default pose, this is the first frame of the idle sequence. A good pose should look balanced and sturdy, it should also utilize the 'line of action'. The 'line of action' means that a smooth line can be drawn through the characters pose. If the arms were up in the air for a swing or punch then the line would go from the hand to the feet. Since our guy is just standing guard and will have his hands at his sides the 'line of action' will go from his head to his feet. You will notice that comic books utilize the 'line of action' often to show motion or impact. A good book to check out that talks about the 'line of action' among other great tips for animating is 'Cartoon Animation' by Preston Blair.



Introduction to the Character Studio Tools

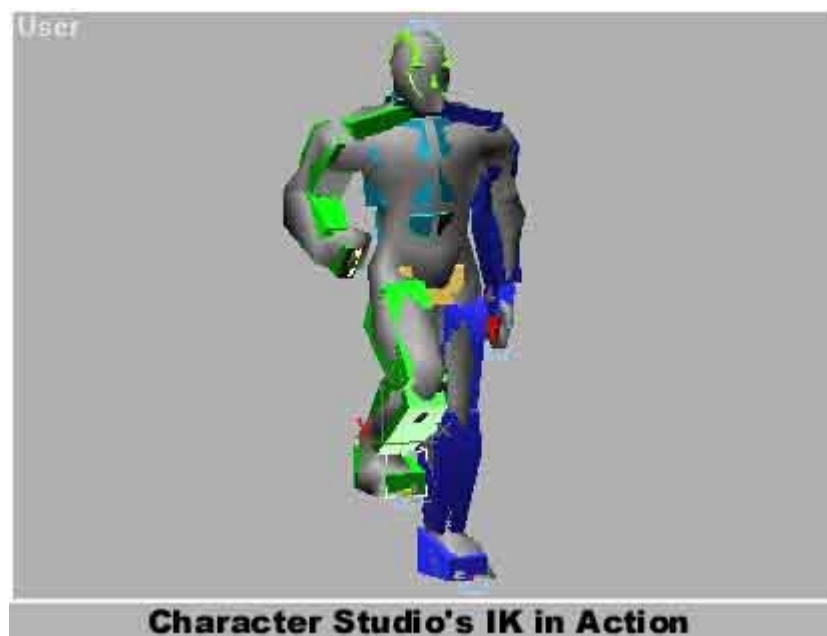
We are now ready to start setting up our guy's default pose. We will load up our guy with his 'Biped', the mesh itself should be frozen since we will be animating just the 'Biped' objects that influence the mesh. Before we do that though lets talk a bit about how to move and rotate the 'Biped' objects. Character Studio has its own built in IK (inverse kinematics) and having Max's IK active will interfere with Character Studios IK so first make sure IK is off.



When working with Character Studio it is a good idea to have the Motion command panel open, this is where most of the tools we will be using are. We will start by selecting the foot. You will notice the Reference Coordinate System is probably set to View. Change this to World. We do this because many of the 'Biped' objects only use the World or Local system and this way we can avoid confusion when we go to move things.



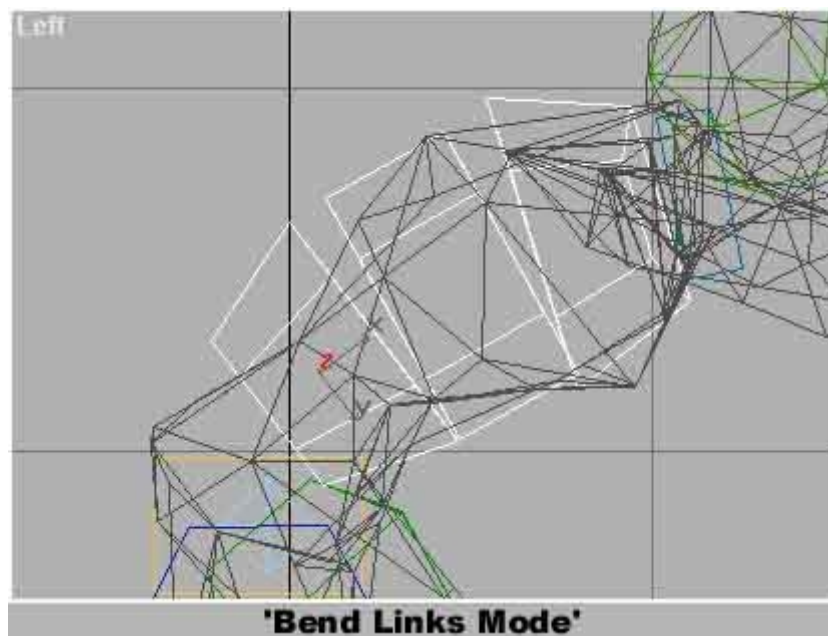
Now lets Move the foot around a bit, we will see how the leg follows the motion and bends and straightens according to the position of the foot. This is the Character Studio IK system in action. We can also see how the knee only bends in one direction. The other leg sections like the toe of thigh can also be moved around in the same fashion as the foot and the IK will continue to try and maintain the leg structure. This type of system is also built into the arms as well, go ahead and move a hand around and you will see what I mean.



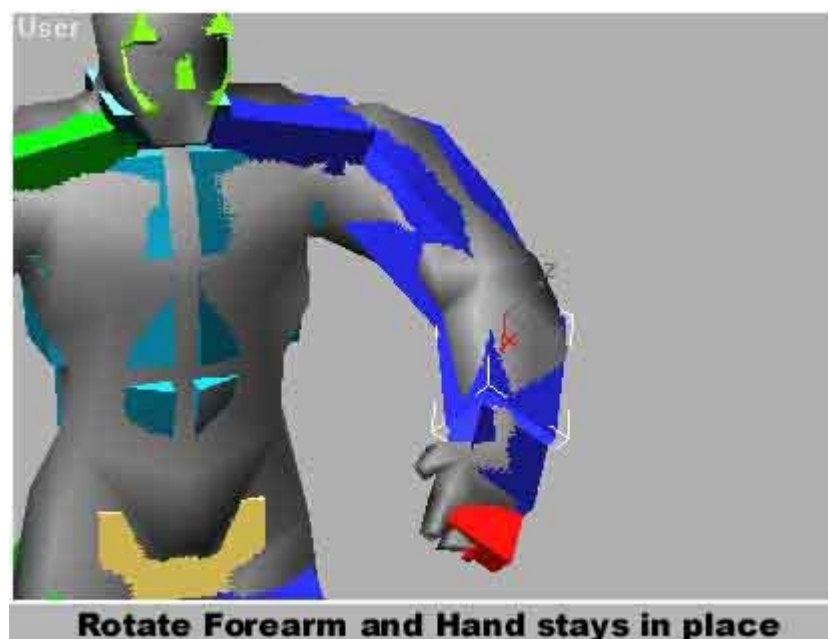
Now select the middle spine link and rotate it to see how it bends. Now hit the 'bend links mode' button and rotate the middle spine link again.



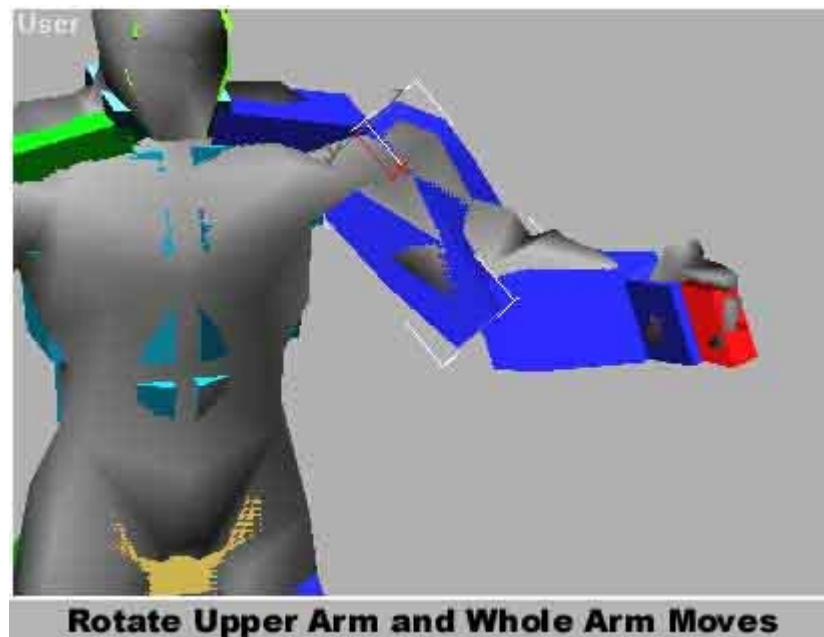
We can see that when 'bend links mode' is off the spine links rotate individually but when it is on the spine links bend in unison.



Now select a forearm, you will see that it cannot be rotated in its local Y-axis. This is Character Studio's way of trying to prevent us from bending the elbow in a way that isn't humanly possible without severe pain or breakage. Character studio has several objects that are limited in their motion but it is in no way perfect and we will still need to use our judgment when animating. I have yet to find a way to override this. If we rotate the forearm in the X-axis we can see that the hand stays in the same spot.



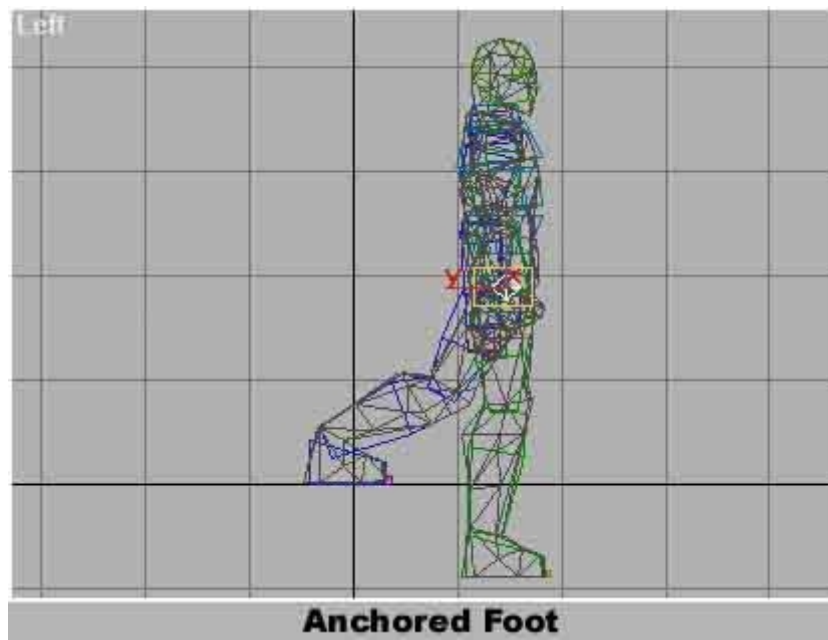
If we rotate the upper arm in the X-axis though the whole arm will rotate with it.



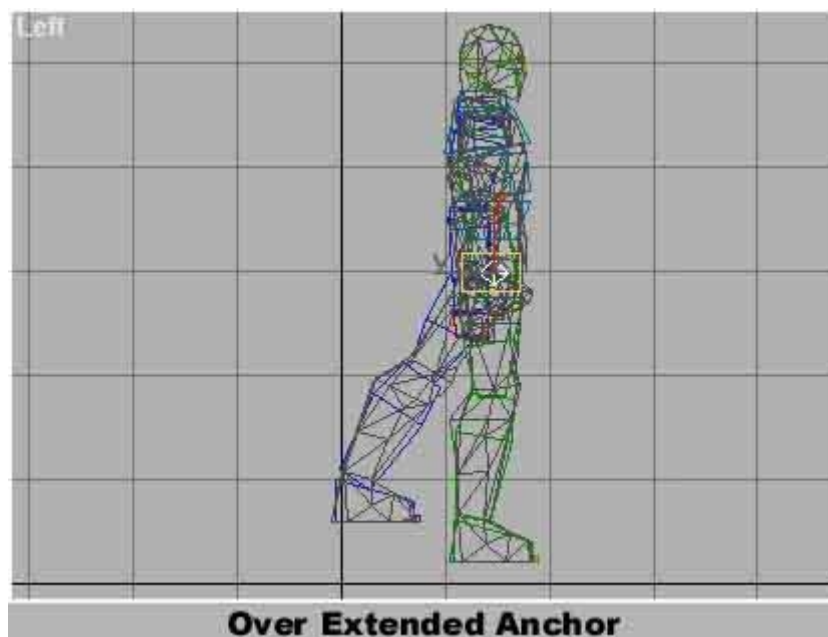
This also applies to the legs where if we rotate the calf the foot will stay in place but if we rotate the thigh then the whole leg will rotate. An other great feature of Character Studio is the feet anchors. Select the 'Biped' center of mass and then on the Motion command panel under the keyframing rollout hit the Left Leg anchor.



Now move the center of mass down on the world Z-axis. You will see that the left foot stays anchored in place and the leg will bend to accommodate the position.



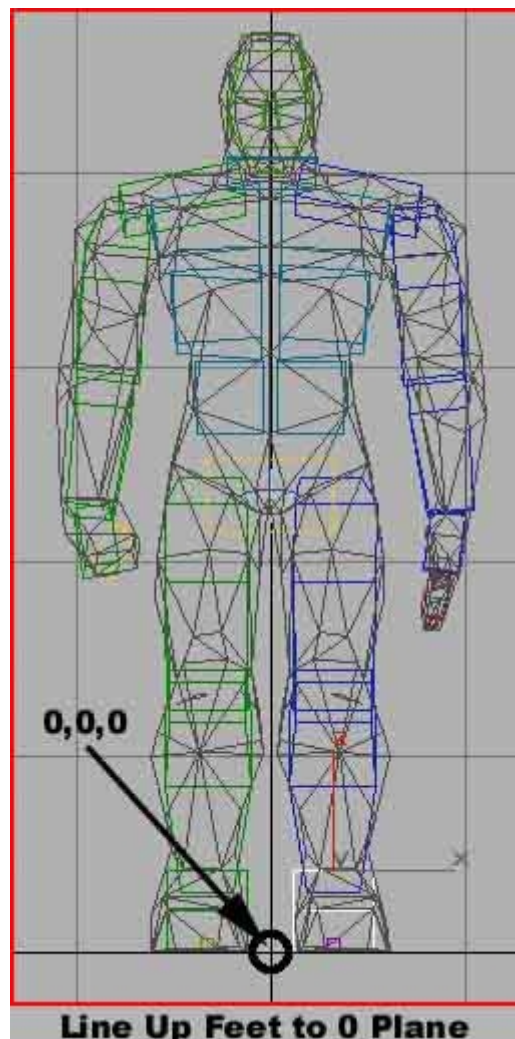
Now move the center of mass up until the foot comes off the ground. We can see that if we over extend the position of the foot it will try and place itself nearest to the original spot the anchor was initiated.



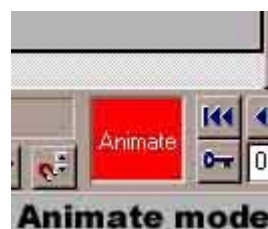
One thing to remember is that you cannot rotate the calf in the X-axis when the foot is anchored. Ok now that we are a bit more familiar with some of the functions of Character studio lets try and apply some of this new found knowledge.

The Default Pose

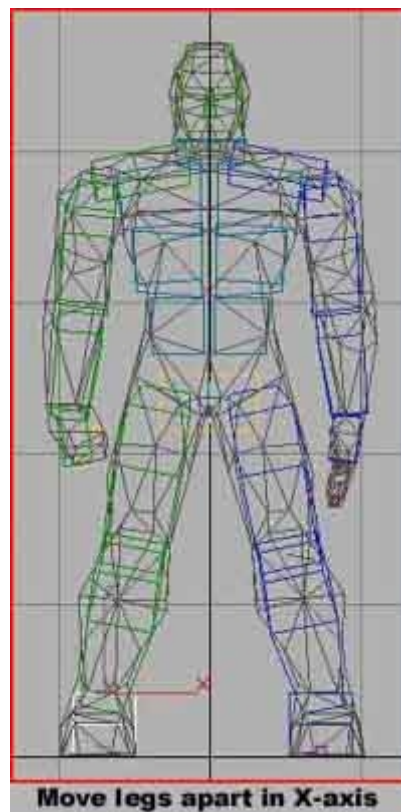
Start by positioning the 'Biped' so the feet are flat on the horizontal line that represents 0.0 on the Z-axis.



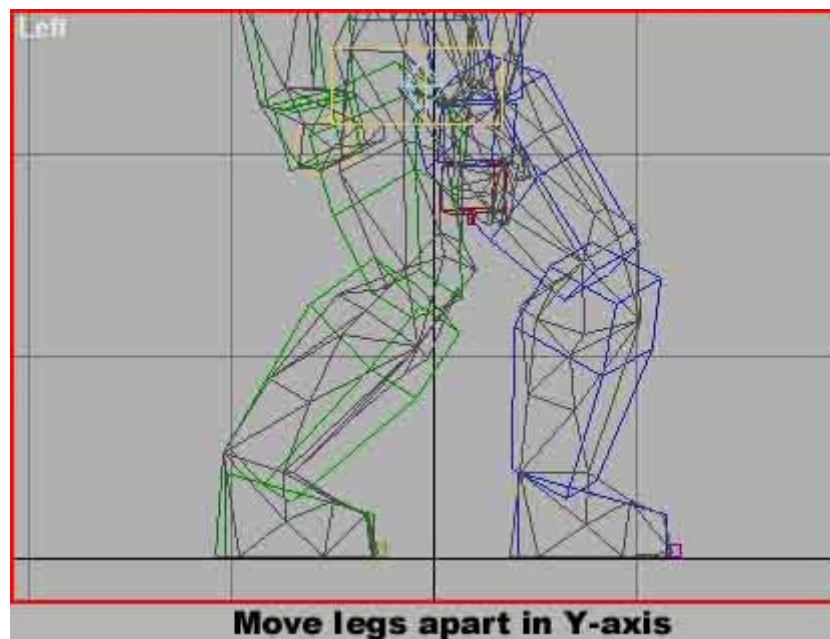
Now right click on the move button to bring up the transform type-in dialog. Make sure X and Y are at zero. Once it is in place we will turn on the animate button. Note that 'N' is the short-cut key to toggle on and off animate mode.



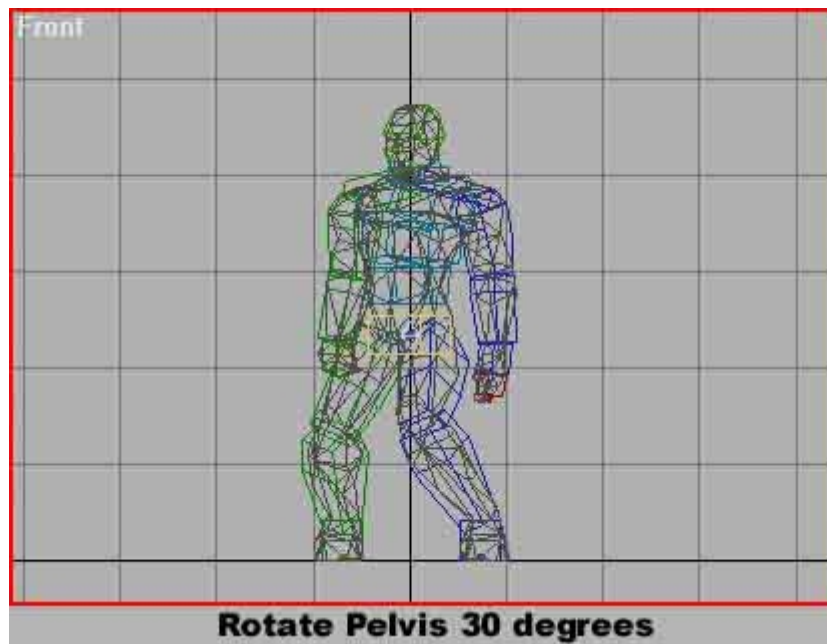
Now anchor both feet in place, remember a 'Biped' object must first be selected to gain access to the Character Studio menus in the Motion command panel. Now move the center of mass down about 1/4 of the way to the floor to give the knees a slight bend. Next spread the legs apart a bit by moving the feet in the X-axis.



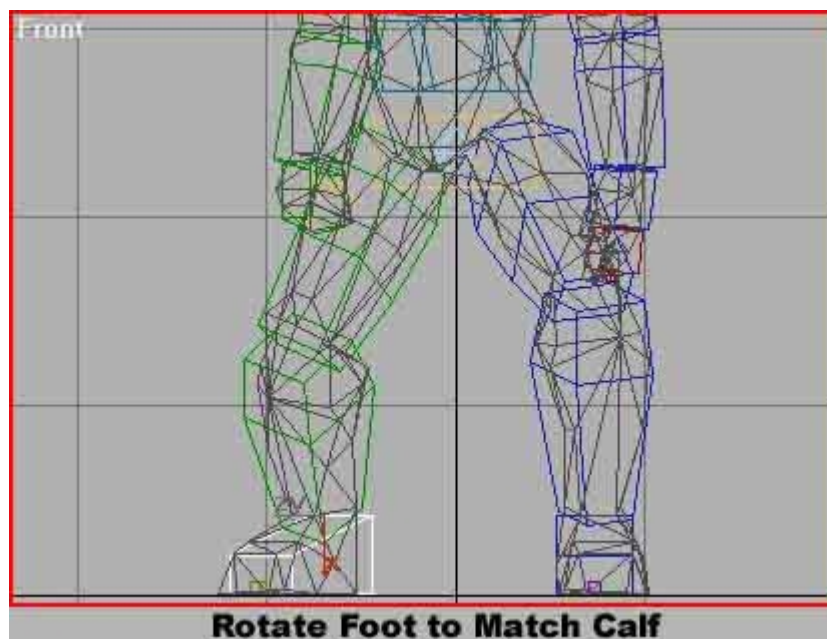
Now we will move the right foot back a bit and the left foot forward.



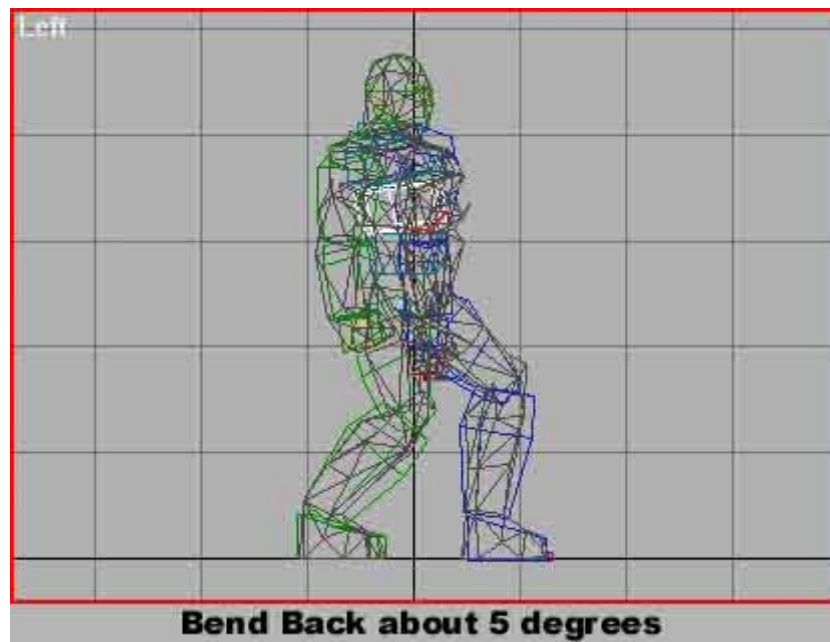
Next rotate the center of mass about 30 degrees in the world Z-axis.



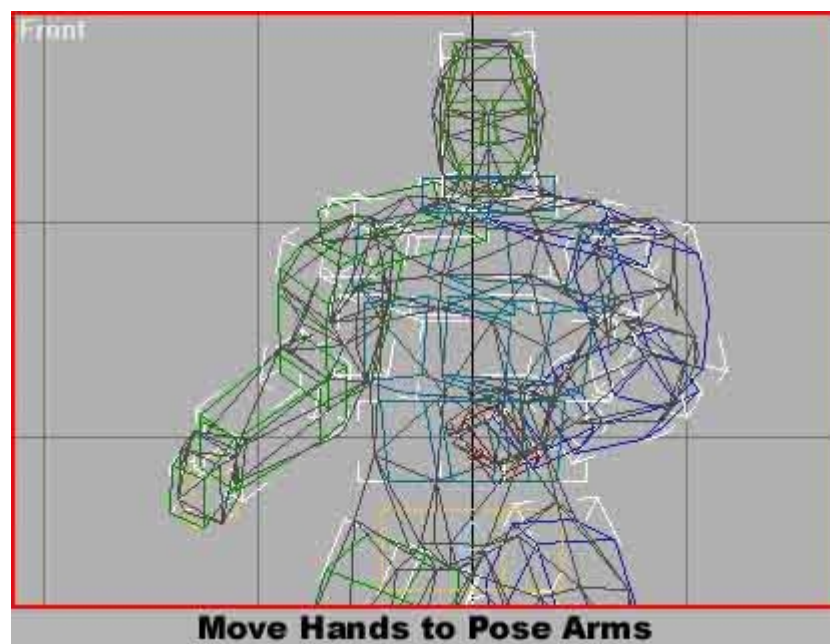
Now select and rotate the left calve in its local X-axis until it is straight up and down in the front view. The right foot looks a little funny so lets rotate it in its X-axis until it lines up with the right calf.



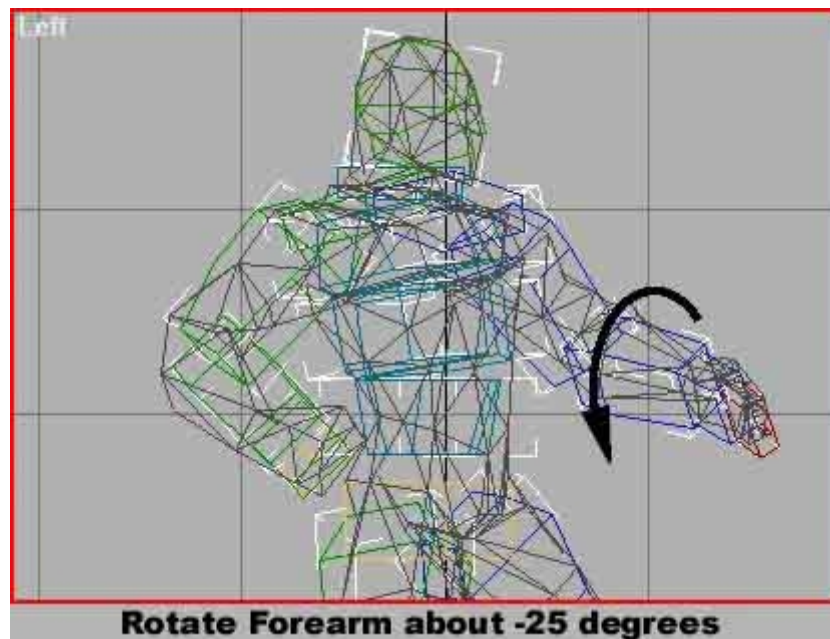
Ok, it is starting to look good, lets do the upper body now. First rotate the head so it is looking forward. Then select the middle spine section and turn on 'bend links mode', make him lean back a tiny bit by rotating the spine about 5 degrees.



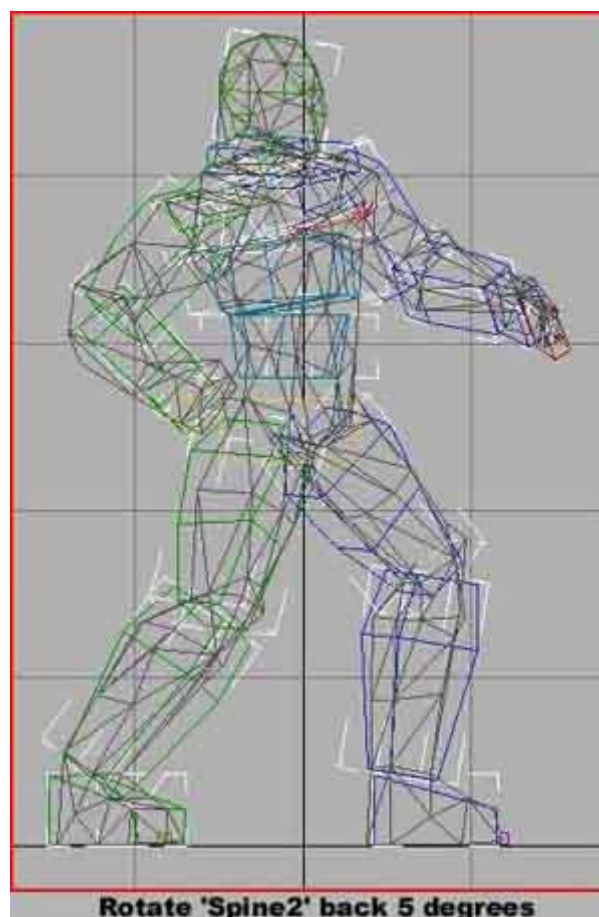
Now lets get his arms up in the air a bit. Grab the right hand and move it up, back and out a bit. Next grab the left hand and move it up, forward and in.



We will also rotate the forearm in its X-axis about - 25 degrees.



Now the model is looking a lot like the sketch from earlier. I think we could move that right leg a little further back and also rotate the 'Spine2' object about 5 degrees back with the 'bend links mode' turned off.



Looks like we have a pretty good line of action. The last thing to do is to select both feet and hit the set key button under keyframing in the motion command panel, this will prevent the feet from going off to where they were before we turned on the feet anchors.

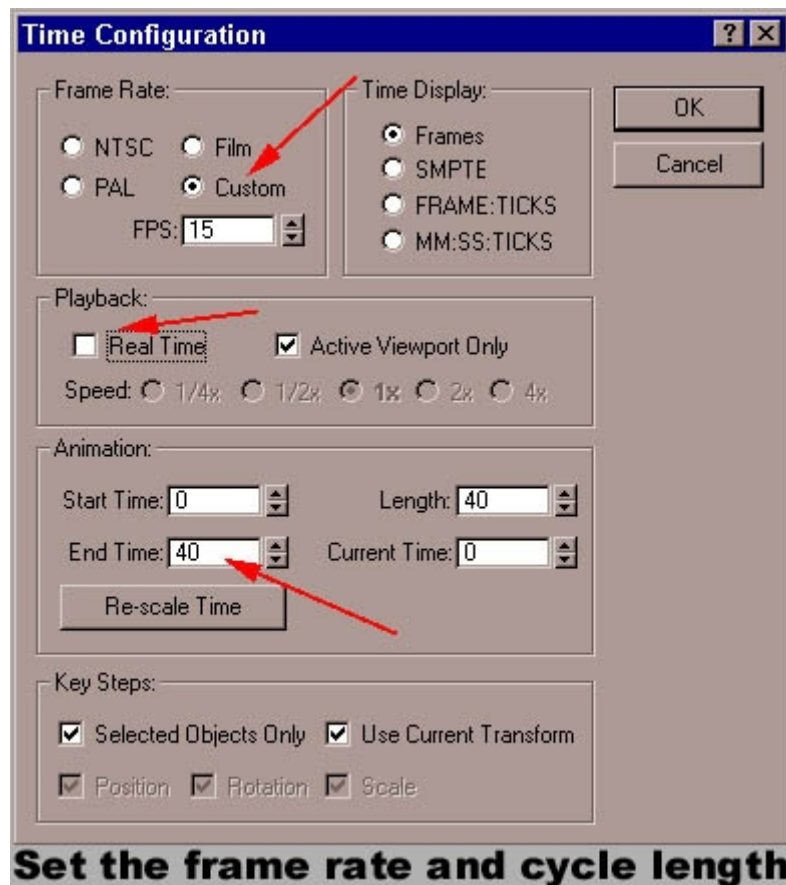


Save the max file as default_pose.max or something and we will move onto animating the 'Idle' cycle.



(Part Three: The Idle)

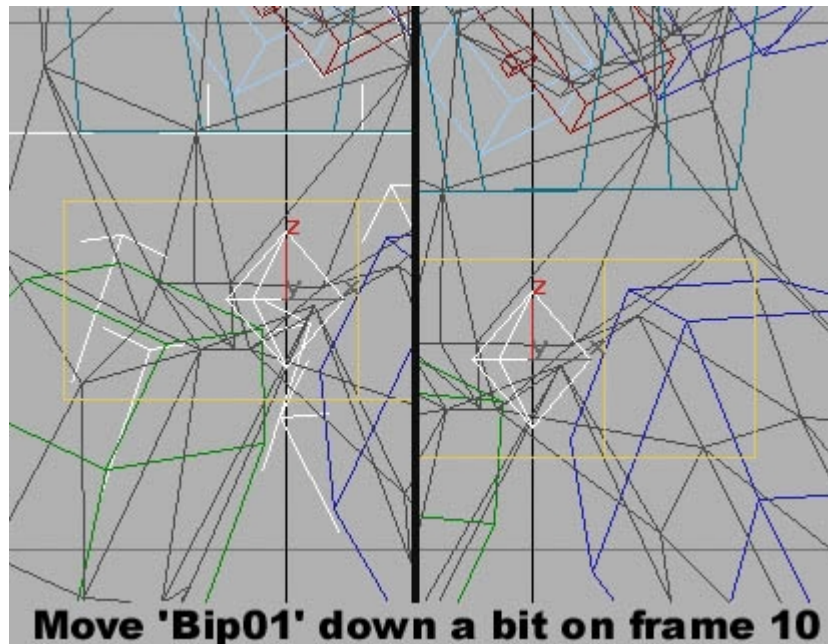
Ok so now we are ready to start animating. First we are going to do the 'Idle' cycle. I want to keep this sequence fairly basic, we will just have the character breathing heavily. We we add some flavor to this with a spice animation later. Ok so the animate button is on (shortcut key for animate button is 'n'). Now click on time configuration and set the frame rate to Custom: 15 and the length to 20, also uncheck Realtime playback.



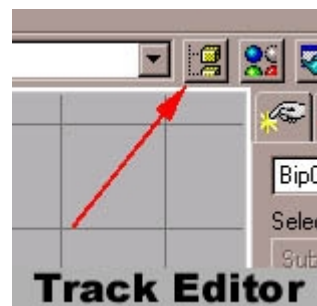
Now we need to lock the feet in place. You should remember how we did this from Part 2. Just go into the Motion command panel with one of the 'Biped' objects selected and hit the two feet anchor buttons.



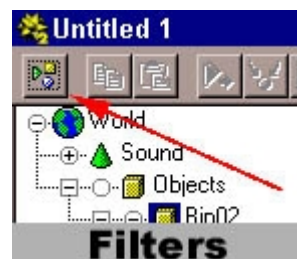
ok now advance to frame 10. You can do this by either typing it into the field beside the animate button or by moving the 'Time slider'. Now select the center of mass and move it down in the world z-axis. Don't move it too much, we just want to give the character a tiny little anxious bob.



Ok so now it goes down but we need to get it back up. This is where we get to use the track editor. If you have never used the track editor before then you are really missing out. This is one of the most important aspects of Max and I would strongly advise you go out on the net or somewhere and find some tutorials on using it. I will explain everything I do in the track editor but I won't be able to explain everything you *could* do. First thing to do is open it up,



once it's open maximize the window and then hit the filters button.



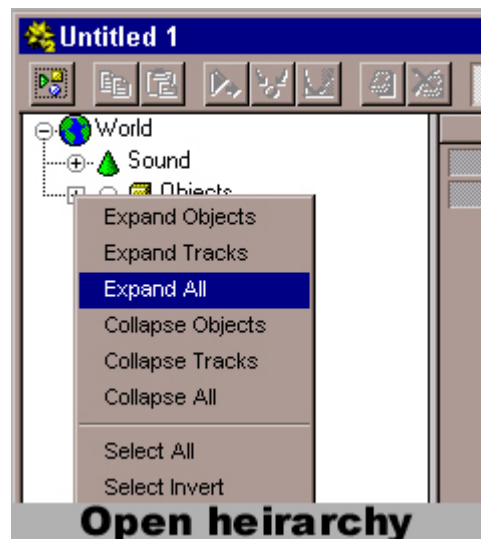
A window will pop up with a whole bunch of check boxes. Set it up like I've shown here, this will hide any tracks that are not animated since we are not really concerned with them at this time.



Ok first I guess I should explain what a track is. Each object in your scene has a set of tracks. The basic tracks are the transforms, these are your position, rotation and scale. Objects can have several different tracks for things like materials and certain kinds of deformation modifiers etc. Character Studio does this neat thing where it simplifies the tracks for an object and combines all its tracks into one. It even combines the tracks for certain objects into one track e.g. the leg has one track for the thigh, calve, foot and toes.

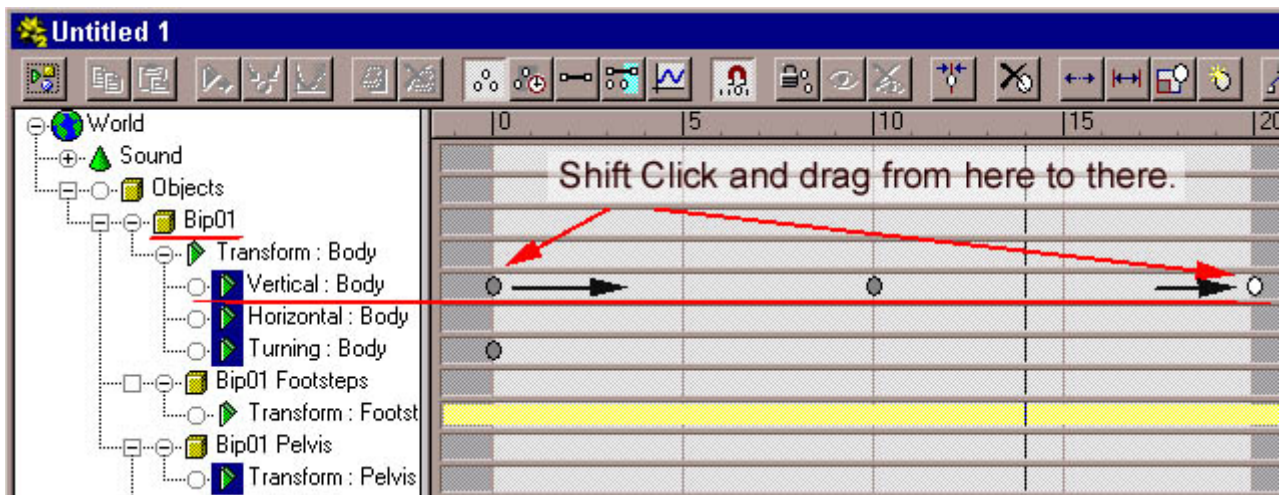
If you don't like this and want the objects broken up into separate tracks then just go into your motion command panel and expand the 'Animation Properties' rollout. There you will see several check boxes, Check the legs box to have separate tracks for the legs and check the arms.. well you get the idea.

Ok where was I? Ah yes the track editor. Ok so each object has a set of tracks, now each track is broken up into keys, each key represents key frames for that object. If we look into the section on the left of the track editor window we will see a heirachy system. Expand the object's tree by hitting the little '+' symbol. Even better why not right click on the '+' and select 'expand all'.



You should see a list of the biped objects that have keys. On the right you will see a time line with dots on some of the tracks. These dots are the 'keys' or 'keyframes' for the object listed on the left. You can scroll down to see all the objects listed. Now you will notice that the only object that has a key on any other frame than frame 0 is the 'center of mass' object called 'Bip01'. That key was created when we went to frame 10 and moved the center of mass down a little bit. Now what we want is for the center of mass to return to it's original position when it gets to frame 20. This way it will loop nice and smoothly. We could just do it in the viewport by going to frame 20 and moving it back but that might not be totally accurate and also once you get accustomed to it you will find the track editor much faster.

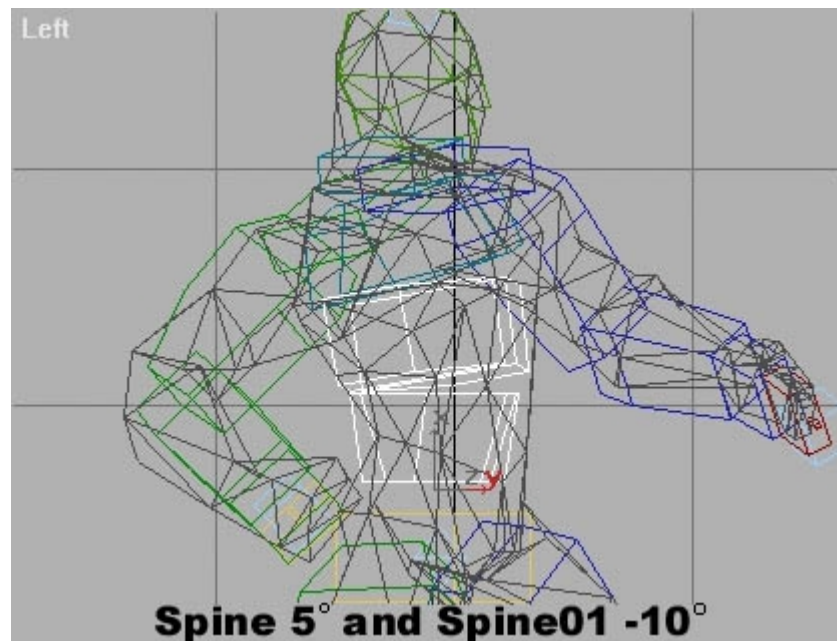
Ok first select the key on frame 0 of the Bip01 object. It will appear white when selected, the rest should be gray. Now while holding shift down click and drag the key to frame 20. This will clone and move the key.



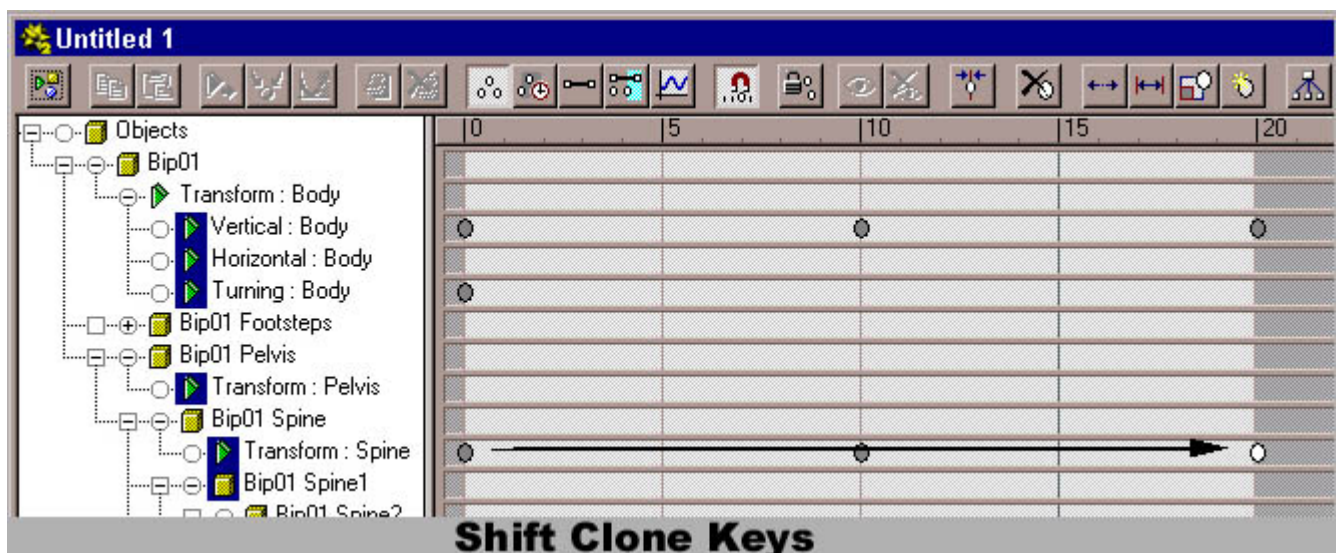
There, it's done, the 'center of mass' should now return to the same position it was in on frame 0 when it gets to frame 20. Don't believe me? Close the track editor, press play, and see for yourself.

So now we have a nice little bob up and down. Now what I like to do is to use try and make the chest heave a little bit it sync with the bob. We do this by

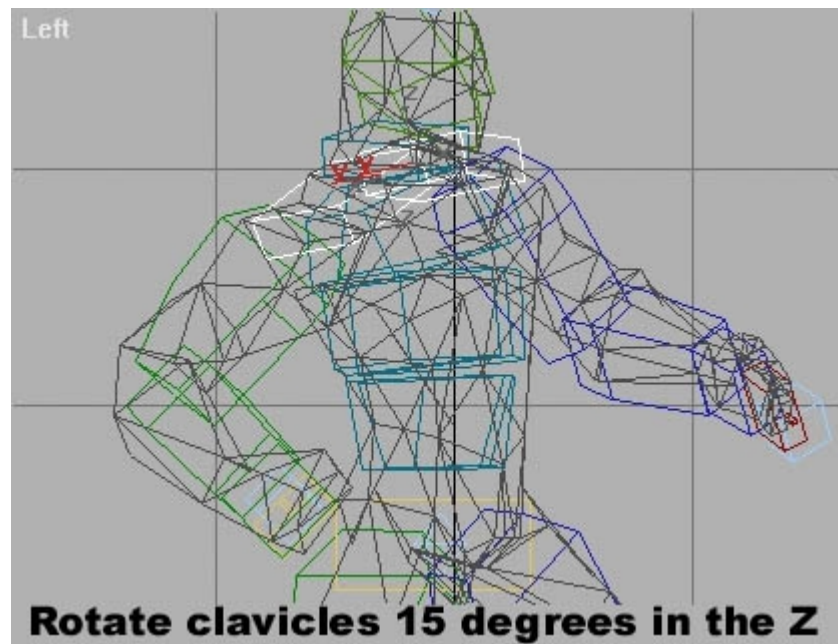
again going to frame ten and changing the pose a little bit. First select the Spine object and rotate it 5 degrees in its Z-axis. Then select the Spine01 and rotate it -10 degrees in its Z-axis.



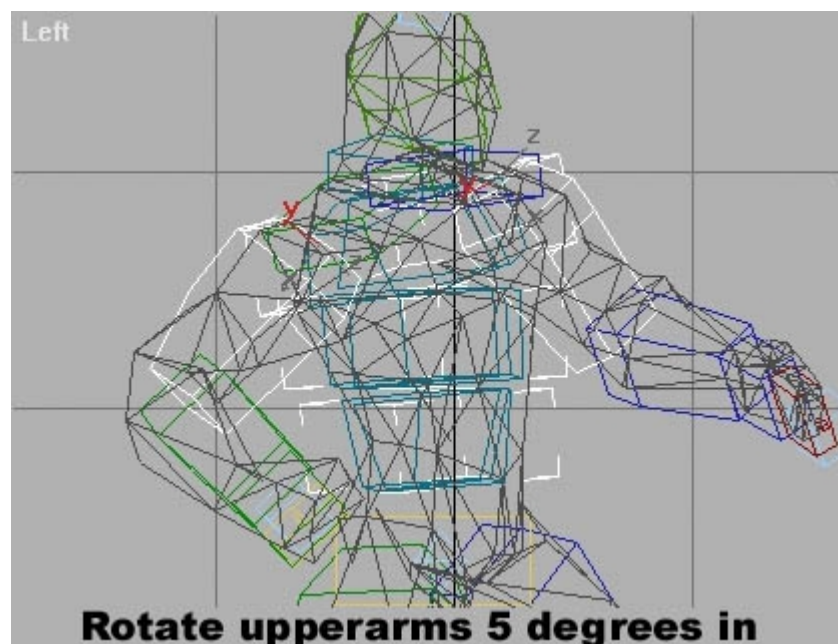
Ok cool, now go into the track editor again. You will notice that the Spine object has a new key at frame 10, remember that character studio has combined all are spine objects in the track editor so there won't be a track for Spine01 or Spine02. Ok just like before clone the fist key of the spine over to frame 20.



Close the track editor and check out the animation. You don't need to completely close the track editor either, you could just make it into a smaller window and work back and forth between the viewport and the editor. Next We will again go to frame 10 and this time we will adjust the two clavicles. Select both clavicles at once and rotate them 15 degrees in their Z-axis.

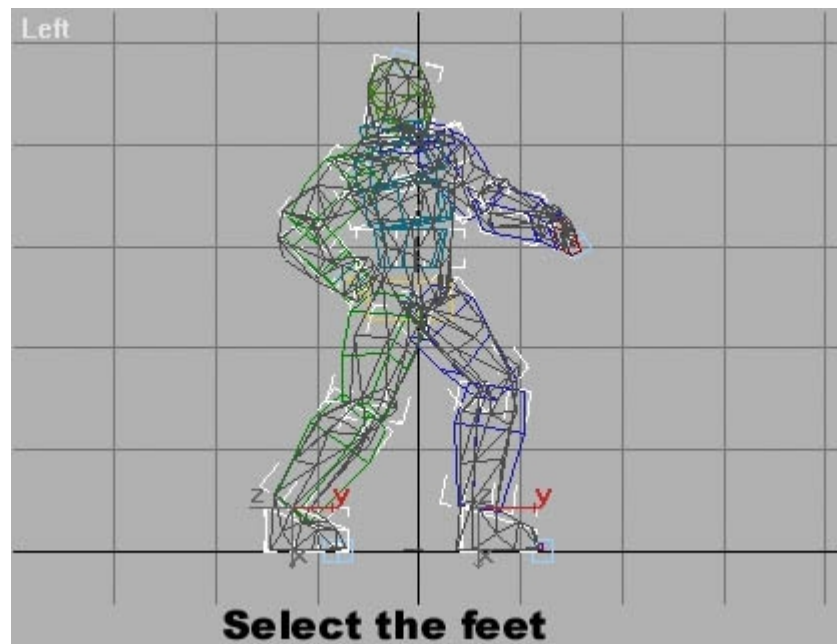


Again go into the track editor and clone those first keys to frame 20. One thing you could do is window select both keys for those clavicles and clone them both at the same time. Now on frame 10 again rotate the upperarm objects 5 degrees.



You won't need to clone the first frame this time because that key was already done when you did the clavicle. That is one of the handy things about having the whole arm treated as one track.

Ok that looks good to me. If you want to add anything feel free. Ok so we are almost done, just one last thing. The feet are currently locked into place but if we save, close and reopen the locks will have turned off. This can be a pain so what we will do is set some keys for the legs so that they will stay in place even with the anchors turned off. First select both feet and go to frame 0.



Ok now what we are going to do is set a key for each frame. There are a few ways to do this. First we could just advance a frame and hit the 'setkey' button in the motion command panel under 'keyframing'.



A good thing to know is that the shortcut keys for advancing or retreating frames are '<' and '>'. There is also a shortcut key for setting keys but it is a bit different in that it is a 'plugin shortcut key'. You must have the toggle pressed first though. It is down on the bottom there near the selection type and snap toggle buttons.

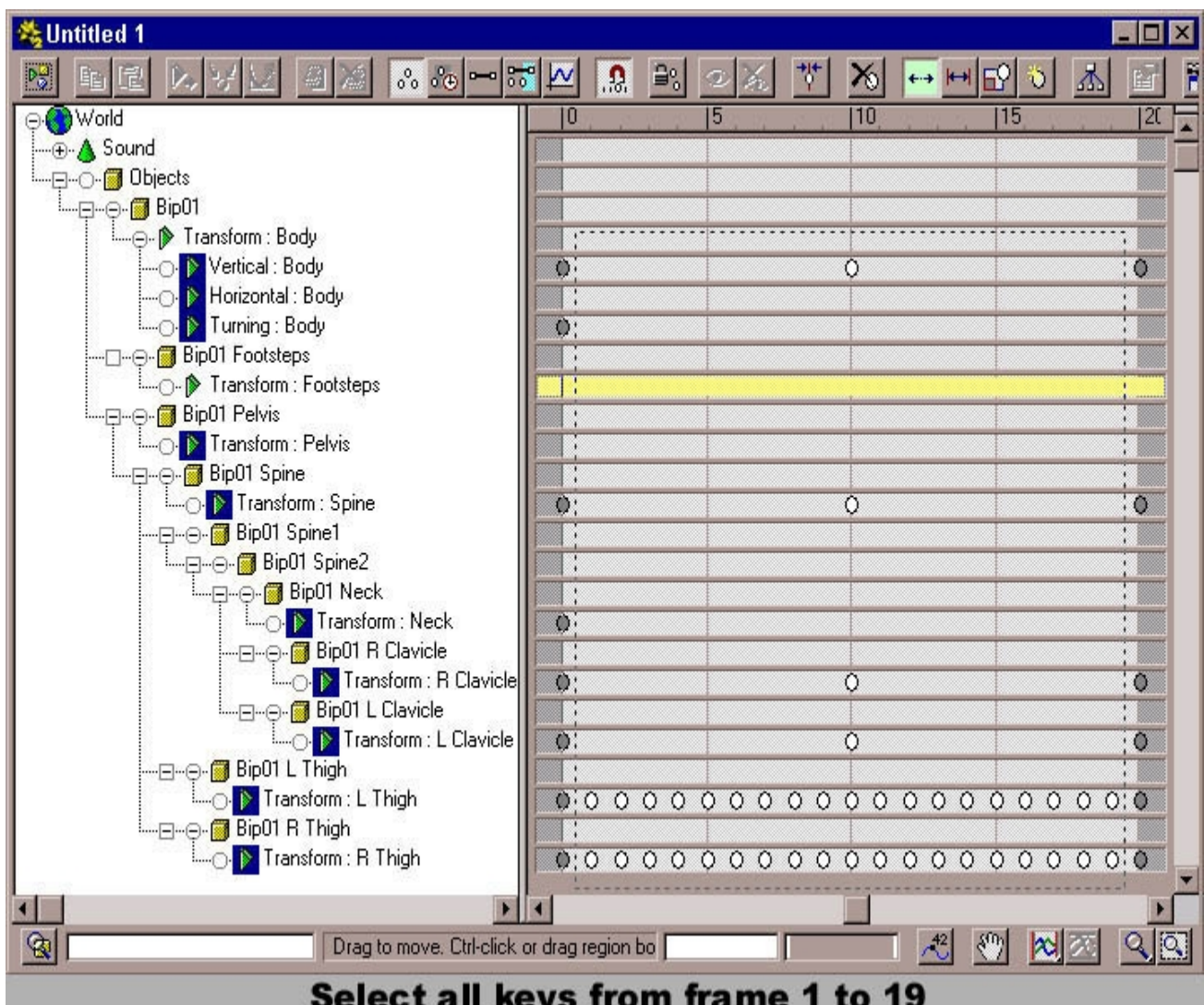


Once the toggle is pressed you must have the motion command panel also open at the same time. Then you just hit '0'(zero) and it will set a key for the selected objects. So with that in mind just hit '>' and '0' and you will advance a frame and set a key for the feet. Keep doing this till the last frame. When I do this I like to try and do it to a beat like my keyboard was a set of drums. I'm sure it irritates the guys around my desk at work so sometimes I even set them more then once just to be a prick :).

(Part Four: The Spice)

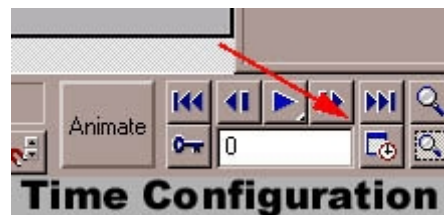
So now we have an 'Idle' animation for our model, the thing is that it is a little plain. To fix that we are going to create a spice animation. This animation will replace the idle sequence every so often to give it a bit of variety or 'spice'. You can make more than one 'spice' animation but for this tutorial we are just going to be doing one. To try and keep things simple the sequence we will be doing for this tutorial will just be our guy looking off to his right like as if he heard something. He will turn and take a small step with one foot and then after satisfied that nothing is there he will return to his original pose and continue on with his 'Idle'.

The first thing to do is open up the file you created in the last tutorial. That file should be saved as something like john_idle.max. Now resave the file with a new name like john_spice.max. Ok next we will open up the track editor, now expand all the tracks and objects by right clicking on the 'Bip01' object in the section on the left and hit expand all (just like I showed you in the last tutorial). Now select all the keys in the window on the right except don't select the ones on frame 0 and frame 20.

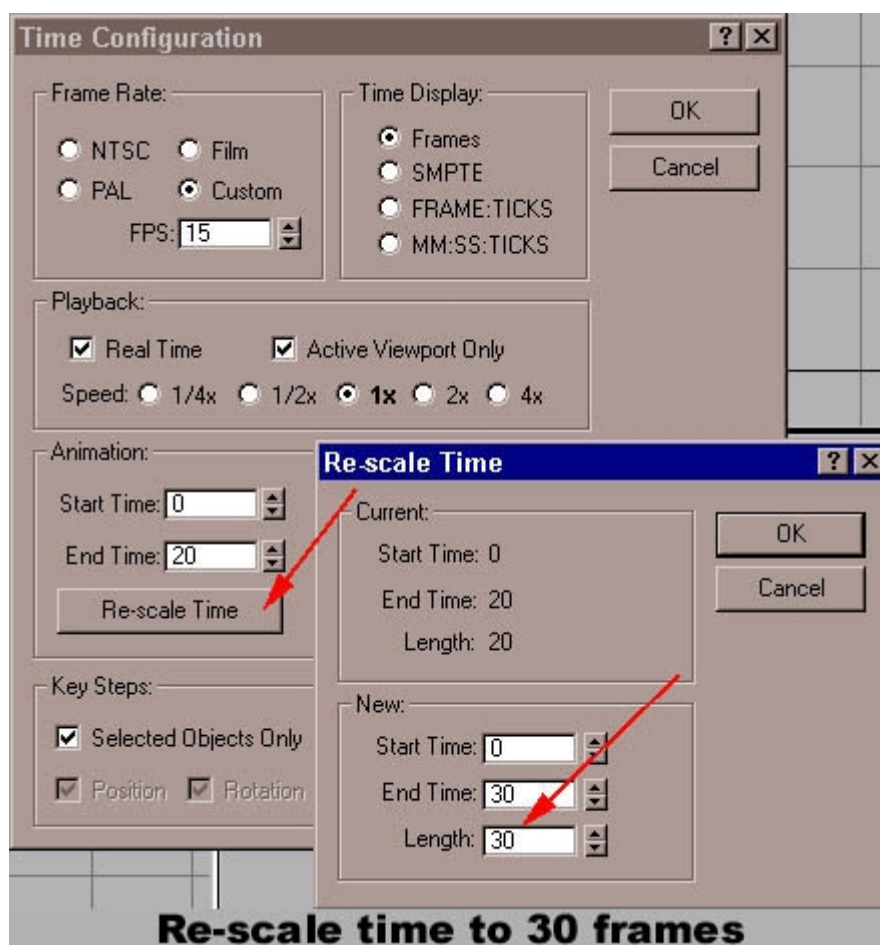


Now hit delete to get rid of the select keys. All that should be left are the keys

on frame 0 and frame 20. Now since this sequence will be a little longer then the spice animation we will need to scale the time line. To do this just open up the 'Time Configuration' Panel by hitting the button down near the Animate button.



In the 'Time Configuration' Panel hit the button marked 'Rescale time' This will open up a new window called 'Rescale Time', under Length type in 30.



This will scale our sequence from 20 frames to 30. Hit Ok for both windows and open up the track editor again. You will see that the keys at the end are now on frame 30 and the 'active time segment' is now 30 frames. The frame rate is still 15 so this sequence is now 1.5 times longer then it was before.

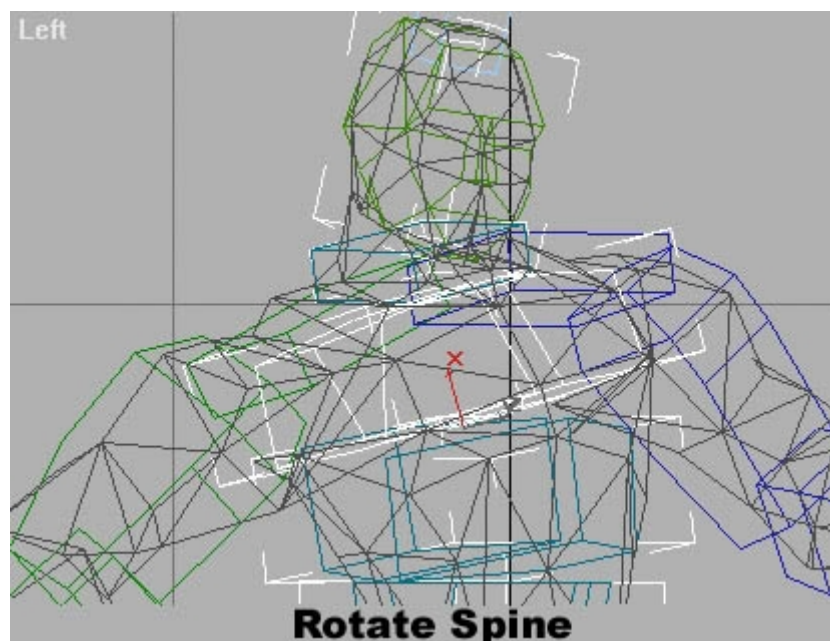
Ok now lets talk briefly about how we will animate the motion. Since the character will be turning his head to look off to his right we need to analyze this type of motion. We could just rotate the head 90 degrees and that's it but it would look like crap. We need to get the whole body moving to convey realism. I've noticed that when I am animating a character that at almost every moment

every part of the body is moving, except the feet when they are planted on the ground. Even turning the head will have a slight influence on the calves motion. An other thing to keep in mind is that the head motion will lead the rest of the body motion. You see first the head will turn to look off to the right and then the torso will follow a few frames behind. Then the head will turn back and the torso again will follow a few frames later. Also the character will take a step to turn the pelvis a little bit, this step will occur at the same time as the torso catching up to the head. Get up and try it yourself and study how you move. Try and imagine hearing a sudden sound off to your right and react to it. If your head didn't lead the torso then your a bad actor and you behaved like you already knew the sound was going to occur (christ now I'm acting like I'm a damn movie director or something).

So lets start by turning the Animate button on and anchoring the feet, then go to frame 5 and turn the head a little bit. Rotate the head about 65 degrees in its Z-axis. Then turn on 'Bend Links Mode'



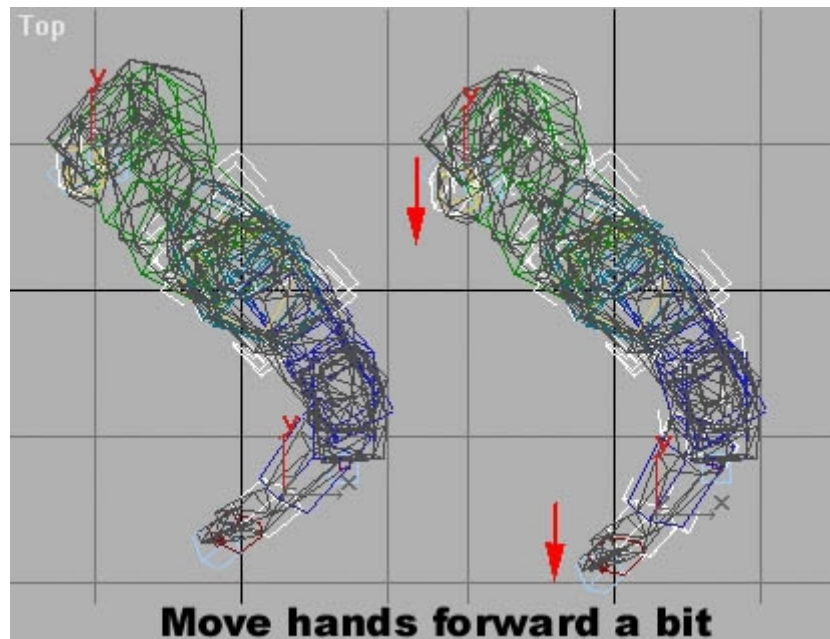
and rotate the 'Spine02' object about 10 degrees.



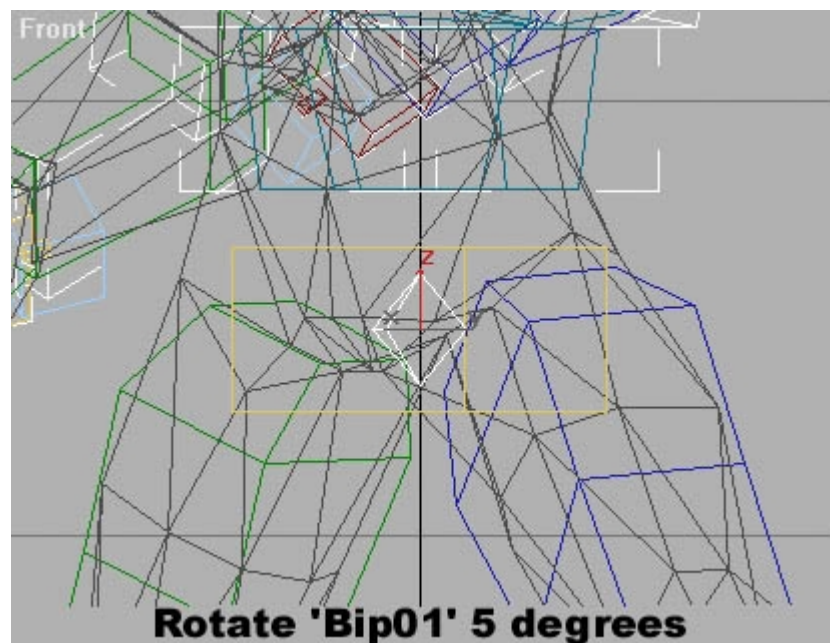
Ok now move to your top view and select both hands. Switch to 'Move' mode and hit 'Restrict Y'.



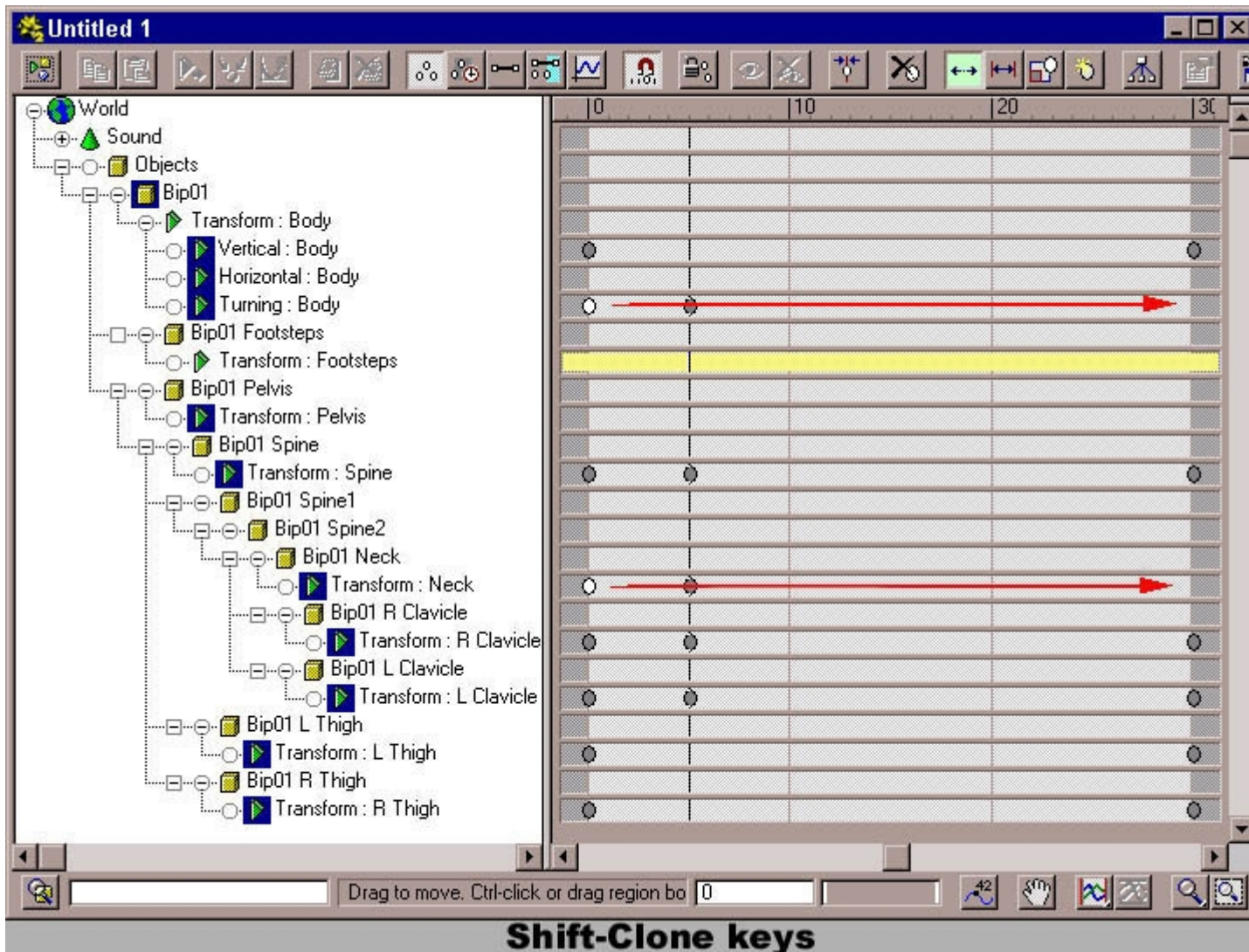
Now move both hands forward a little bit. Not to much we just want to give the impression that the arm's motion is lagging behind the torso twist.



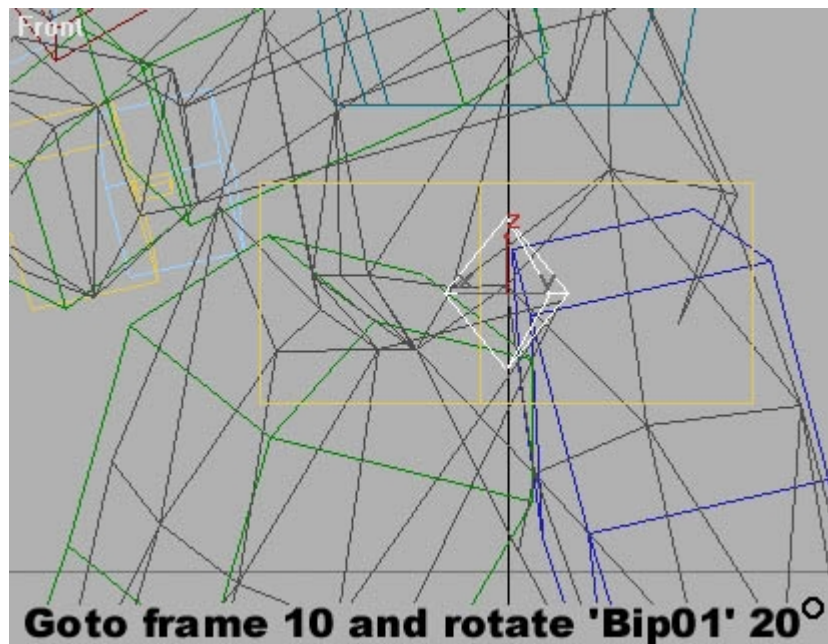
Next we will select the 'Bip01' object and rotate it 5 degrees. This is so that the hips and legs have a bit of motion in them or else they would look like they were made out of stone, stone is bad. :)



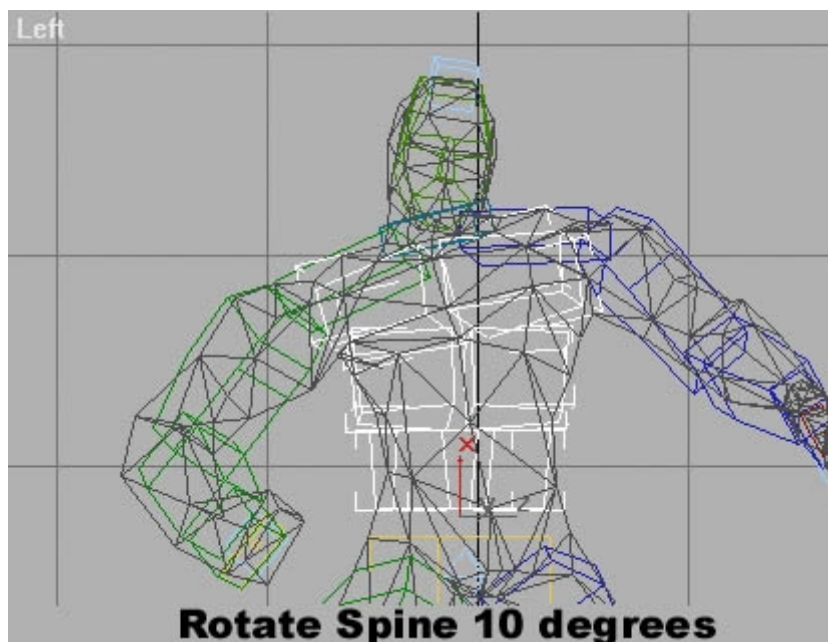
Lets see how it looks now. Go back to frame 0 (shortcut key is 'home') and advance each frame up to frame 5. Do this a couple of times to get a good idea of how the motion looks. Now press play and you will notice that after frame 5 it starts to return to it's original position, but wait some of the objects are not returning exactly as they should. Ok open up the track editor and lets check this out. We can see that two of the objects have keys on frames 0 and five but none on frame 20, well this is no good, select the keys on frame 0 and shift-clone them over to frame 30. Now it should return to its original position correctly.



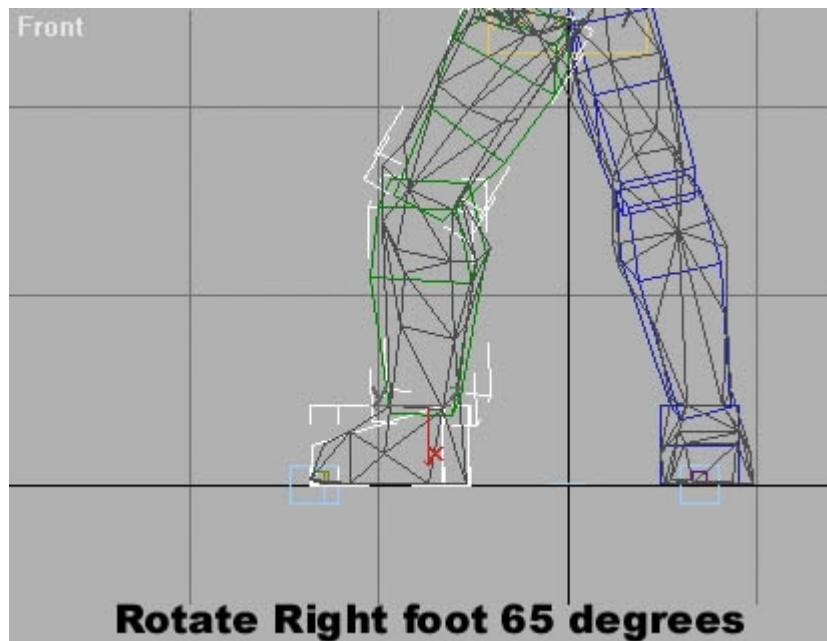
Before we move onto frame 10 we will first select the feet and set a key for them on frames 0 to 5. Lets move over to frame 10 now. We now want the torso to catch back up to where the head is looking. First select the 'Bip01' object and rotate it 20 degrees in its Z-axis.



Then turn off 'Bend links mode' and select all the 'Spine' objects and rotate them 10 degrees



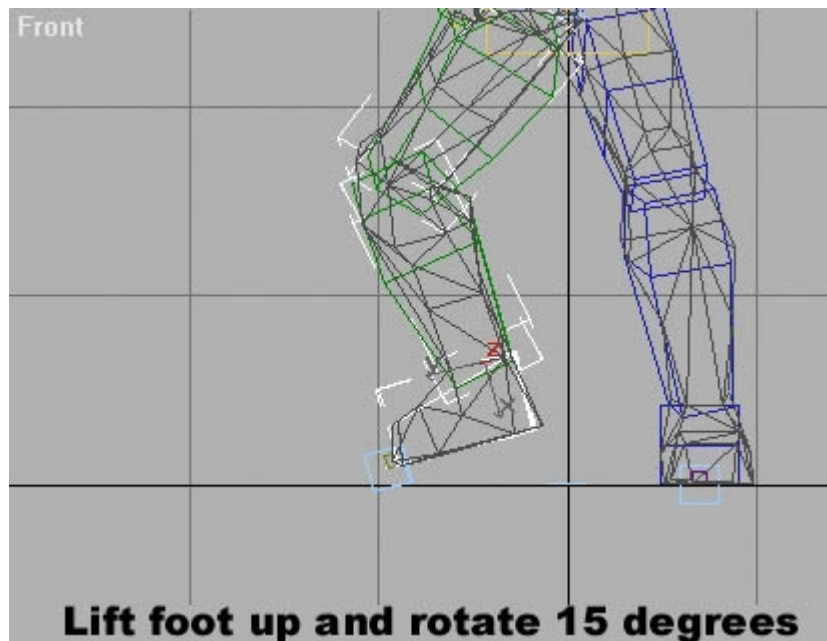
Ok hit zoom extents all and take a look at the right foot. Doesn't look very comfortable in that position does it. So what we will do is make our guy take a little step. First select the right foot and un-anchor it. Now right calve and rotate it 45 degrees in its X-axis. Then grab the foot and rotate it 65 degrees in its X-axis also.



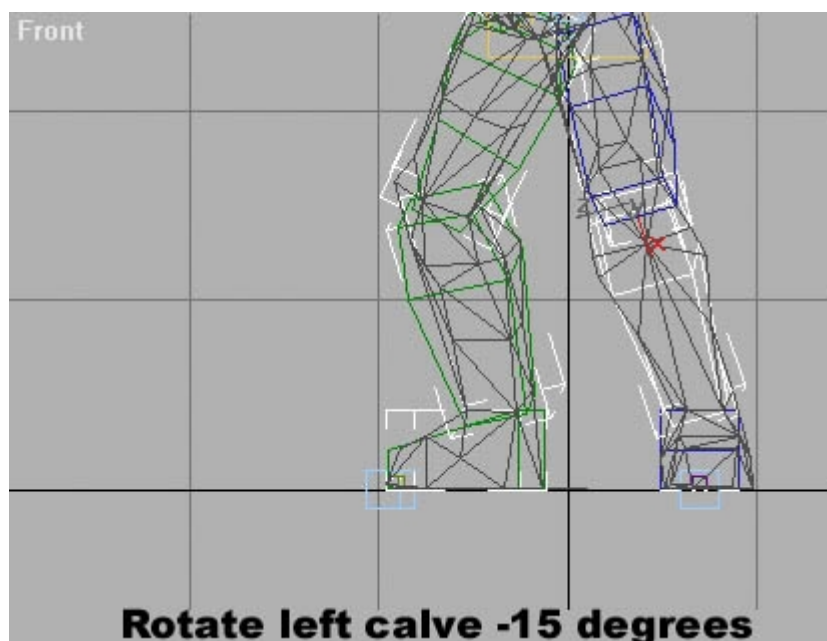
Now move the foot about one foot length to the right in the front viewport.



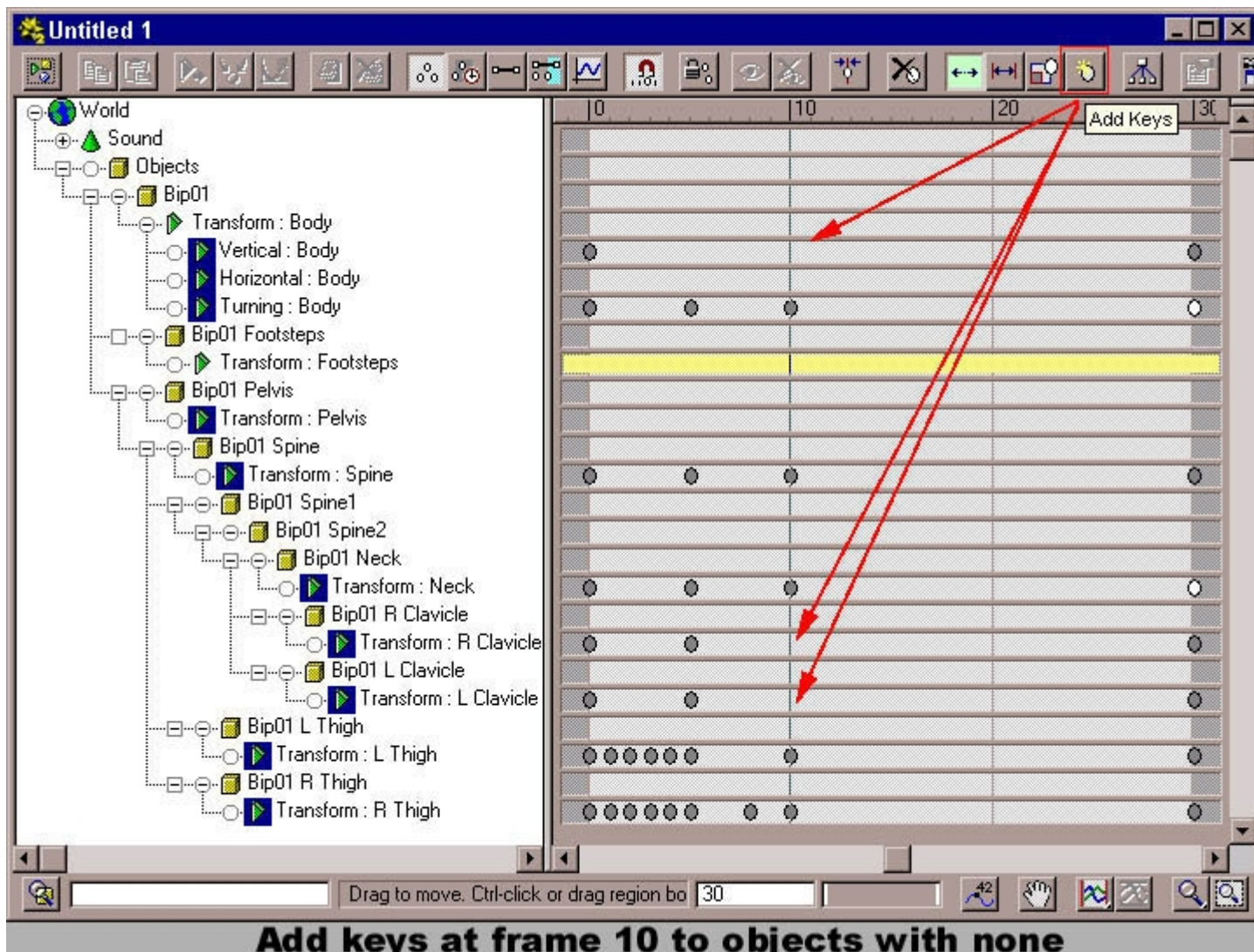
The step is almost complete except that it doesn't rise on its way to its new position. This is very easy to do, just go to frame 8 and move the foot up off the ground a bit. Also while it is up there you probably should rotate the foot about 15 degrees to make it look more realistic.



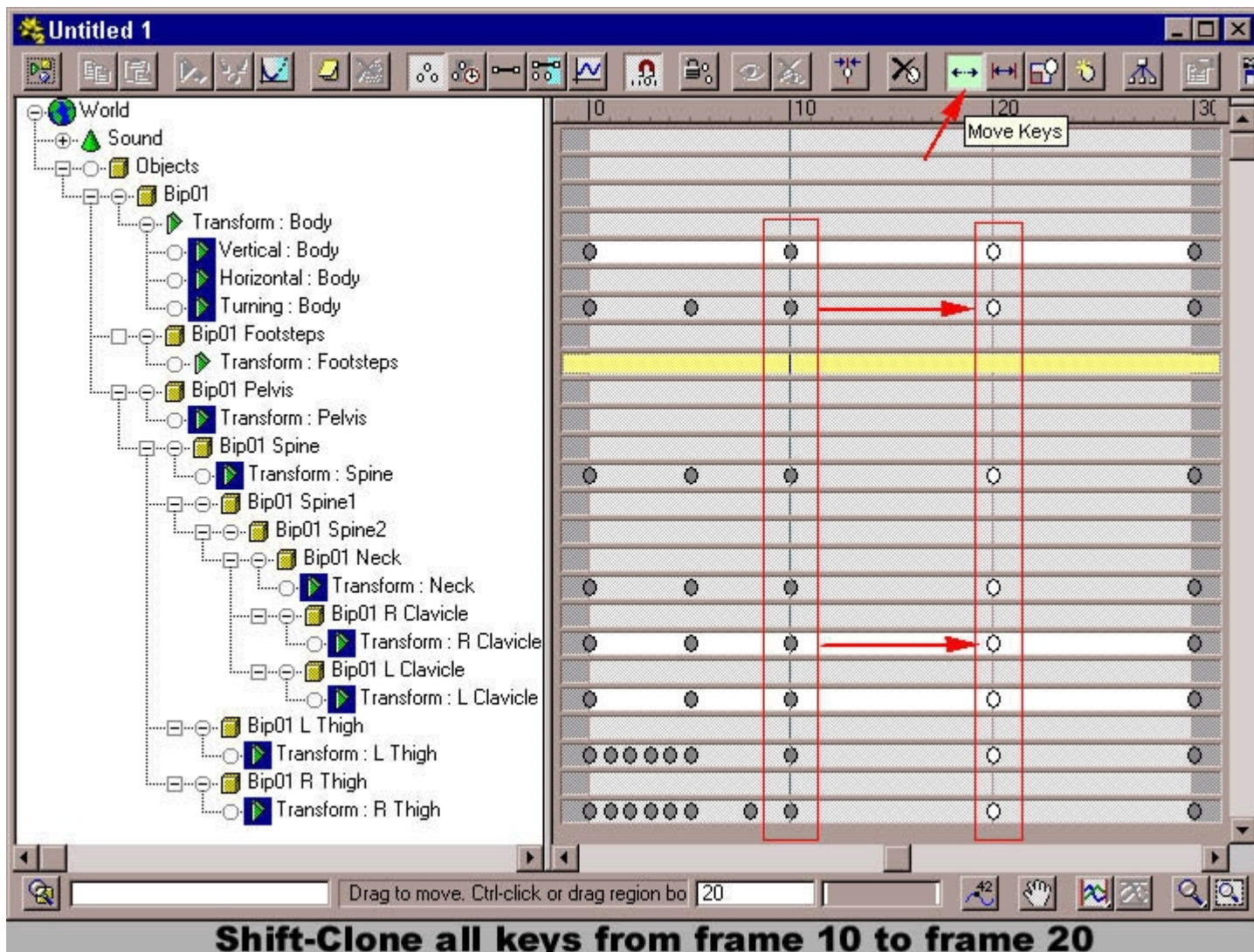
Now with the Left leg still anchored set a key for it by selecting the calve and hitting '0'(zero). If it didn't set a key it is because you don't have the motion command panel open or the 'Plugin shortcut key toggle' isn't pressed. Now un-anchor the left foot and rotate the left calve -15 degrees. Notice how the foot stays in place, I just love that feature.



Now that frame is done. You will notice that when you hit play the feet will slide around a little bit in the those first 10 frames we just worked on. We will fix this later once we have the rest of the frames set. Ok now currently our guy looks to the right and then slowly returns to his original position. This isn't really very good, he barely has time to see if anything is there and he is already turning back. So we want him to stay in that position at frame 10 for a little while. This is very easy, all we need to do is clone the keys from frame 10 over to frame 20. So we open up the track view and see that not all the objects have keys on frame 10. Well lets add some then. Just hit create keys and click on the spot you want to add a key.

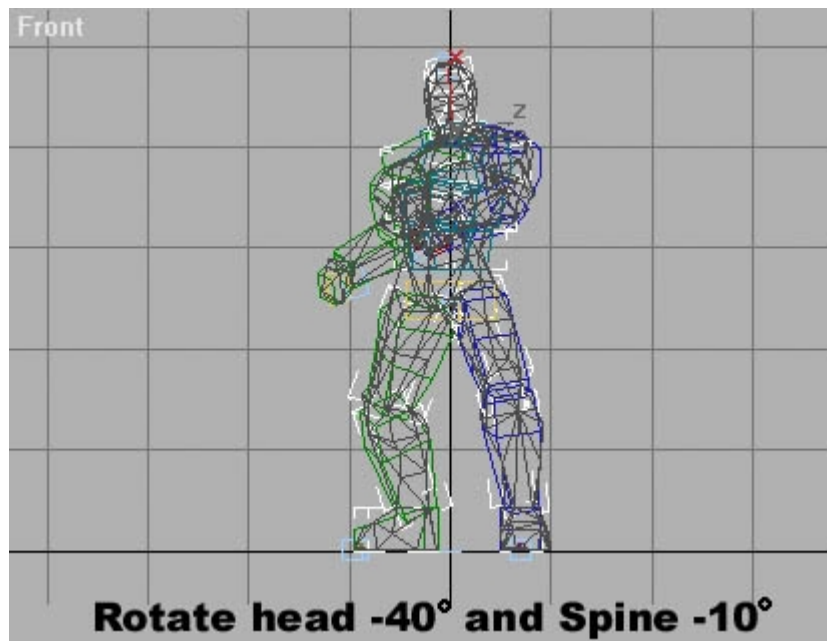


Now select all the keys on frame 10 and shift-clone them over to frame 20.

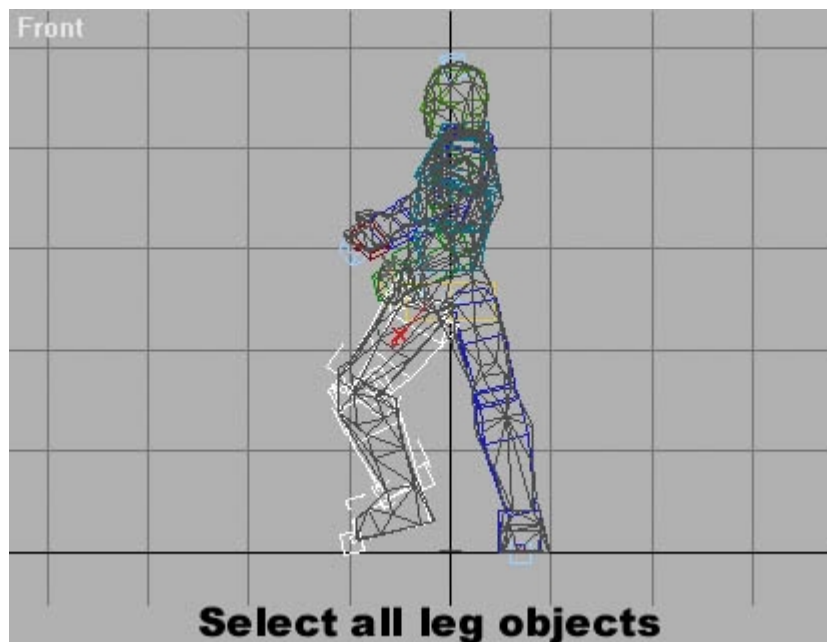


Shift-Clone all keys from frame 10 to frame 20

Ok so now our guys tends to look a little longer before returning to his original position. Now we need to fix up the frames between frame 20 and 30. First we will need to make the head lead the motion like we did before and second he will need to take a step back to his original position. Start by going to frame 20 and anchoring both feet into place, then go to frame 25 and rotate the 'Bip01' center of mass object -5 degrees in its Z-axis. Then set a key for both legs, after this we can un-anchor the feet again. Now select the head and rotate it back -40 degrees in its X-axis, just like before we will turn on 'Bend links mode' and rotate the 'Spine02' object -10 degrees. Ok that is good enough.



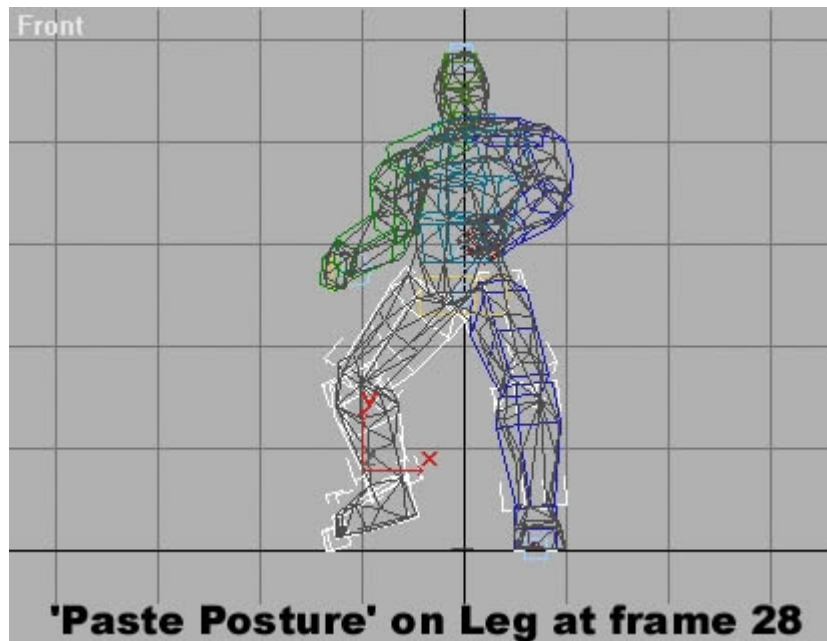
All we need to do now is give that leg the little step it needs. To do this we will copy the position the leg was in on frame 8 and paste it onto frame 28. First of course go to frame 8 and double click the 'Right Thigh' object (double clicking will select the object and all the children of that object).



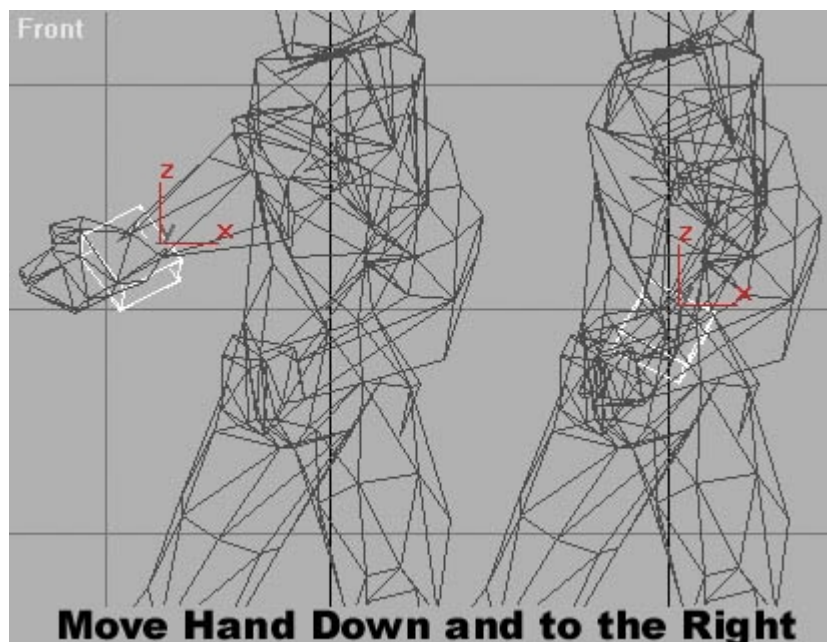
Now hit the 'Copy Posture' under 'Keyframing' in the 'Motion Command Panel'.



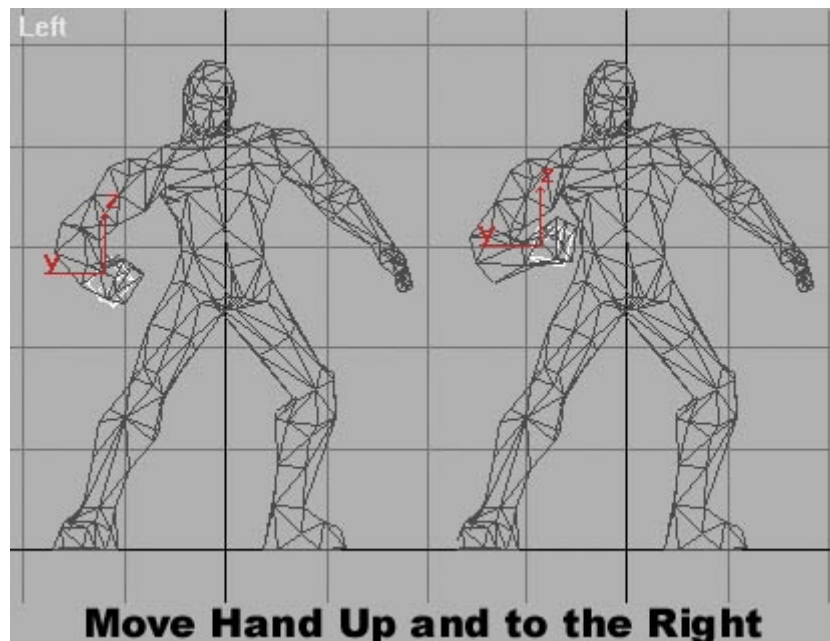
Go to frame 28 and hit the 'Paste Posture' button right under the 'Copy Posture' button.



So hit Play and let's see how it looks. Hmm arms are kind of stiff. Let's go back to frame 20 and see if we can fix that. Select the left hand and at frame 20 move it down and to the right in the front view. Don't move it so much that it hyper-extends the elbow but still move it enough that we will notice the motion.



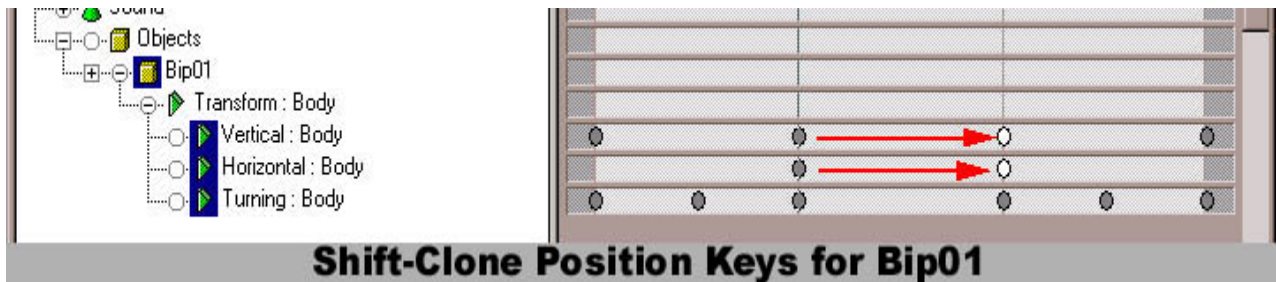
Next Grab the right hand and go to the left viewport and move it up and to the right a bit.



Now let's look at the sequence again. Ok it's looking ok but something bothers me a bit. I think I'd rather have him look around a bit more instead of just staring into that one direction. Let's try and see how it looks with a pan. Go to frame 20 and rotate the head 40 degrees in its X-axis. Press play and we see that it looks a lot better. The head motion fits rather nicely with the arm motion as well. Only thing is that the head pauses its scan from frames 5 to 10. If we get rid of the key at frame 10 that should smooth out the motion. We could go into the track editor to delete that key but I know an other way. Just select the head and under 'Keyframing' in the motion command panel hit the 'Delete Key' button.



You may have also noticed that the center of mass never moves. It just rotates. This isn't very realistic and I think we will need to fix this. Start by going to frame 10 and anchoring both feet down. Now select the 'Bip01' object and in the left viewport move it up and to the left a bit. Now go into the track editor and you will see some new keys on the 'Bip01' object. Shift clone the two position keys over to frame 20. This will over write any keys that were there from before.



Now go back into your left viewport and you will see that the feet are no longer on the ground. Select the Right foot and move it down until it is even with the ground. Don't worry about the other foot that will get fixed in the next step.

Ok looks good and all that is left to do is set some keys for the feet like we did in the 'Idle' sequence. Start by going to frame 0, select the left foot and anchor it down. Then set a key for every frame from 0 to 30. Next go back to frame 0 again and select the right foot and anchor it down. Now set the keys for frames 0-5 and then un-anchor the foot again. Move to frame 10 and re-anchor the foot. Now set keys for frames 10-25. Ok un-anchor both feet and hit play. The feet should be solid on the ground except when it takes the two steps.