

George Rig



Animator's Survival Kit

1. Introduction

The George Rig is a cartoon rig for Blender (www.blender.org). This rig was developed with Blender 2.48 and 2.49.

George has standard functionality an animator expects from a cartoon rig:

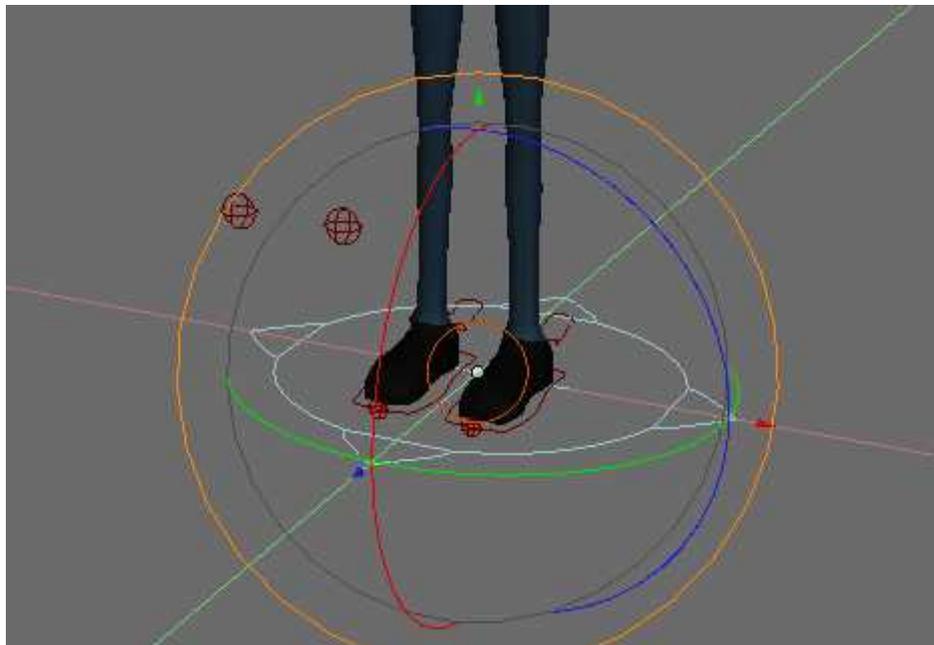
- FK & IK limbs including switching
- IK torso
- squash and stretch effect
- face rig
- bending limbs
- etc.

Concerning functionality that production rigs should have I would like to thank to Jason Schleifer¹ for his brilliant tutorials on animator's friendly rigs which I highly recommend to any serious rigger or animator.

2. Interface

It is expected that you are familiar with Blender interface and basic functionality. If not do not hesitate to visit Blender wiki (<http://wiki.blender.org/index.php/Doc:Manual/Interface>).

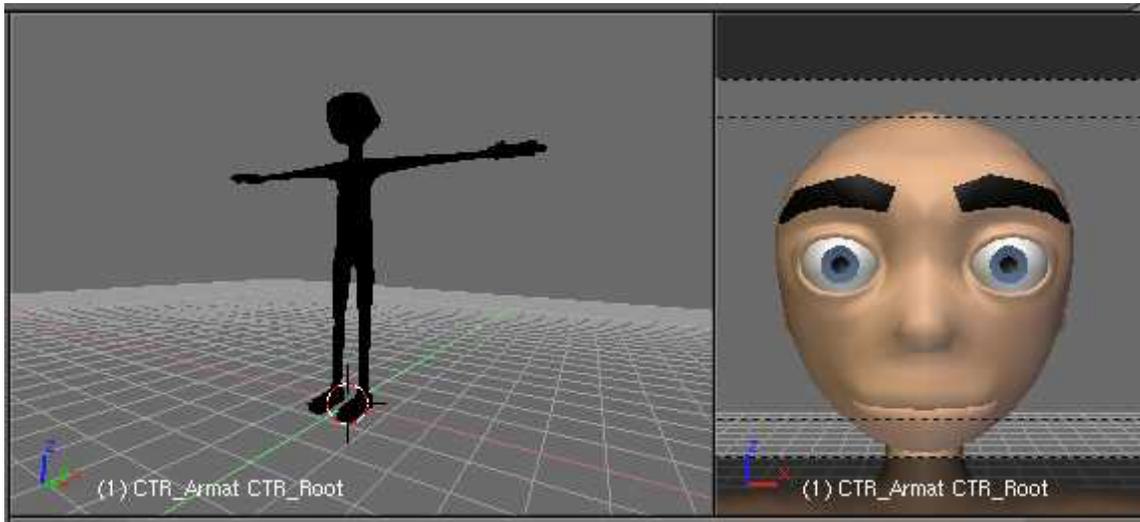
Transform manipulator is probably the best with settings Size 25, Handle 7, Hotspot 20 (User preferences - View & Controls - 3D Transform Widget). With these settings it is really fast and at the same time quite precise to use. Normal (transform) orientation is the one to be used for rig manipulation.



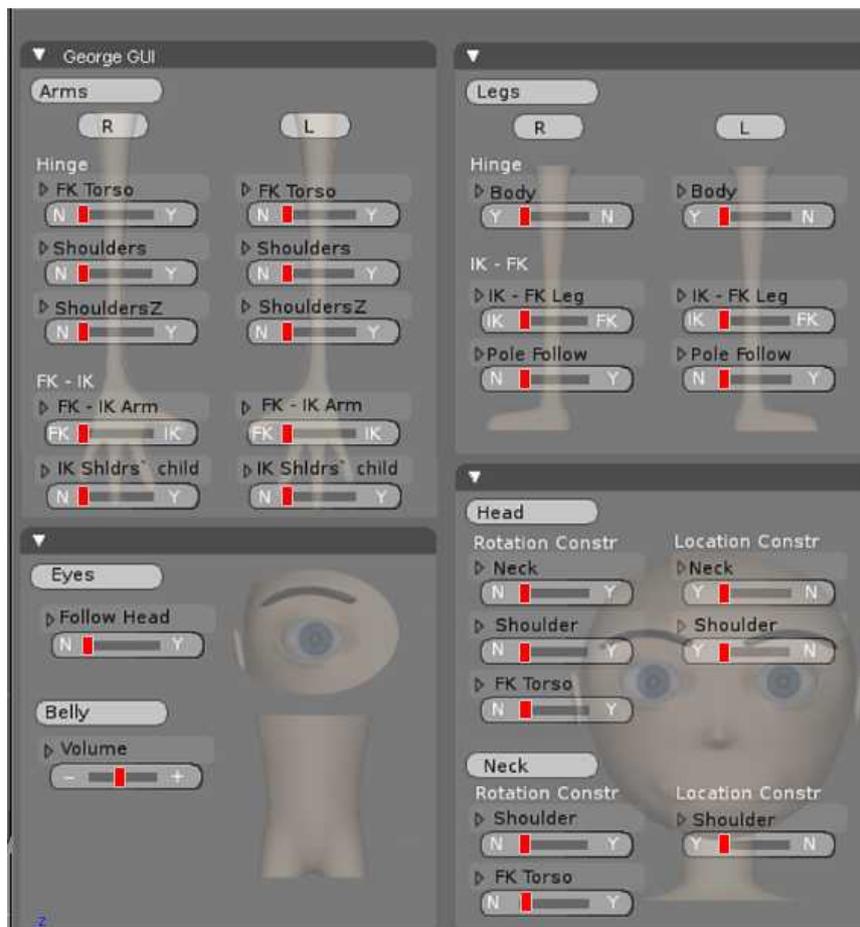
First layer contains the rig and mesh. The second one has only the mesh. The third one contains camera and lighting for rendering output. The layer eleven has only the rig and the GUI. The layer ten and twenty has hidden deforming armature and widgets for manipulators.

¹ <http://www.imdb.com/name/nm0772192/>

Besides 3d window where the rig is placed you can find one 3d window where only silhouette of George is visible which may be very useful for strong posing. Next 3d window shows George's face to have direct reference for facial animation.



Under bones layers window you can see special GUI for some rig switches. In fact it is just a plane with the texture made in GIMP and bones switches placed before the plane. If you accidentally move the view just press 1 and pane.



The George mesh has deactivated subsurf modifier for 3d window display, for rendering it is on

level 2. If you need to change these settings open Outliner window under DEF_Armature find George mesh and switch on select-ability (arrow icon), now you can modify George mesh settings.

Feel free to set up your Blender windows according to your animation workflow, I guess F-curve editor (IPO Curve Editor) or Dopesheet (Action editor) may be helpful. Note: Autokeyframing is off so turn it on if you are used to this animation attitude.

3. Bones Layers

The bones layers use quite simple and standard set up.

First row - Body

Layer 1 - FK Torso, IK Torso, Neck, Head, Eyes target

Layer 2 - FK Arms, Shoulders

Layer 3 - IK Legs

Layer 4 - Fingers

Layer 5 - IK Arms

Layer 6 - FK Legs

Layer 7 - Palm, Fingers detail, Bending limbs

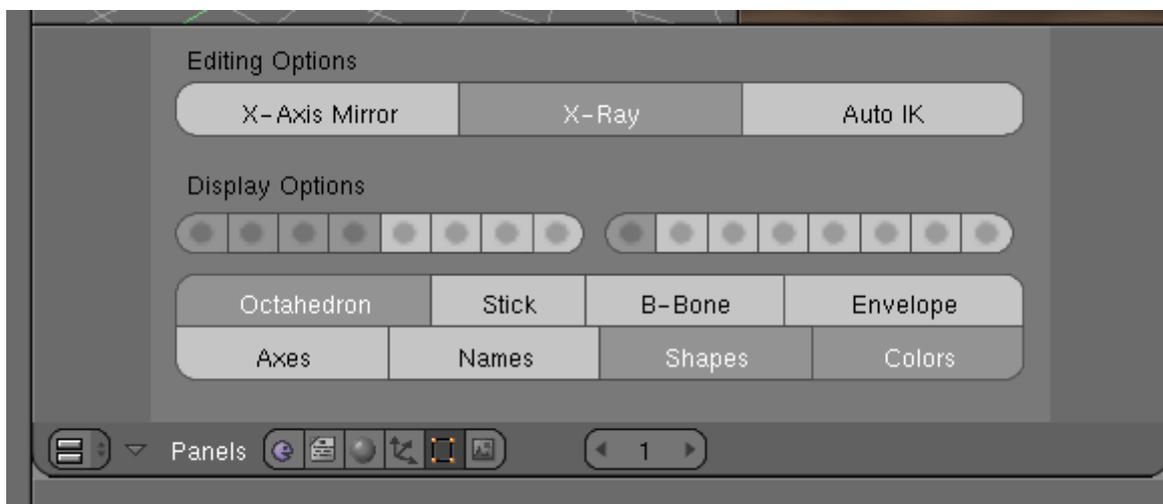
Layer 8 - Copy bones for FK-IK switching

Second row - Face

Layer 9 - Face

Layer 10 - Face detail

Default visible bones layers are 1, 2, 3, 4 and 9. Root bone and switchers are on all bones layers.

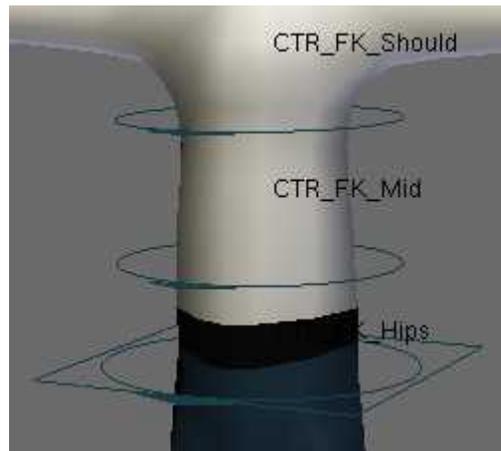


4. Body & Torso

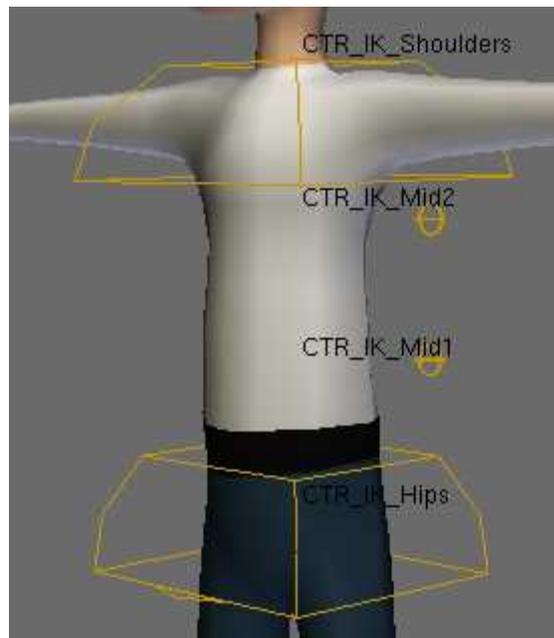
All body is controlled by the CTR_Root bone. The torso has FK and IK torso chains. When you use both chains together the FK should be used as a base and on the top of FK torso pose you should use IK torso.

FK torso is manipulated by rotations. Also multiple-bones rotation is possible for faster posing (i.e. you can select and rotate more bones of a chain at once). CTR_FK_Hips is also used for moving

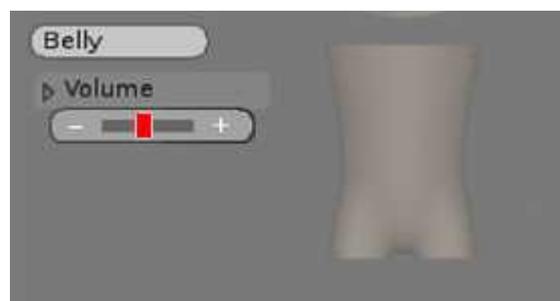
(translating) the upper body.



IK torso has IK functionality as well as squash and stretch effect. CTR_IK_Hips and CTR_IK_Shoulders use for rotating and moving, CTR_IK_Mid1 and CTR_IK_Mid2 for fine tuning of the spine. Also nice and accurate (with popper distribution along whole torso) rotation along torso Z axe is possible.



You can also use special slider in rig GUI for changing the volume of the torso.

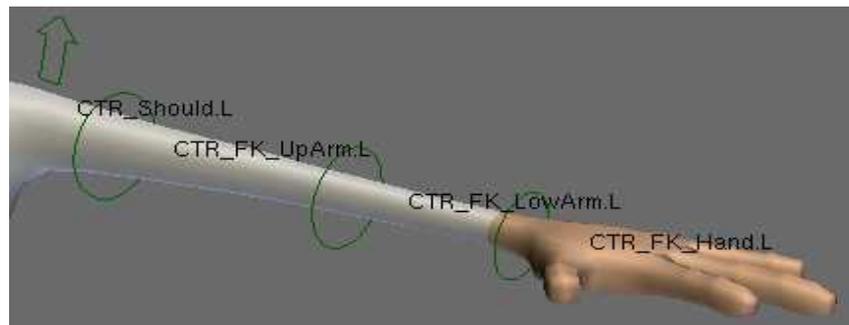


5. Arms

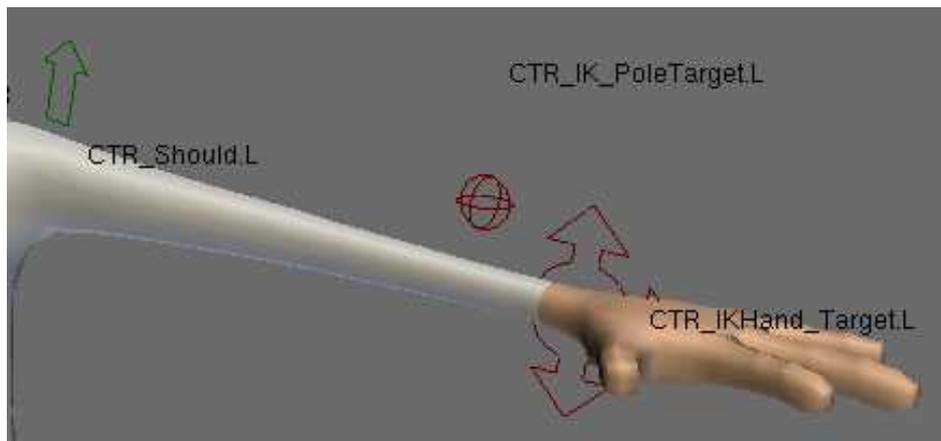
George has FK as well as IK arms both with squash and stretch effect.

Shoulders (CTR_Should bones) are based on translating with slight squash and stretch effect which gives more freedom to animator opposed to shoulders based on rotation.

FK arms chain is manipulated by rotation. Use scale for squash and stretched effect. FK arm bones have multiple-bones rotation enabled. I did not locked any rotation axes (I believe animators are sane people and will not brake joints too much :-)



IK arms chain is quite standard. IK handler (CTR_IKHand_Target bone) is used by rotating and translating. Pole vector is controlled by CTR_IK_CTR_IK_PoleTarget bone.



Quite important for arms are switches in rig GUI. You can find them in GUI under Arms switchers label.

First feature concerns high control over arms hinge (i.e. how arm follows/inherits rotation of the torso). They are relevant for FK arms of course. FK Torso switch enables turn on and off rotation of arm with the FK torso. Shoulders switch turns on and off how arms inherit rotation of the IK spine (i.e. IK shoulder).

To have really high control for animation I have separated Shoulders Z axe hinge to have its own special switcher.

More over you can even switch the arm to inherit rotation of the IK torso (IK shoulder) but have FK torso one off.

Second group of switchers refers to FK to IK (or IK to FK) switching. I guess nothing special here

to explain.

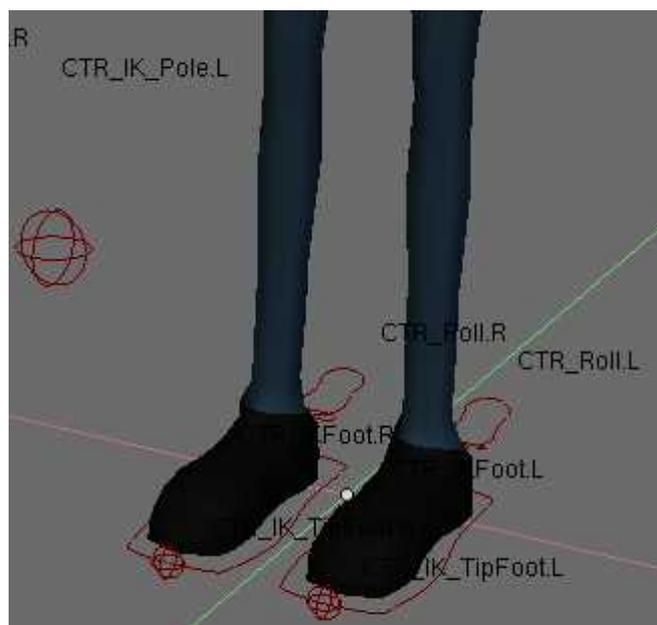
I find it useful for animating to have the possibility that arm is in IK mode but at the same time IK target (i.e. CTR_IKHand_Target) inherits the movement of the shoulders (you may know such switch form other advanced rigs when IK arm/hand follows the hip or head, same principle here).



6. Legs

George has FK as well as IK legs both with squash and stretch effect.

IK leg use CTR_IKFoot bone as IK target and CTR_IK_Pole to control pole vector. If you rotate CTR_IKFoot bone you have rotation of the leg in ankle. For other needed rotation pivots use CTR_Roll bone (little foot widget). If you rotate it along X axe you have toes and heel pivot. If you rotate it along Y axe you have side to side pivot. If you rotate it along Z axe you have tip side roll. If you scale it you have tarsus pivot rotation needed for walkcycle. CTR_IK_TipFoot is for tip rotation.



Usage for walkcycles is quite easy (to be honest I was highly inspired by and have to give credit to Jason Schleifer). First use CTR_IKFoot for translating along a ground. Then use CTR_Roll Y scale and Y rotation to have nice roll. CTR_IK_TipFoot use for fine tuning the tip rotation.²

FK legs chain is really standard one. FK leg bones have multiple-bones rotation enabled. Use can scale legs along Y axe to have squash and stretch effect.



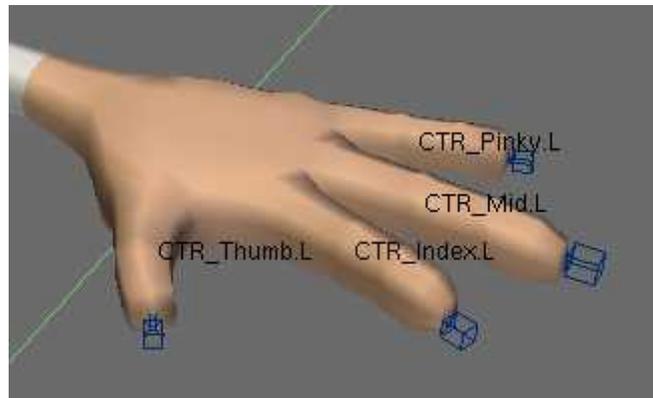
There are some switchers that can be found in rig GUI. The first one is for hinge (for FK legs). Standard IK to FK or FK to IK switch follows. As same animators prefer to have "auto" pole vector target I add switcher for parenting to the foot (CTR_IKFoot bone).



² The best example animated by Jason Schleifer himself can be seen here: <http://www.youtube.com/watch?v=1zrObqm4Fm0&feature=related>

7. Hands & Fingers

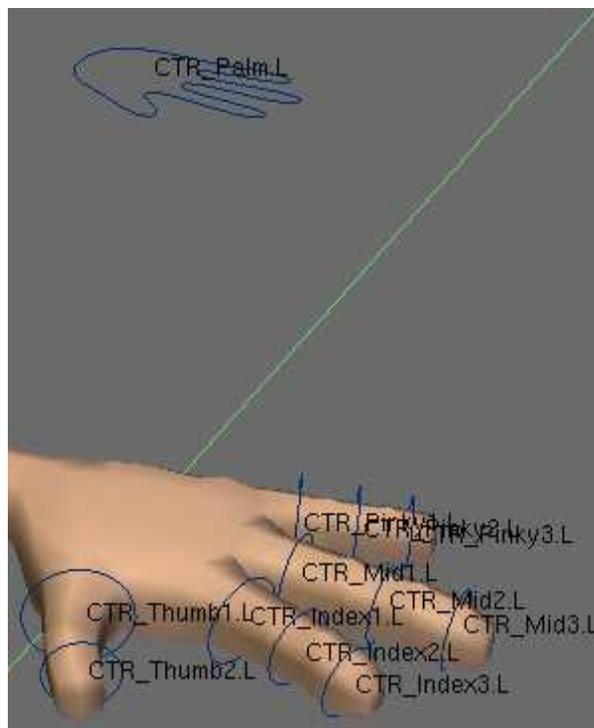
Finders are quite easy to use and follow "Blender standard". So scale them for bending and rotate them.



There are also high level controllers. You can manipulate (rotate) each finger segment.

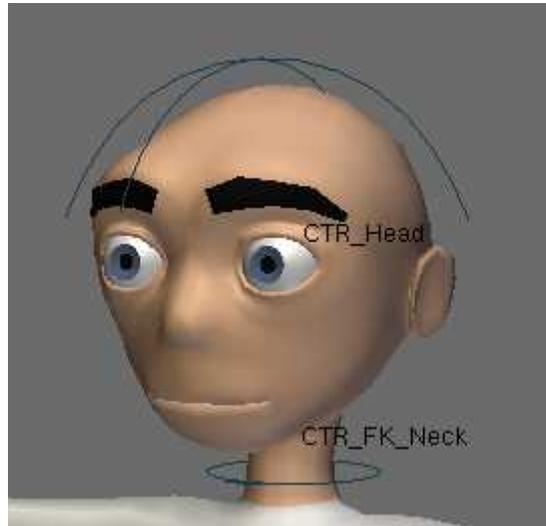
Quite useful maybe also palm controller (CTR_Palm). Rotate it to have different pivots which maybe fine when you animate hand laying on or touching the table. If you scale palm controller you have same pre-animated finger and palm movement.

I did not add any special fingers poses because Blender has in build pose library feature so feel free to store you own (you know all curl, cup, relax etc. poses).



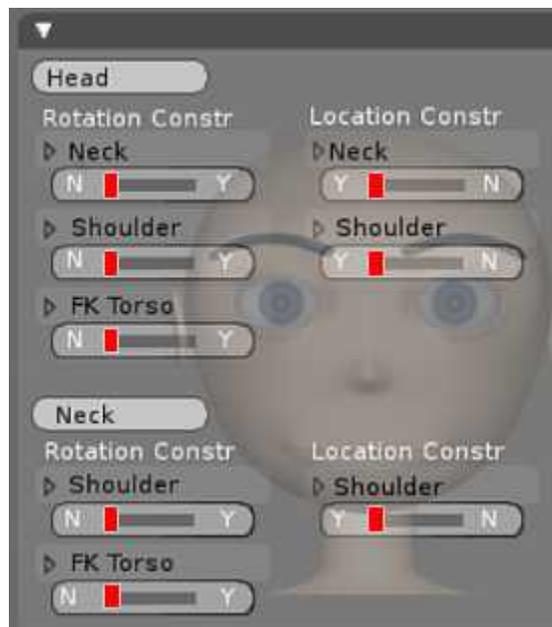
8. Head & Neck

The head and neck are manipulated by rotations. You have the possibility to free the head as well as the neck location and move it.



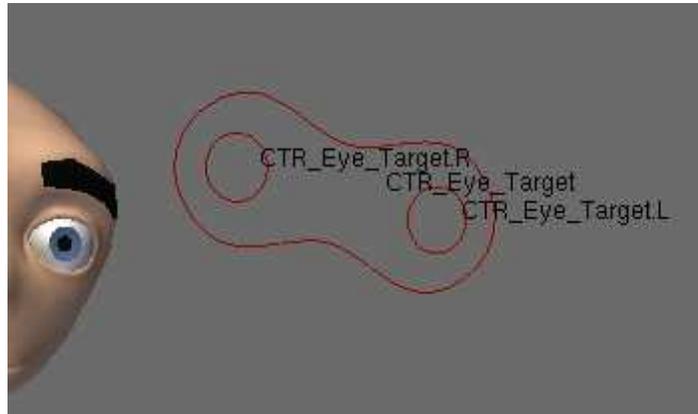
The basic state of the head and neck is that they do not inherit rotation of torso but they do inherit the location. You can change this in rig GUI. Number of combinations is possible. I believe the most useful are rotation constraints switchers.

I guess animators are smart people so they find out that some combinations do not make sense (for example if you free head from shoulders but not from neck (while neck is still locked to the shoulders) the head will not move freely). The best way to find how this work is to test it.



9. Eyes

Eyes are simple but powerful. Use main target to change eyes (look) direction. If you scale it you have nice pupil change. You have also individual target for each eye that can be moved separately.

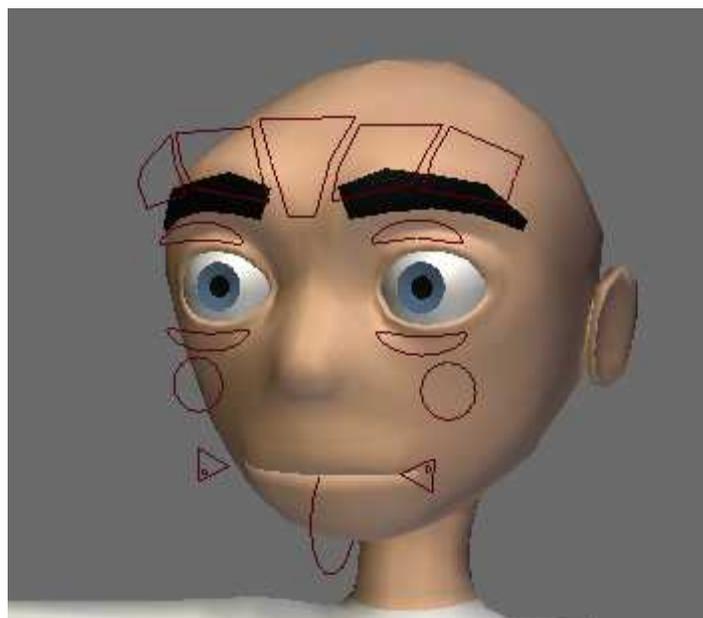


Lids has some auto animation with eye movement. Sometimes it is useful to lock eye target towards head movement, for this you can use special switcher in the rig GUI panel.

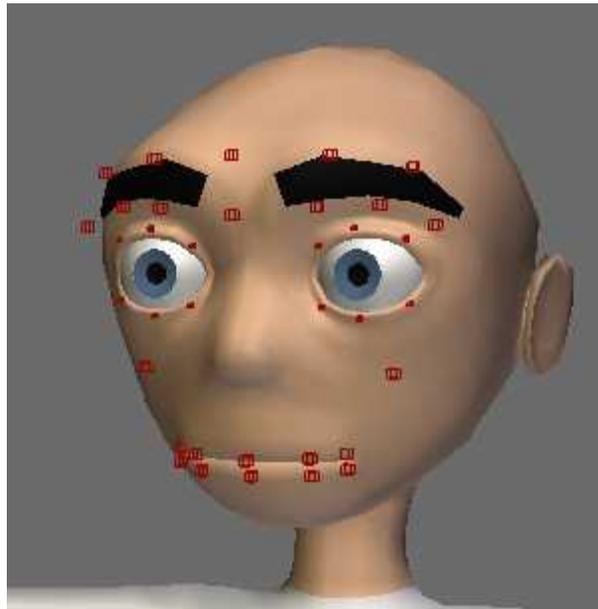


10. Face

Face has basic bones located in bones layer 9.



More detail controls are in bones layer 10



The face do not use any shape keys. In fact basic face bones animates the more detail ones.

Simply move the bones as you wish. The CTR_Jaw bone is to be rotated of course.

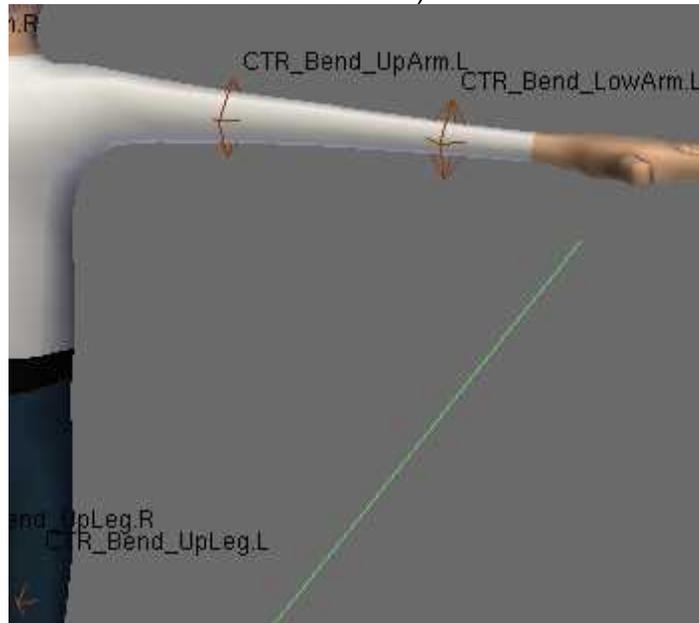
In the mouth are two tongue controlling bones.

If you scale CTR_Cheek bone you have puff effect. When you scale CTR_MouthCorner.R lower lip rolls in or out, the CTR_MouthCorner.L bone does the some for upper one.



11. Bending

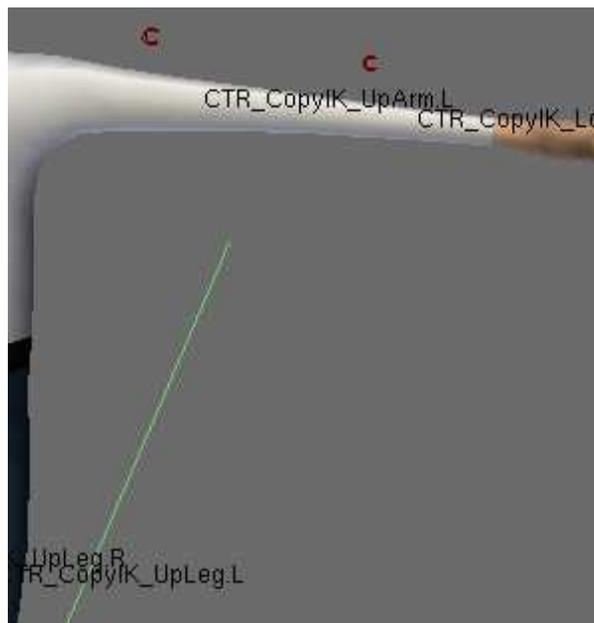
Just simple bending bones rather for fine tuning the poses not for any crazy snake man escapades (they are not intended to be used with stretched limbs).



12. FK to IK and IK to FK switching

After some time of testing I decided not to use any available scripts as they are not 100 % reliable especially when you switch on and off autokeying. So manual attitude is to be used (I believe Blender 2.50 will have macros possible so just one button click should supersede this repetitive steps eventually in Blender 2.50)

You have to use special copy bones (layer 8)



The arms switching is as follows:

IK to FK (FK chain needs to copy IK chain):

- Select CTR_FK_UpArm.L - Shift select CTR_CopyIK_UpArm.L - copy (Ctrl+C) Visual Rotation
- Select CTR_FK_LowArm.L - Shift select CTR_CopyIK_LowArm.L - copy (Ctrl+C) Visual Rotation
- Select CTR_FK_Hand.L - Shift select CTR_IKHand_Target.L - copy (Ctrl+C) Visual Rotation
- then just GUI switch (bone) from IK to FK using switch GUI_ArmsFKIK_L without no hopping (both chains seamlessly match)

FK to IK (IK chain needs to copy FK chain)

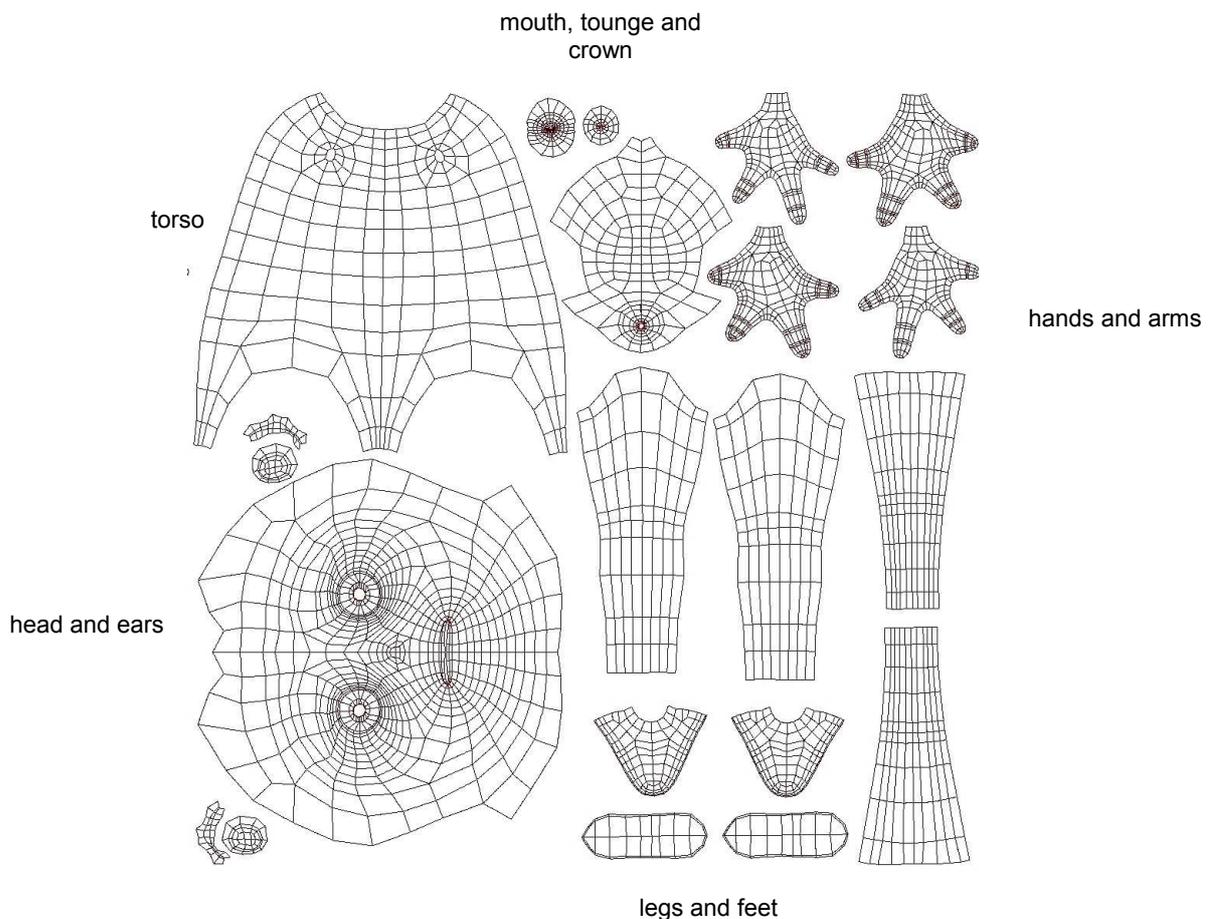
- Select CTR_IKHand_Target.L - Shift select CTR_FK_Hand.L - copy (Ctrl+C) Visual Visual Locatoin and Visual Rotation
- Select CTR_IK_PoleTarget.L - Shift select CTR_FK_LowArm.L - copy (Ctrl+C) Visual Locatoin
- then just switch from IK to FK using switch GUI_ArmsFKIK_L without no hopping (both chains seamlessly match)

For legs the process is quite similar.

None, in stretched position (stretched IK or scaled FK) seamless switching is not implemented (and I guess the animators can deal with it because stretched position are rather extremes where going from switching to IK to FK key respectively is not really needed so often).

13. Bonuses

UV map - I have unwrapped George so anyone can paint his own UV texture for him.



GUI map - If someone is interested I have attached GUI map as GIMP file with all separated layers. So feel free for your own

Script - Believe it or not but the George rig uses only one python script. This is the Roll.py made by Nathan Vegdahl (thank you very much). It is attached as a separate file as well.

14. Licence

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Good luck and have fun while animating George!

Jiri Heneberk aka JiriH