ANYIK 3 GUIDE

(v 3.0)

1. Introduction

AnyIK 3 is successor of AnyIK 2 on the Unity Asset Store. AnyIK 3 is easier to use and setup than its predecessor. There are some differences between two packages.

a. AnyIK 3 is for humanoid models only. That is, character needs to have a humanoid animator on it. (AnyIK 2 will be on the store until AnyIK 3 can also work on non-humanoid characters)

b. Bone structure and bone limit templates in AnyIK 2 is replaced with Muscle Setup Asset in AnyIK 3 which is generated from the model in the editor and used at runtime. A few pre-generated muscle setup assets are provided in the package. These are for some widely used character models and they have unity default muscle rotation limits. For generating your own muscle setup asset please see the related section of this document.

c. AnyIK 2 is executed on "Update" where AnyIK 3 is executed on "AnimatorIK". This means you must have IK pass enabled on your animator layers. And naturally any modification by other scripts to bone rotations on "update" will override AnyIK 3.

d. Foot IK and Generic IK scripts still uses a bone limit applied CCD algorithm but for look IK AnyIK 3 uses Unity's look IK in the background but apply additional limits to it to prevent unnatural head positions.

2. Usage

a. Controller Coordinator

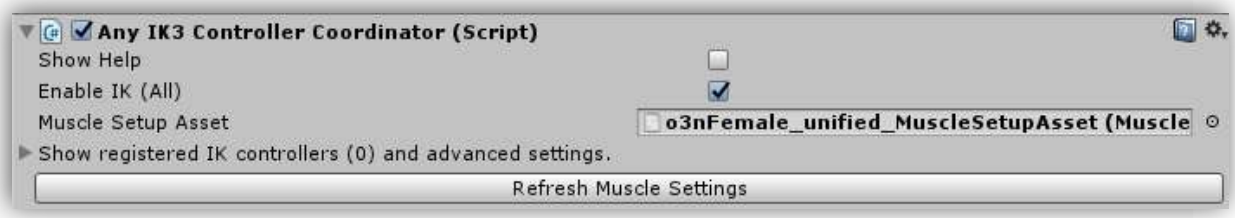
AnyIK3ControllerCoordinator is placed on the character game object as soon as you put any of the generic, foot or look IK on the character. It is the coordinator of all the IK scripts on the character.

Show Help : When enabled, a short description under each setting is displayed. (every script has this option)

Enable IK (All): This option is to enable and disable all the AnyIK 3 script on the character at once.

Muscle Setup Asset : This is where you drag the muscle setup asset compatible with your character model. If provided muscle setup assets are not compatible with your model please see the relevant section on this document for generation of the asset.

Refresh Muscle Settings Button : Click this button whenever you change the muscle setup asset to reset the muscle information in memory.



b. Foot IK

AnyIK3FootIKController is a special IK script designed to keep the character's feet on the ground.

Show Help : When enabled, a short description under each setting is displayed. (every script has this option)

Given Name : This is the name of the IK script. It can be changed to whatever you want. It's value is not used by AnyIK 3. It's for easy recognition of the IK scripts on the inspector. (Every script has this property)

Enable IK : This is to enable / disable the IK script. (Every script has this option)

Ground layer : This is the layer for ground detection. If you want to exclude unintended geometry from being considered as ground you can use this option to set ground layer(s).

Ground Check Height : This is the height in meters to check for geometry above and under the foot bone.

Ground Tolerance : This is the distance in meters to be considered on ground by the script.

Foot forward Detection : When enabled an additional raycast is used in front of the foot for forward geometry detection. This is useful for stair like objects on the ground.

Forward Detection Range : This is the range in meters for forward detection.

Vertical Body Position Offset : This is the fixed body height offset in meters.

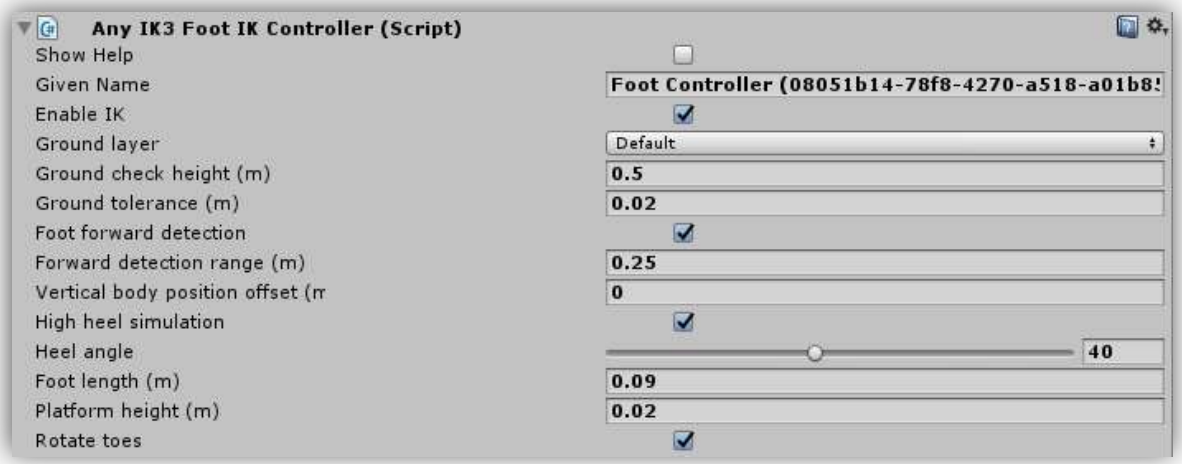
High Heel Simulation : This is to simulate heeled shoes. Basically this enables rotating the foot bone down and toe bones up for given angle.

Heel Angle : The angle of the foot.

Foot Length : This is the length from foot bone to toe boneç Used to calculate the height change by the foot rotation.

Platform Height : This is the height of the shoe in meters under the toe.

Rotate Toes : This is to enable / disable rotation of the toes.



c. Generic IK

AnyIK3GenericChainController is for defining IK chains from body bones.

Show Help : When enabled, a short description under each setting is displayed. (every script has this option)

Given Name : This is the name of the IK script. It can be changed to whatever you want. It's value is not used by AnyIK 3. It's for easy recognition of the IK scripts on the inspector. (Every script has this property)

Enable IK : This is to enable / disable the IK script. (Every script has this option)

Target : This is the target transform for the IK chain.

IK Weight : This is the weight of the IK.

IK Stop Distance : This is the distance from target when IK is considered achieved.

Constraint Rotations : This option limits the muscle rotations by the muscle setup asset's values when enabled.

Iteration Max Rotation: IK scripts are executed in iterations. This is the max rotation for a bone in each iteration.

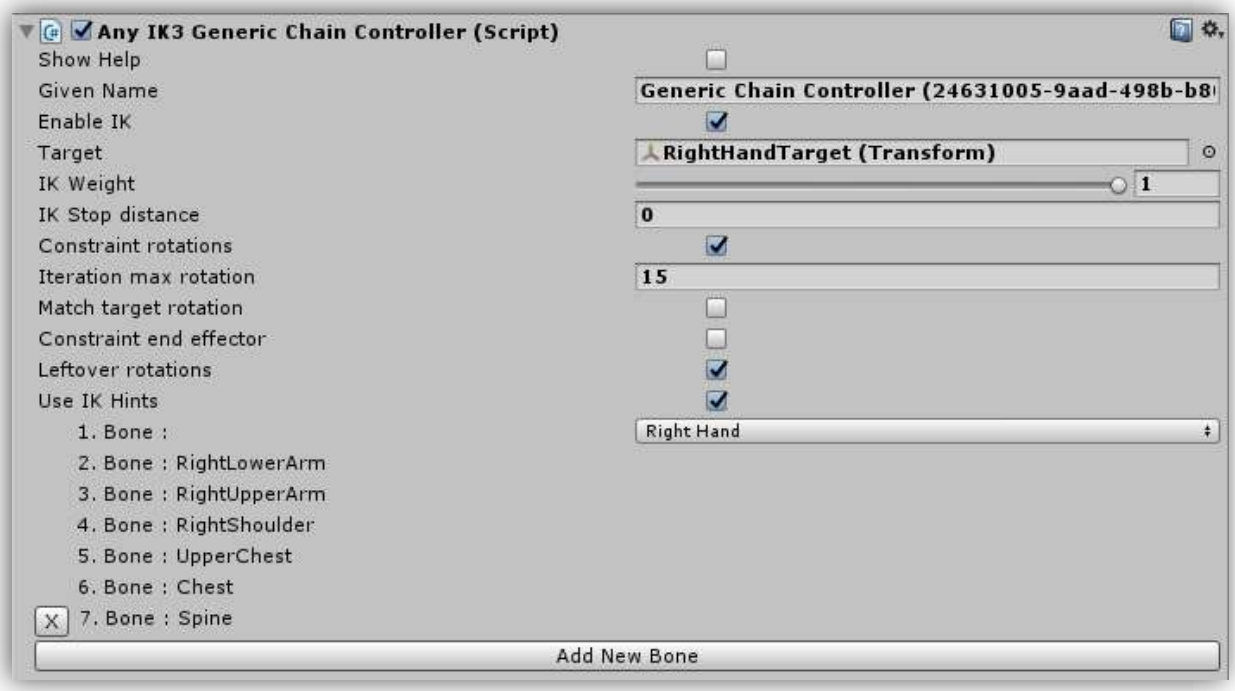
Match Target Rotation : When enabled the first bone of the chain is rotated to match the target transform's rotation.

Constraint End Effector : This option defines if the first bone of the chain will be constrained or not when matching the target rotation.

Leftover Rotations : When enabled, if the bone is constrained and it still needs to rotate to match the target, the leftover rotation is passed to the next bone in the chain.

Use IK Hints : When enabled Unity IK hint positions are exploited to guide the knees and elbows during IK. Hints are not matched exactly.

Add New Bone Button : This button adds a bone to the chain. First bone can be selected from Unity human bone list. The rest will be defined by the parent bone when new bones are added. The last bone added can be removed.



d. Head Look IK

AnyIK3HeadLookController manages head look by activating / deactivating Unity head look IK in the background.

Show Help : When enabled, a short description under each setting is displayed. (every script has this option)

Given Name : This is the name of the IK script. It can be changed to whatever you want. It's value is not used by AnyIK 3. It's for easy recognition of the IK scripts on the inspector. (Every script has this property)

Enable IK : This is to enable / disable the IK script. (Every script has this option)

Target : This is the target transform for the head look.

Target Human Bone : If the target transform game object has a humanoid animator this option sets the look target on the selected bone. For example you can "look at" head of the target.

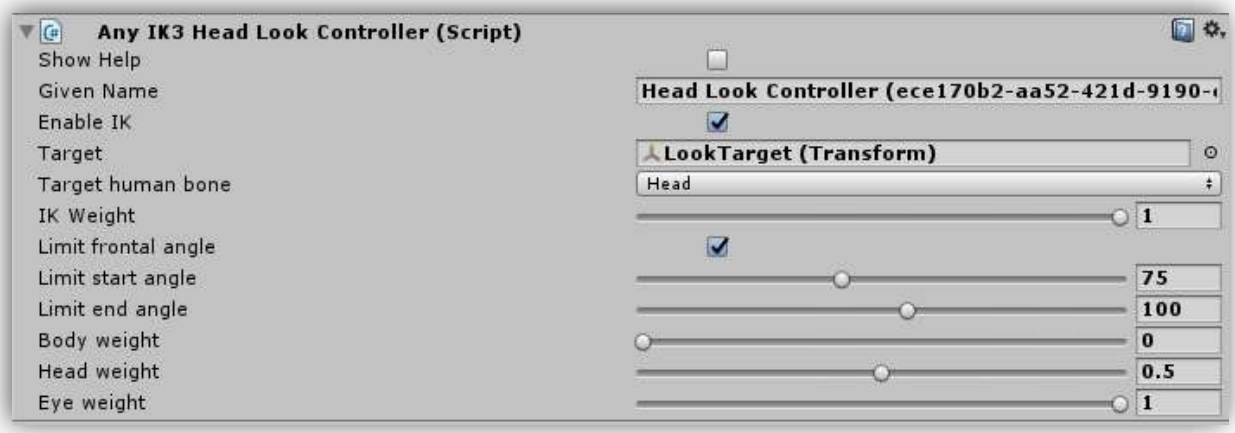
IK Weight : This is the weight of the IK.

Limit Frontal Angle : When enabled IK weight fades out down to zero from limit start angle to limit end angle. Angle is measured from the front.

Body Weight : Weight of the body rotation in the look action.

Head Weight : Weight of the head rotation in the look action.

Eye Weight : Weight of the eye rotation in the look action.



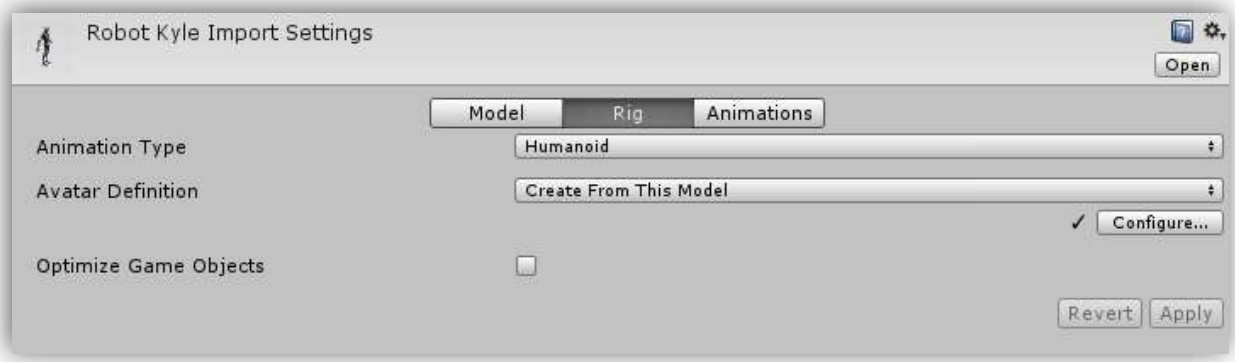
3. Muscle Setup Asset Generation

Muscle Setup Asset contains information on bone orientations of the model as well as muscle rotation limits.

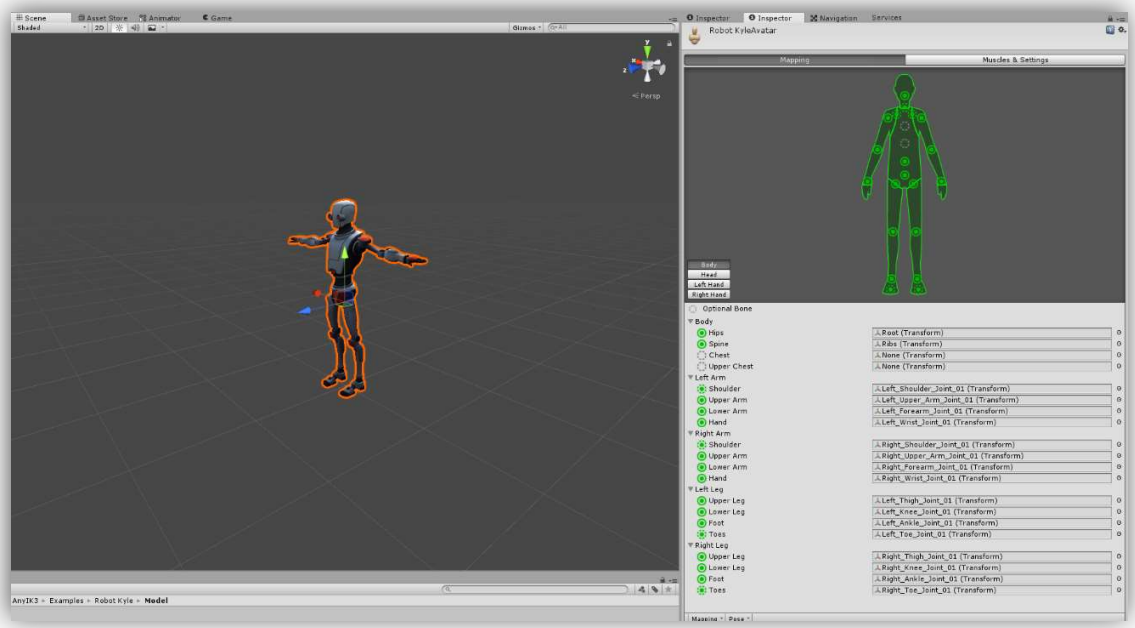
This asset is essential for AnyIK 3 to work. This asset must be generated for every model that has a different bone set. The supplied muscle setup assets are the basic ones which contains the Unity Default muscle rotation limits. The supplied assets are for; UMA Male / Female, o3n UMA Male / Female, Morph 3D Male / Female, Robot Kyle, Mixamo Malcolm.

If you need to use AnyIK 3 with a different model or you want to use different muscle rotation limits, you must generate a Muscle Setup Asset yourself. But don't worry it's super easy. Just follow these instructions.

a. First select the model (i.e. Fbx File) in your project. It must be a humanoid rig.

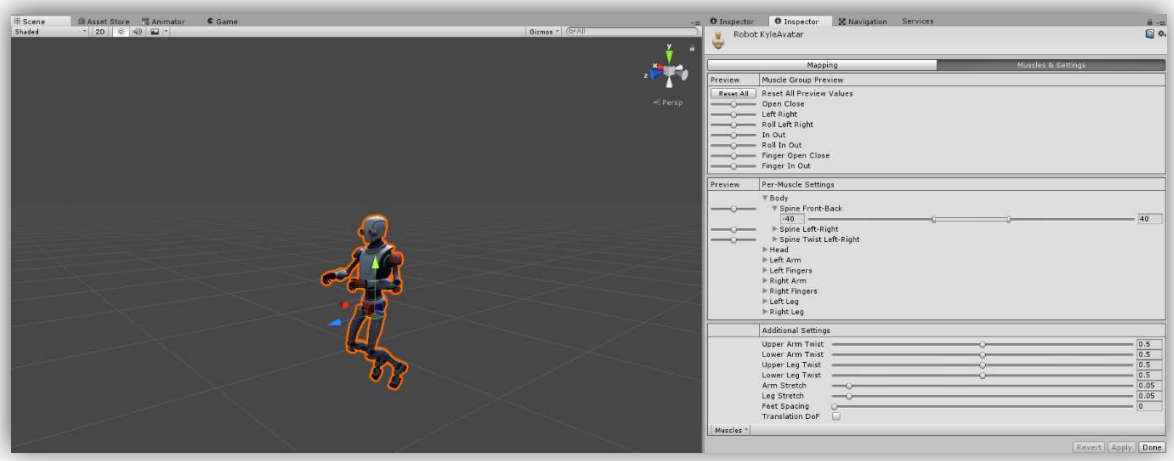


b. Hit Configure button. It should open the Unity scene for mecanim bone mapping.(Sometimes you need to hit Configure Avatar button before it shows up) It should look something like this.



c. The mappings must be correct on this screen for the AnyIK 3 to work correctly. (You must be familiar with this up to this point since it is what you do to make mecanim work with your model.)

d. Before extracting the muscle setup asset we might adjust the muscle rotation limits if we want to. So hit the Muscles & Settings button at the top right on the mapping inspector window. This should bring up a screen like this. (Notice that the pose has changed.)



e. In this window you can see how changing values rotate the limbs and set upper and lower limits as you see fit. (see the Spine front – Back limits shown on the screenshot)

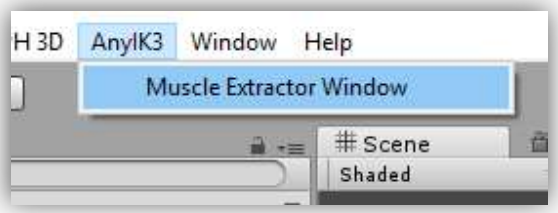
f. The default values are Unity's default muscle rotation limits. (These are used with supplied muscle assets)

g. IMPORTANT! When you are satisfied with your model's mappings and muscle limits, first hit Apply button in the bottom then The Done button. This should get you out of this scene to whatever scene you were before. This is essential for you to get out of the scene before coming back to extract the asset since generated asset will not be correct if you extract it without fist applying the settings and leave once.

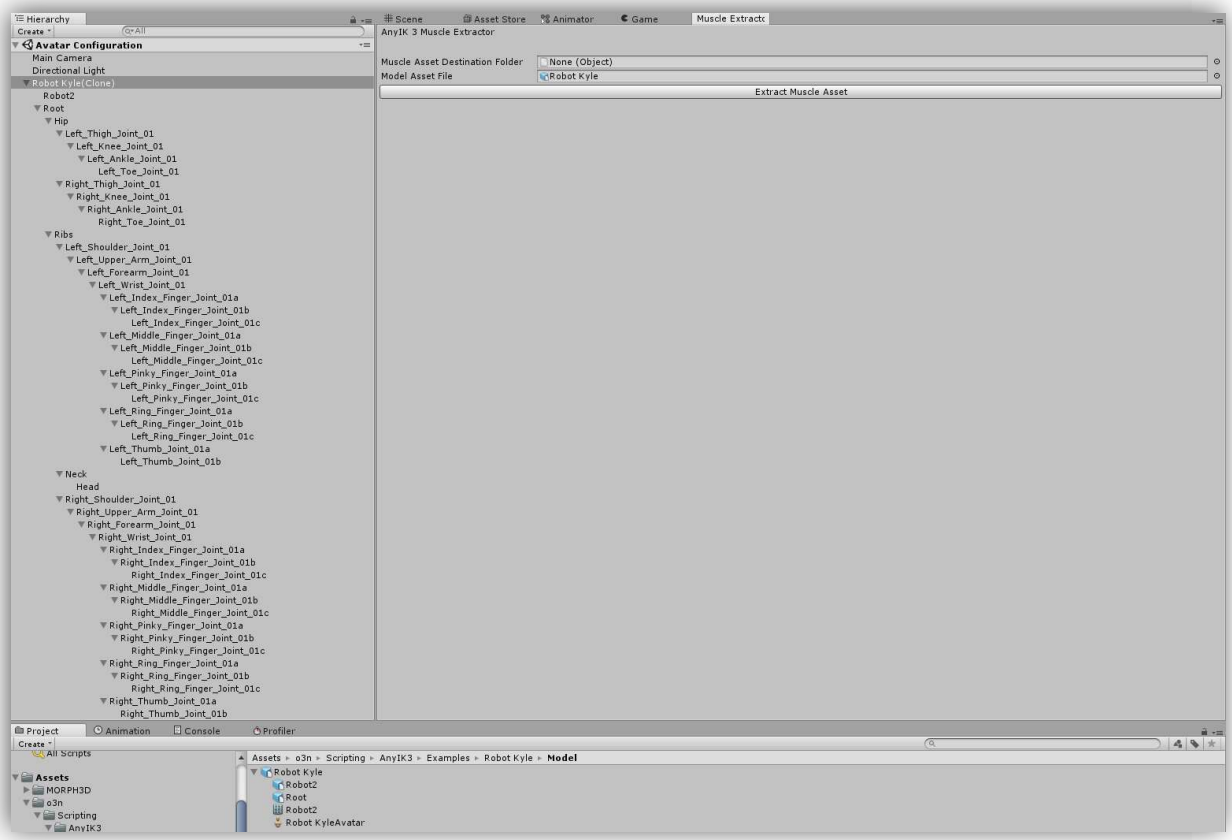
h. Again select the fbx and hit configure button as directed at 3.b.

i. Again hit Muscles & Settings button as directed at 3.d. (Now you should see something similar to the last screenshot.) (Your model should be in semi-crouching-like pose)

j. At this time, select Muscle Extractor Window from AnyIK3 menu.



k. This should bring the muscle extractor window. (You can dock it anywhere)



l. There are two fields in the window; the first one is the folder you want the extracted asset to be (which is optional, if empty the asset will go to the MuscleSetupAssets folder), the other one is for the model file (i.e. the Fbx file).

m. And for the last part hit the Extract Muscle Asset button to extract your model's muscle asset. This should extract the asset with model's file's name and print out the result in console output. (Careful! It will overwrite the file if the folder contains another asset with the same name)

n. That's it! You have your custom muscle setup asset. You should use it with the controller coordinator as described at 2.a.