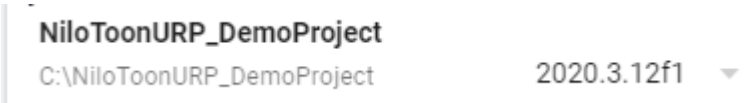
NiloToonURP user document

version 0.8.10 (2021-10-13)

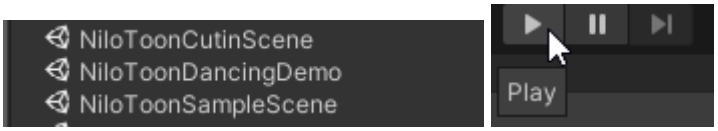
How to play the demo project correctly?

1)Download and unzip the full project .zip file

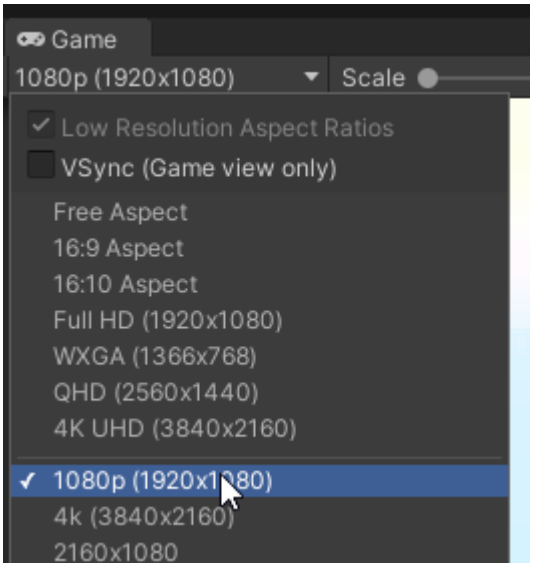
2)Open the project using the latest Unity2020.3 (at least 2020.3.12f1, you can install it via UnityHub)



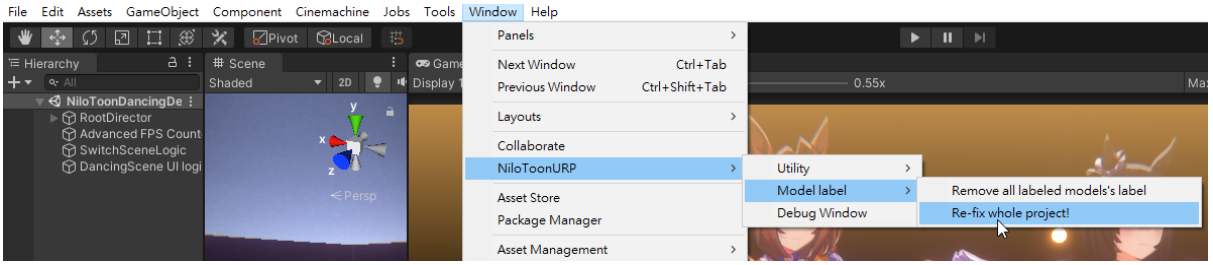
3)Play any scene containing NiloToon in the name
[for example -> NiloToonDancingDemo.unity]
(you can search in project window using **nilo t:scene**)



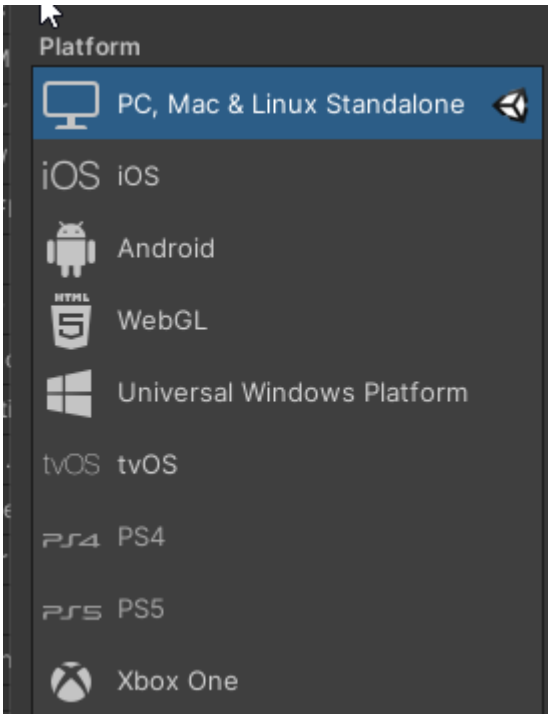
4)You will now see the same result of the downloadable demos inside your editor's game window (recommend using 1920x1080 or above game window size) .



5)(Optional)If characters are not rendering correctly, try clicking this button [Window/NiloToonURP/Model label/Re-fix whole project!]



6)(Optional) build the project to your target platform to test, the downloaded zip already included build of PC .exe and Android .apk, so you can save some time if you just want a quick check



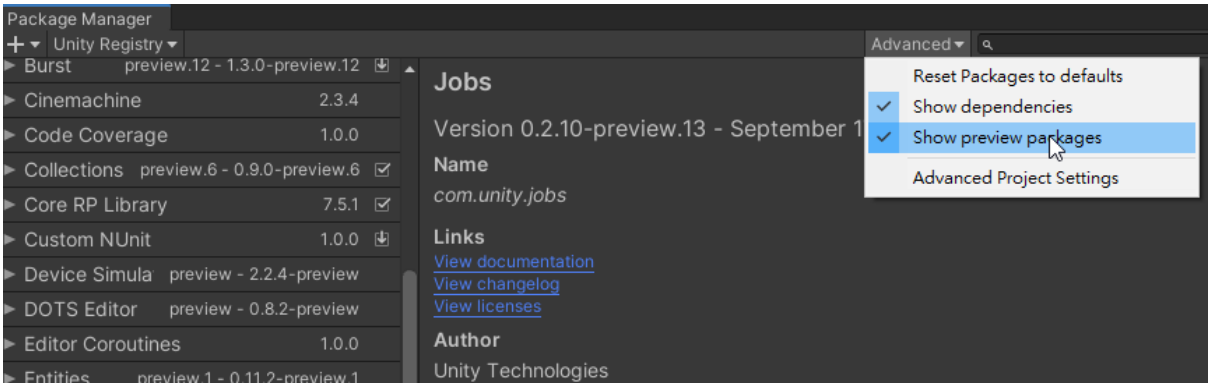
7)(Optional) If there are problems/bugs in your target platform's build, always contact us, we will help you to solve it (contact info located at the ending section of this document).

How to install NiloToonURP.unitypackage into your existing URP project (Unity 2019.4 or above)

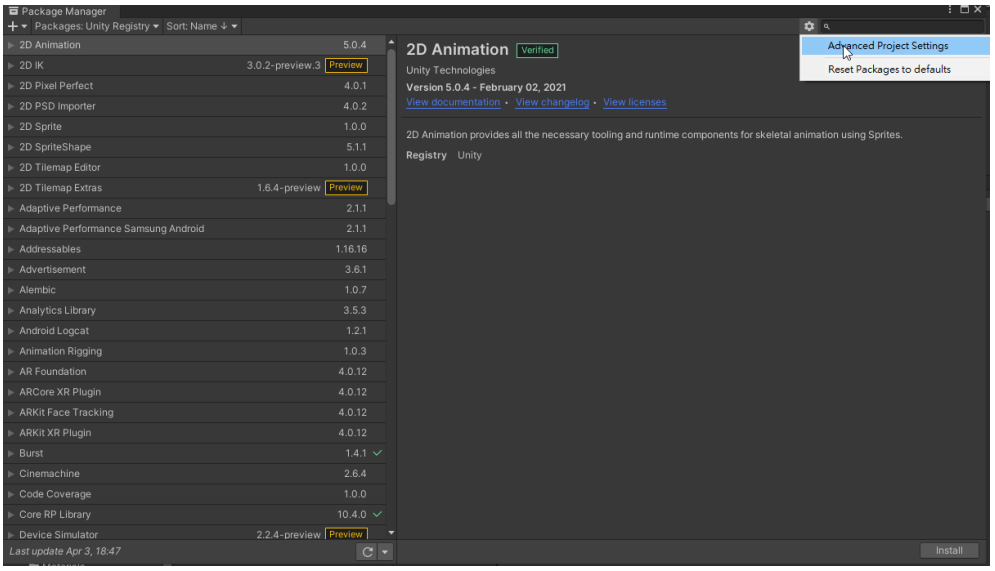
1. Install Jobs in the Package Manager if you haven't.

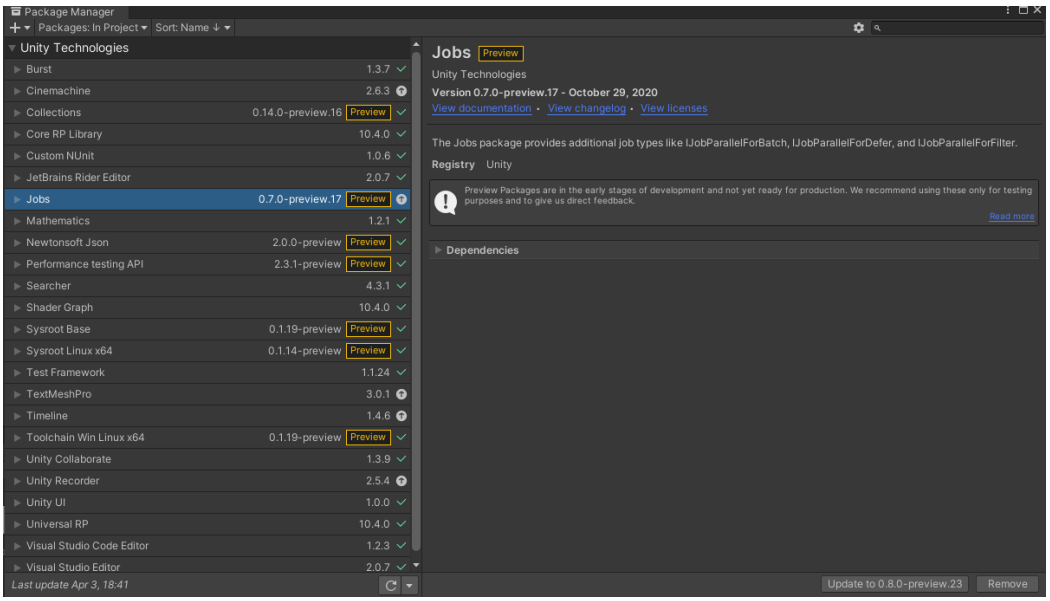
*NiloToonURP only use Jobs in editor to process character outline data, it is not needed in build

(In Unity 2019.4, you have to click advanced/Show preview packages in order to see Jobs in Package Manager)

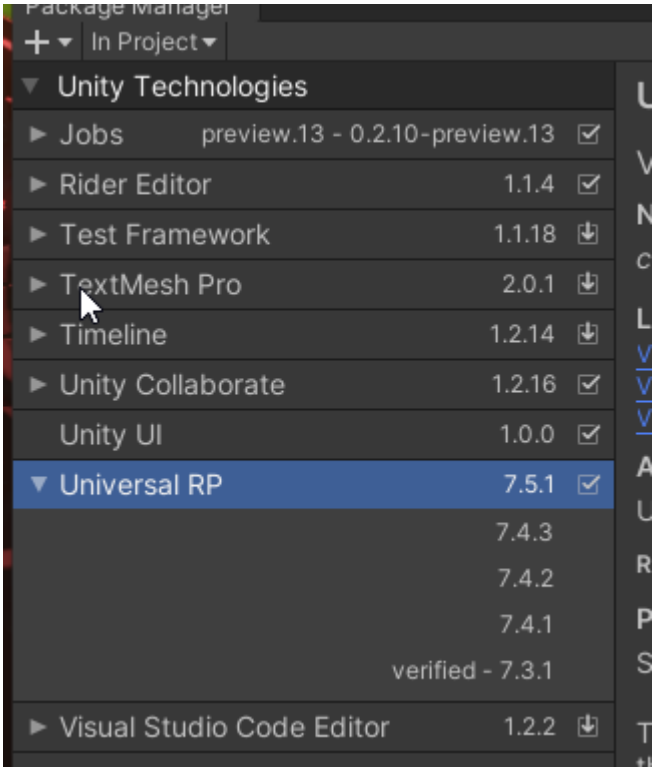


(In Unity 2020.3, it is more complex, you have to first click Advanced Project Settings, then enable enable preview packages in order to see Jobs in Package Manager)

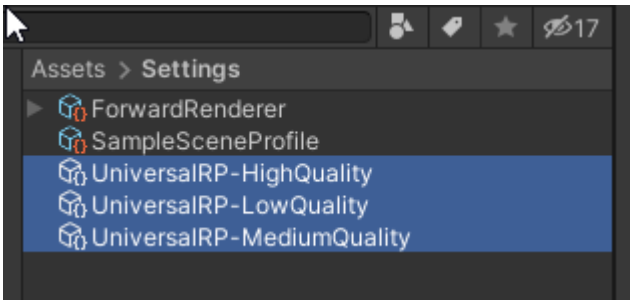


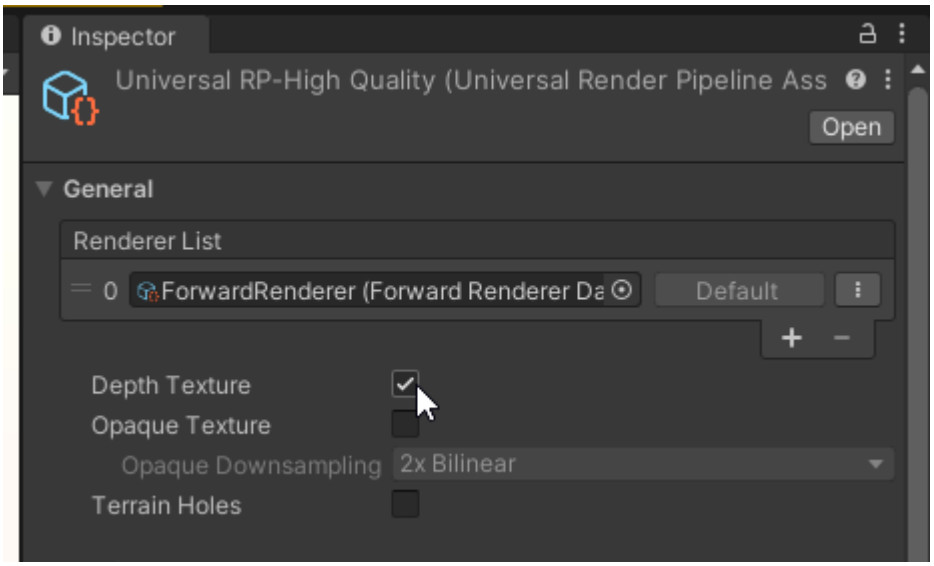

Package Manager
Packages: In Project
Sort: Name
Unity Technologies
Burst 1.3.7
Cinemachine 2.6.3
Collections 0.14.0-preview.16 Preview
Core RP Library 10.4.0
Custom NUnit 1.0.6
JetBrains Rider Editor 2.0.7
Jobs 0.7.0-preview.17 Preview
Mathematics 1.2.1
Newtonsoft Json 2.0.0-preview Preview
Performance testing API 2.3.1-preview Preview
Searcher 4.3.1
Shader Graph 10.4.0
Sysroot Base 0.1.19-preview Preview
Sysroot Linux x64 0.1.14-preview Preview
Test Framework 1.1.24
TextMeshPro 3.0.1
Timeline 1.4.6
Toolchain Win Linux x64 0.1.19-preview Preview
Unity Collaborate 1.3.9
Unity Recorder 2.5.4
Unity UI 1.0.0
Universal RP 10.4.0
Visual Studio Code Editor 1.2.3
Visual Studio Editor 2.0.7
Last update Apr 3, 18:41
Jobs Preview
Unity Technologies
Version 0.7.0-preview.17 - October 29, 2020
View documentation · View changelog · View licenses
The Jobs package provides additional job types like IJobParallelForBatch, IJobParallelForDefer, and IJobParallelForFilter.
Registry Unity
Preview Packages are in the early stages of development and not yet ready for production. We recommend using these only for testing purposes and to give us direct feedback.
Read more
Dependencies
Update to 0.8.0-preview.23
Remove

2. If your project is using URP 7.3.1, open Package Manager, upgrade to URP 7.4.1 or above (**7.3.1 is not high enough for NiloToon to work correctly**!)



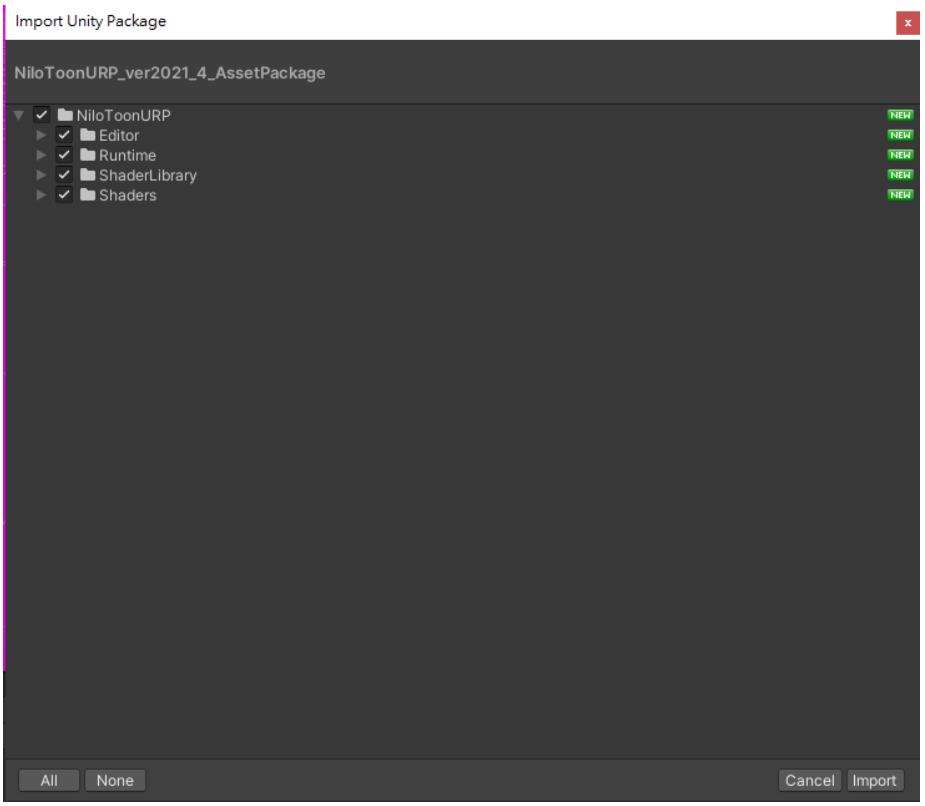
3. If you are using URP 7.x.x(Unity 2019.4), select all your Universal Render Pipeline assets(usually called **UniversalRP- xxx Quality)**, enable URP's Depth Texture.
(You don't need to do anything if you are using URP 10.4.0 or above)





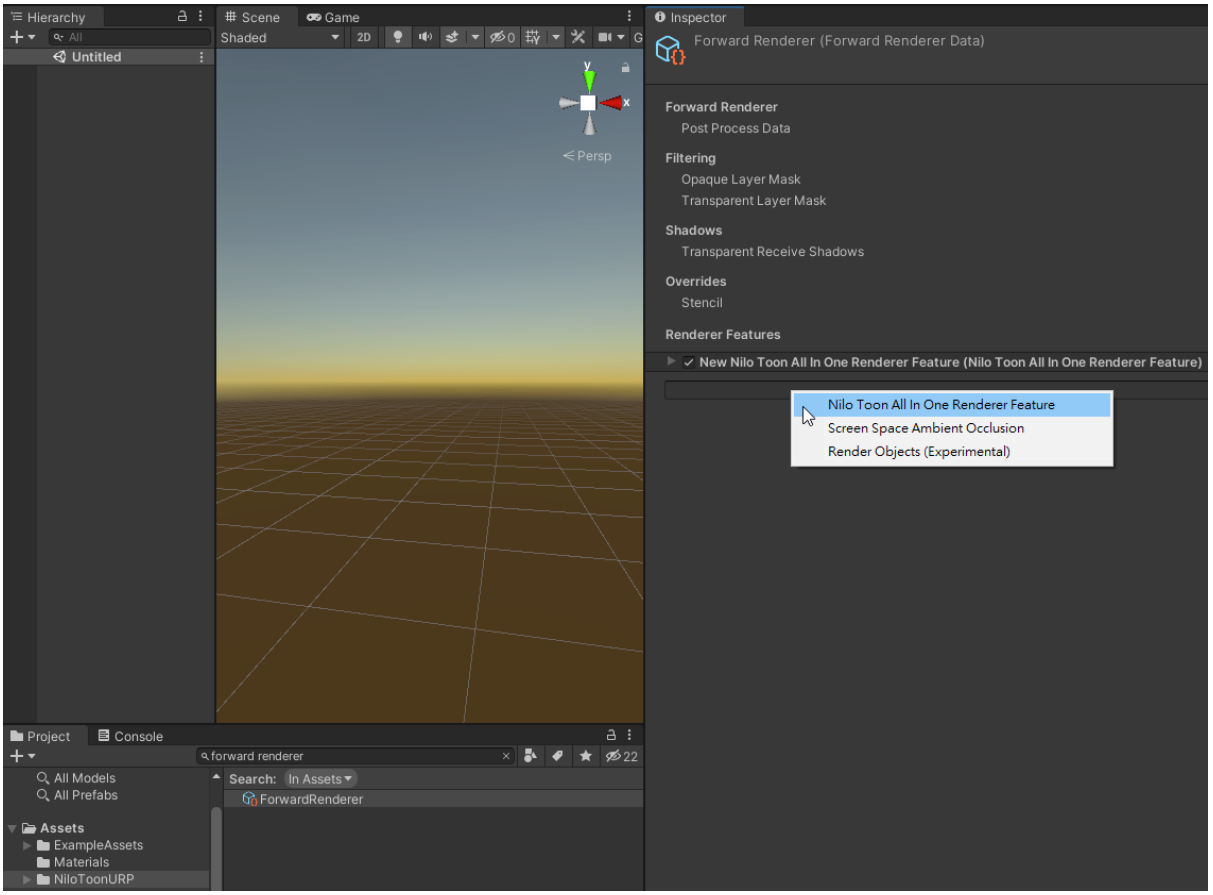
4a. Delete your project's NiloToonURP folder first if you to want to avoid all update problem after update

4b. Import NiloToonURP_[version].unitypackage

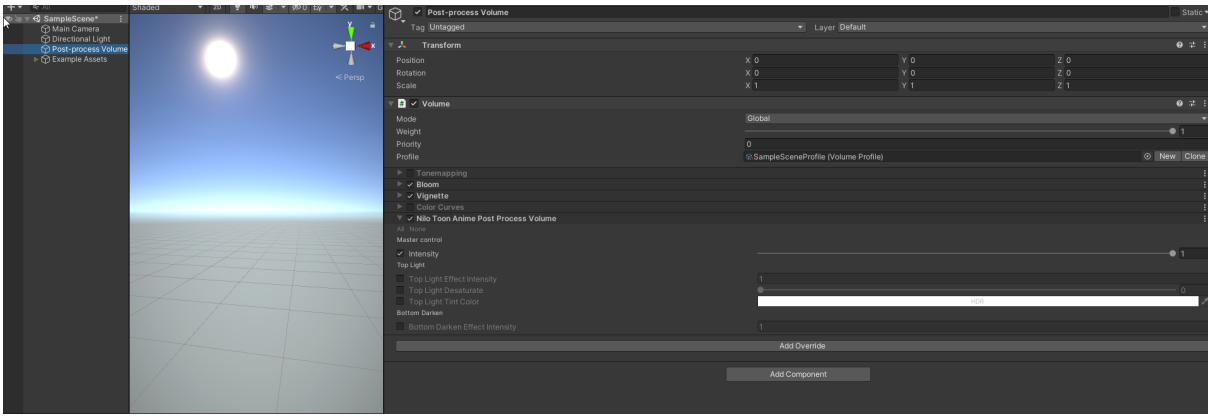


4c. Restart Unity if error appeared

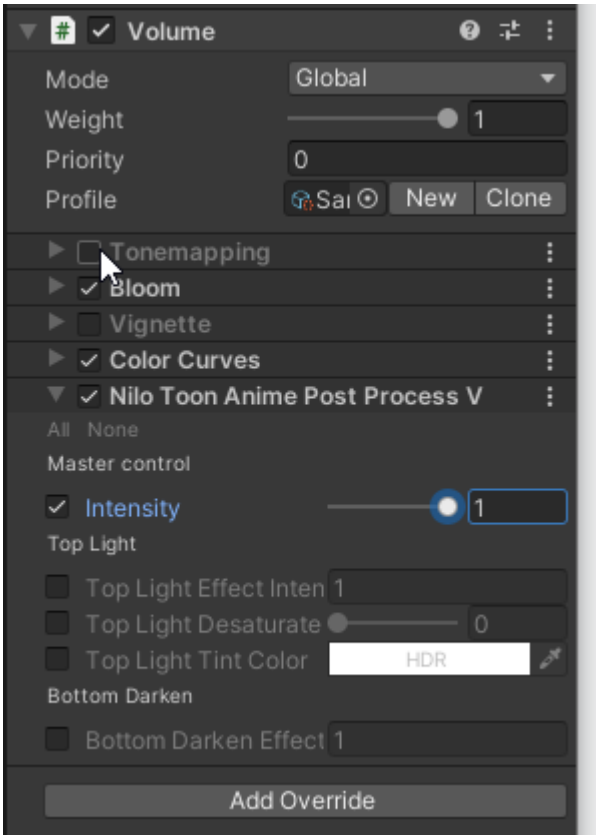
5. Select all your URP ForwardRenderers, Add one NiloToonAllInOneRendererFeature to them
(don’t add multiple NiloToonAllInOneRendererFeature to one ForwardRenderer)



6. (optional)Find your scene's Post-process Volume, Add NiloToonAnimePostProcess volume to it, enable intensity control and drag it to 0.5~1 (you can add other NiloToon's volume to it also)



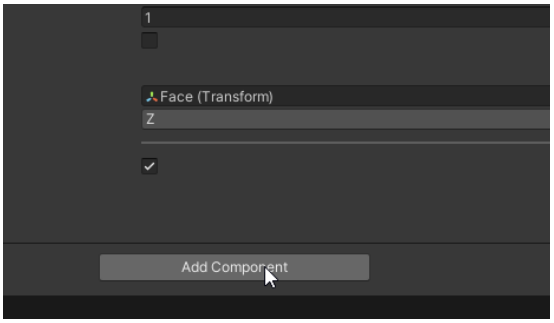
7. (optional)Disable Post-process Volume's **Tone mapping**, technically there is no conflict with NiloToon, but URP's Tone Mapping usually destroys your character's NPR color design.
You can keep it turned on if you know tone mapping is needed in your project.

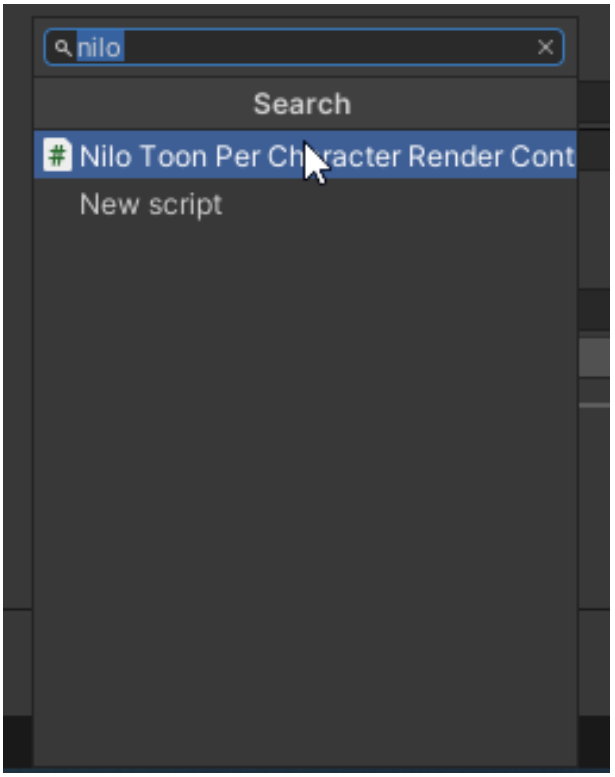


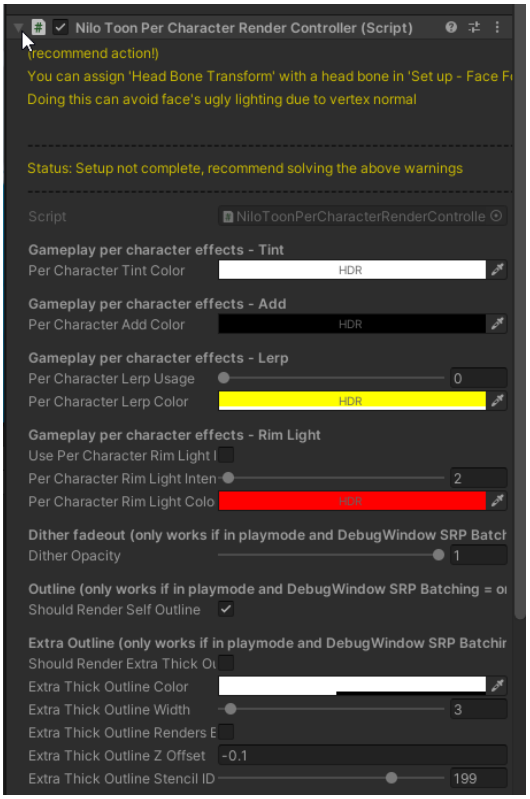
6. per project set up now DONE

How to set up a new character in your project (using the auto setup button)?

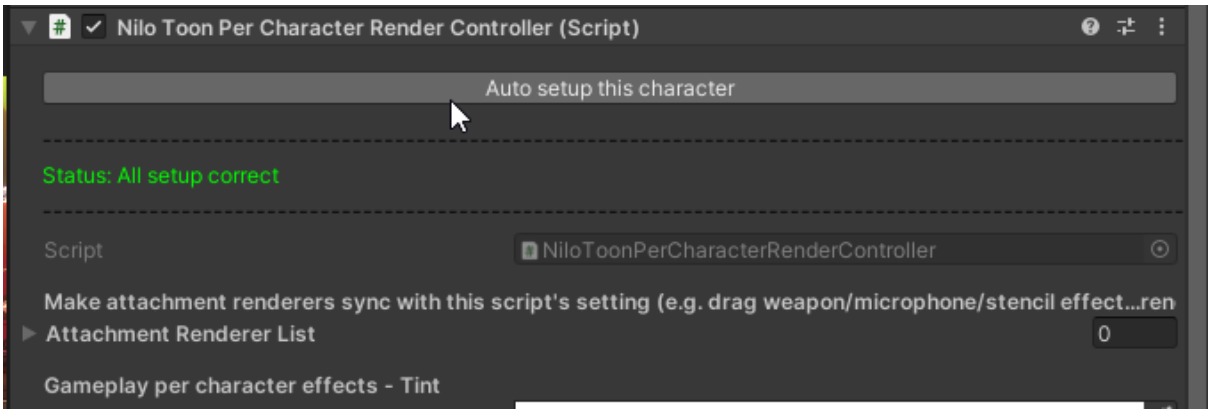
1. Select your character prefab's root (A GameObject that includes all renderers, usually it is not just the root bone in the rig).
Attach a script NiloToonPerCharacterRenderController (you can type **nilo per** to find it).







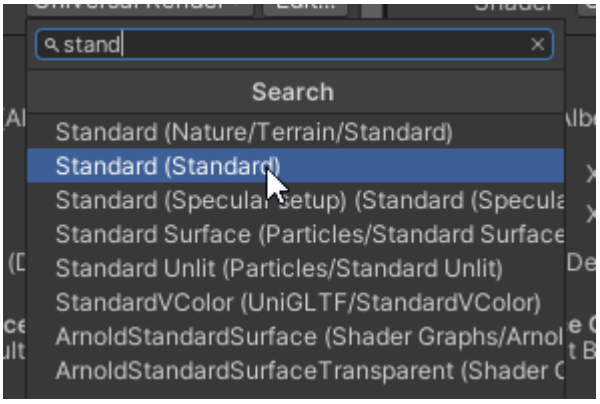
2. Click this button, this will handle material and shader conversion for you



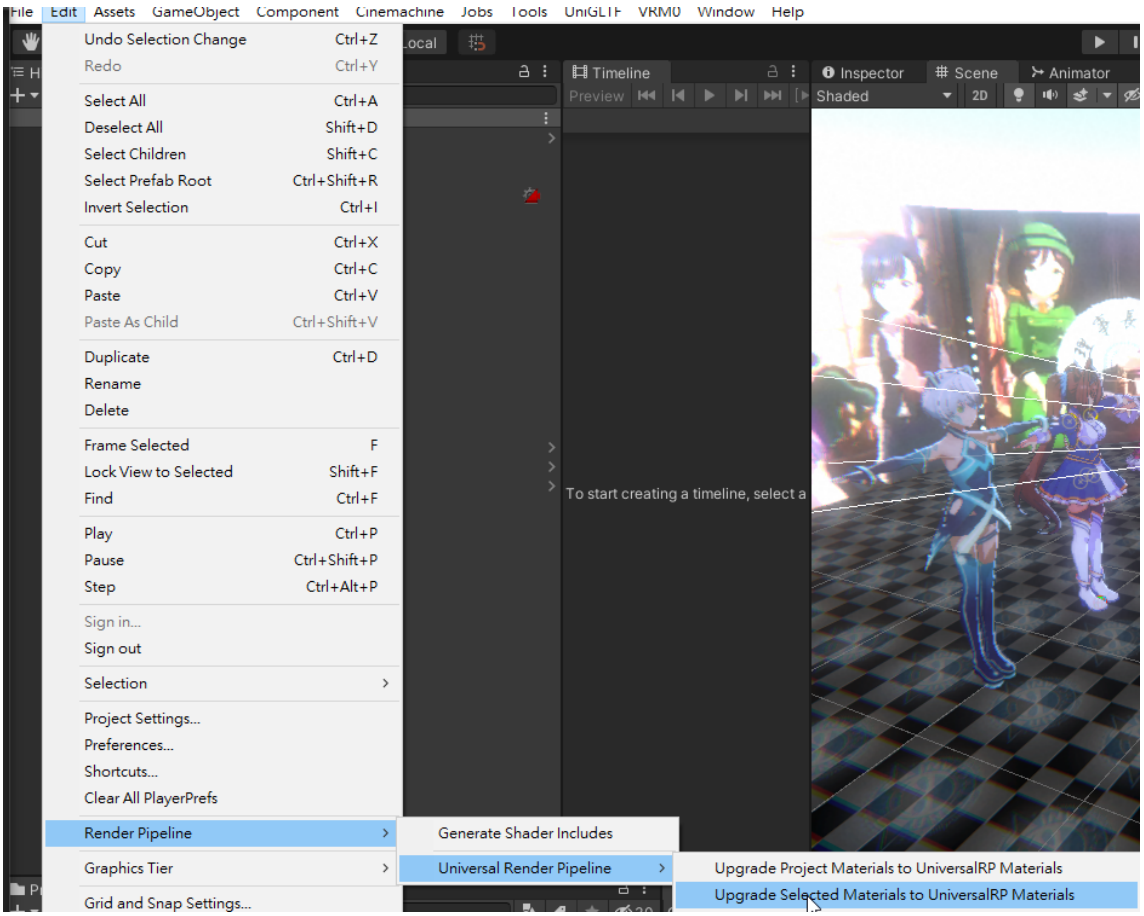
3. you should already see your model set up correctly, if you want to improve the result, continue **How to set up a new character in your project (manually)?** section 3.1

How to convert VRM(MToon) / RealToon materials to using NiloToon manually? (you can skip this section if your character materials are already using URP's naming convention shaders, or you are setting up character using Auto setup button in the above section)

1.select all character VRM(MToon) / RealToon materials
2.switch material's shader to **Standard(Standard)**



3.click this button

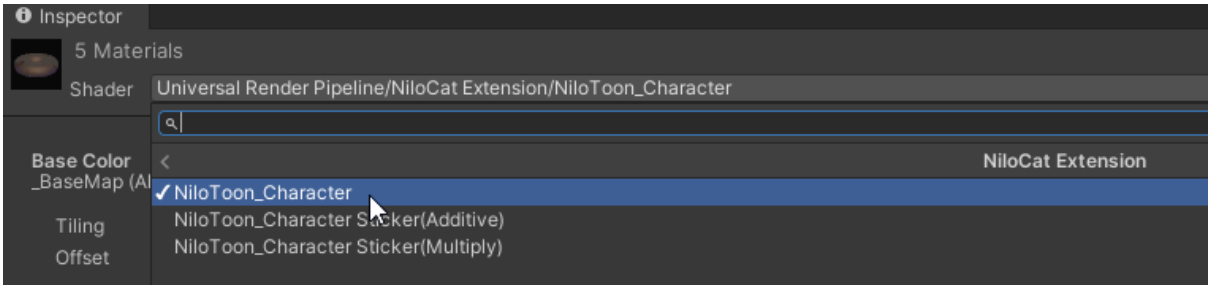


4.continue the steps in the following **How to set up a new character in your project?** section

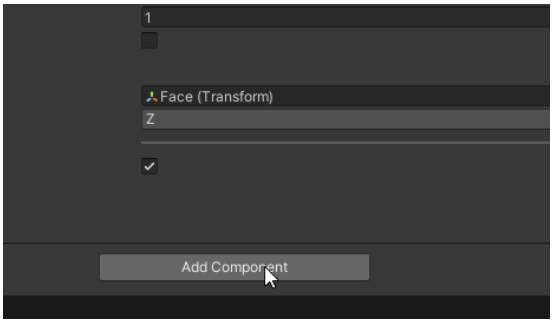
If you skip the above steps and switch material to NiloToon character shaders directly, you will lose all texture references on the material (become all white).

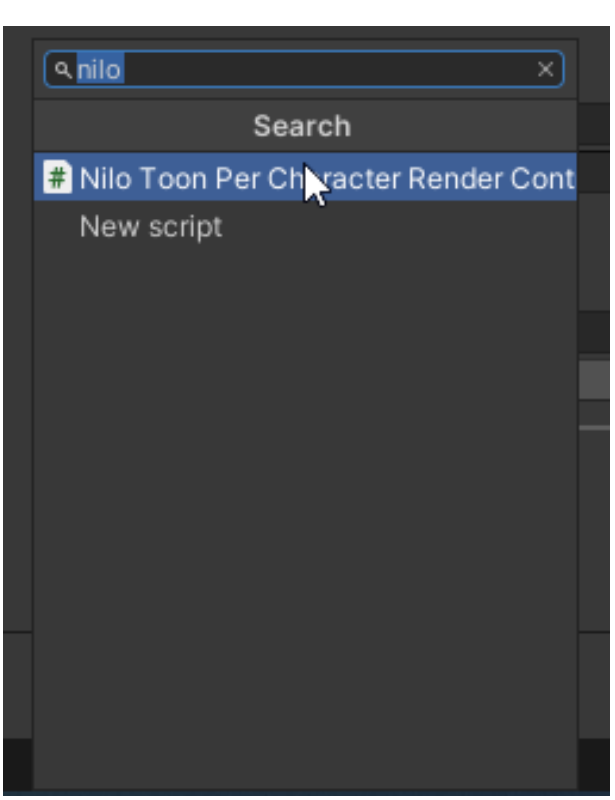
How to set up a new character in your project (manually)?

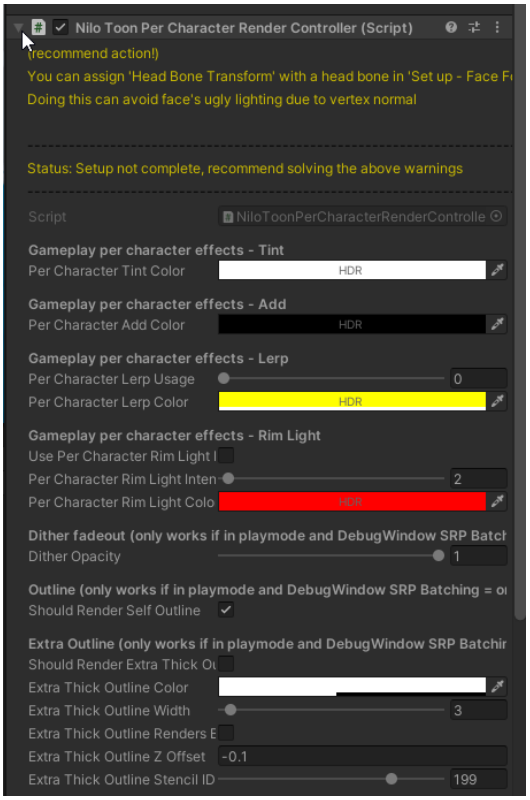
1.1 Change all materials of your character to use NiloToon_Character shader, you can type **nilo** in the shader search field to find it



2.1 Select your character prefab's root (A GameObject that includes all renderers, usually it is not just the root bone in the rig).
Attach a script NiloToonPerCharacterRenderController (you can type **nilo per** to find it).

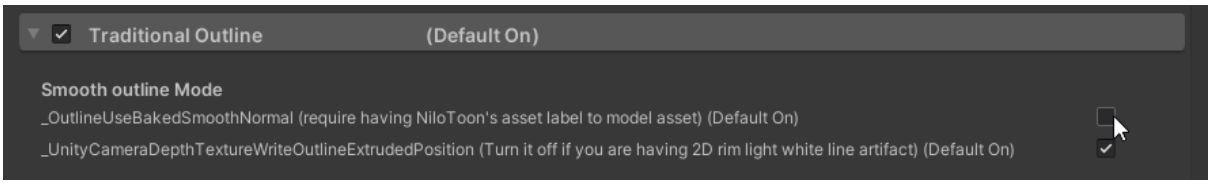






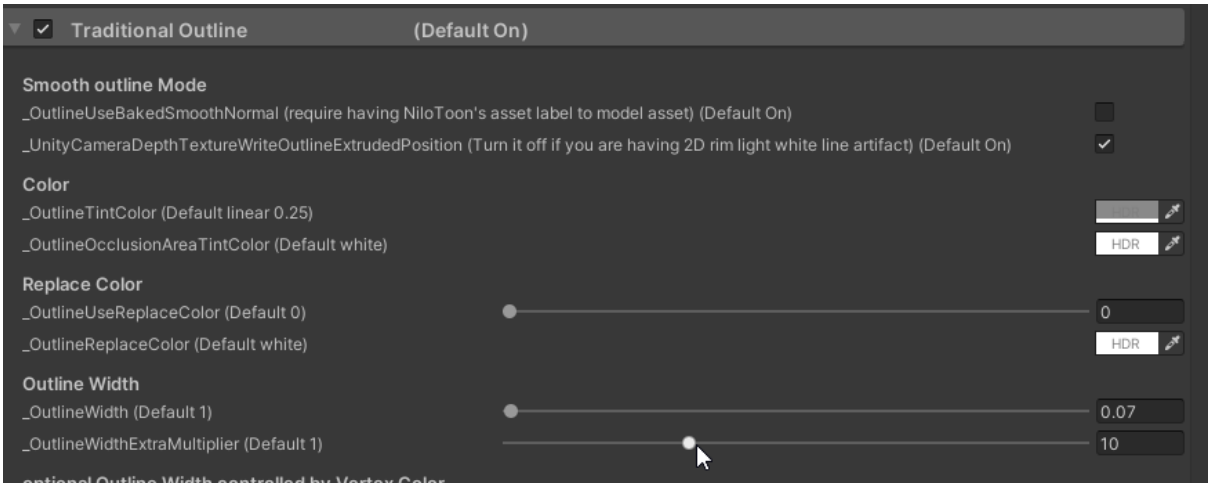
At this moment your character should render partially correct already (not pure black)!

3.1 For .vrm file generated character prefabs, since no .fbx is generated, you should always disable **_OutlineUseBakedSmoothNormal** toggle in all materials of that character in the **Traditional Outline** section

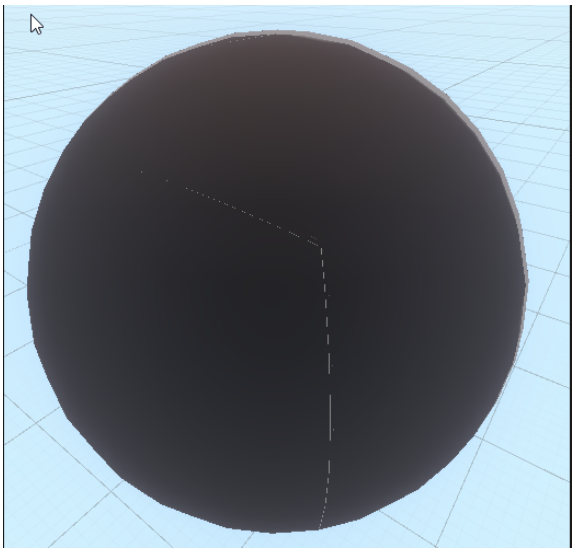


3.2 If you want to hide ugly outline artifact, try increase _OutlineZOffset

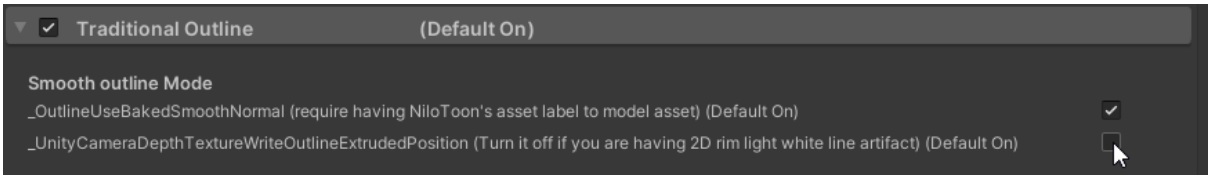
3.3 If you can’t see outline, make sure in all your material’s outline section, **_OutlineWidthExtraMultiplier** is big enough, because **_OutlineWidth** will preserve values saved in the past, sometimes preserved **_OutlineWidth** is not directly usable if you are switching from another toon shader(e.g. VRM MToon or RealToon) to NiloToon shaders.



3.4 If you see weird white line on your material,

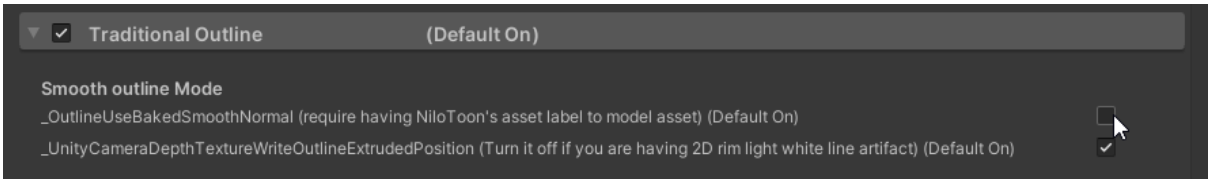


you can try disable **_UnityCameraDepthTextureWriteOutlineExtrudedPosition** in the Outline section of the material



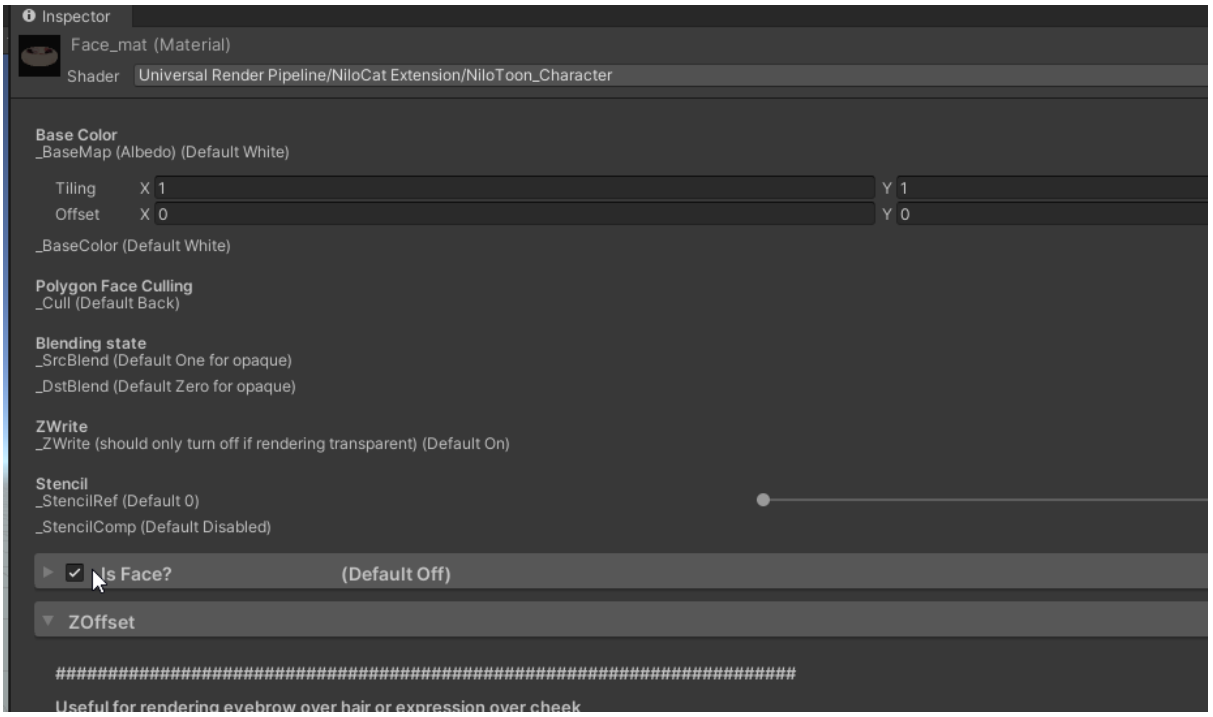
disable **_UnityCameraDepthTextureWriteOutlineExtrudedPosition** will solve the problem, but material will not write outline's depth into URP's _CameraDepthTexture, which makes post process effect like Depth of Field not correct on outline pixels.

3.5 If you endup still having an outline problem, you can try disable _OutlineUseBakedSmoothNormal



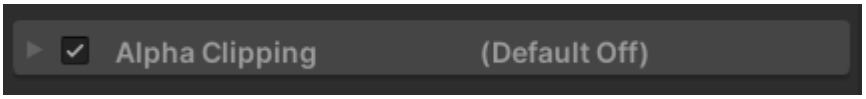
The outline will always render correctly if you turn it off, but ugly breaking outlines may appear at corners of a polygon(for example, corners of a cube).

4.1 Find all face material, turn on “Is Face?” in the material inspector, else turn it off



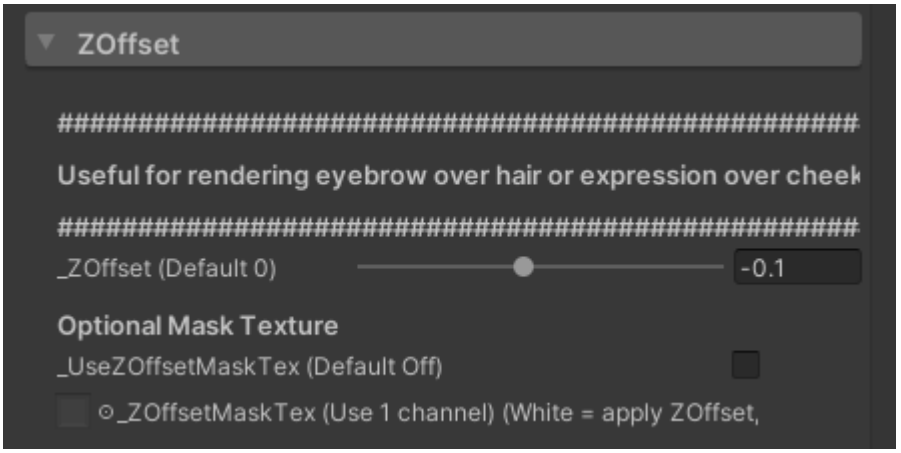
4.2 Find all skin material, turn on “Is Skin?” in the material inspector, else turn it off. Enable it will make skin’s shadow color use an override color for skin

4.3 If the base texture contains alpha data for alpha clipping, enable Alpha Clipping toggle

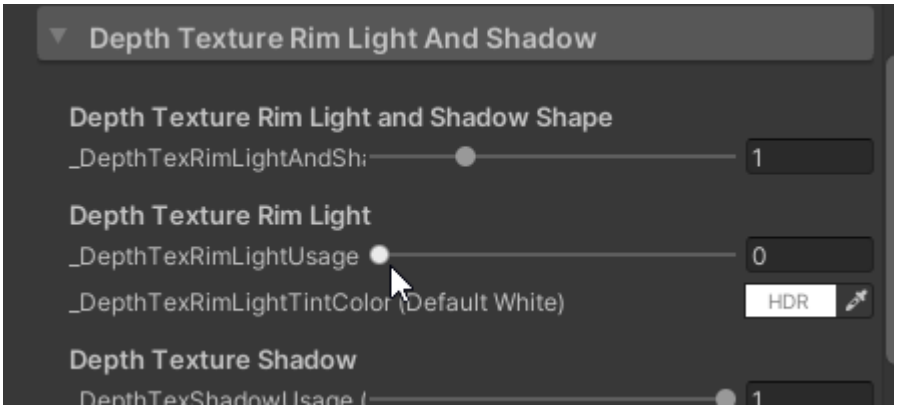


4.4 If the material should be double side, turn Cull to Off

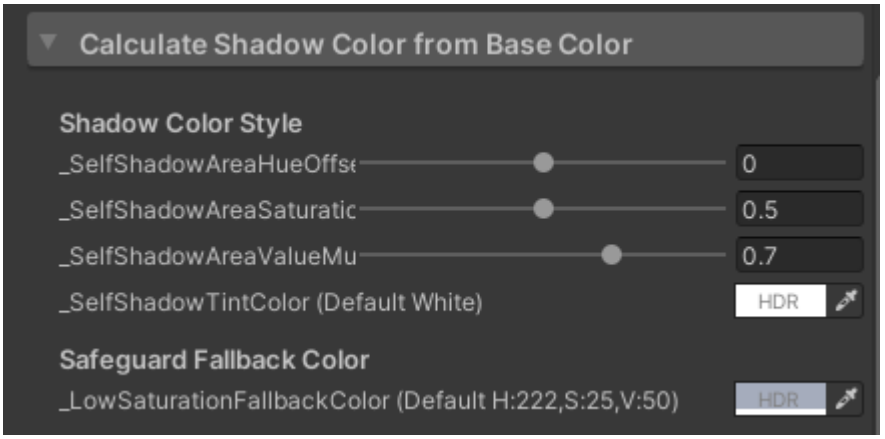
4.5 (optional)If the material is an eyebrow material, you can drag _ZOffset to around -0.1 or more, this will make the eyebrow render over hair, but it may make the rendering become white. (*If you want to render semi transparent eyebrow on hair, you can skip this step and see semi transparent eyebrow section in FAQ)



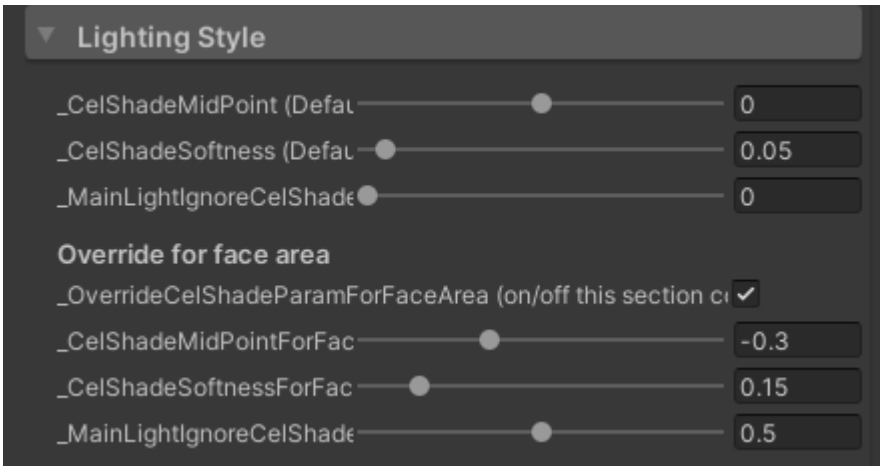
(optional)if your eyebrow material becomes pure white after editing _ZOffset, you can disable depth texture rim light by dragging _DepthTexRimLightUsage to 0, which will solve this problem



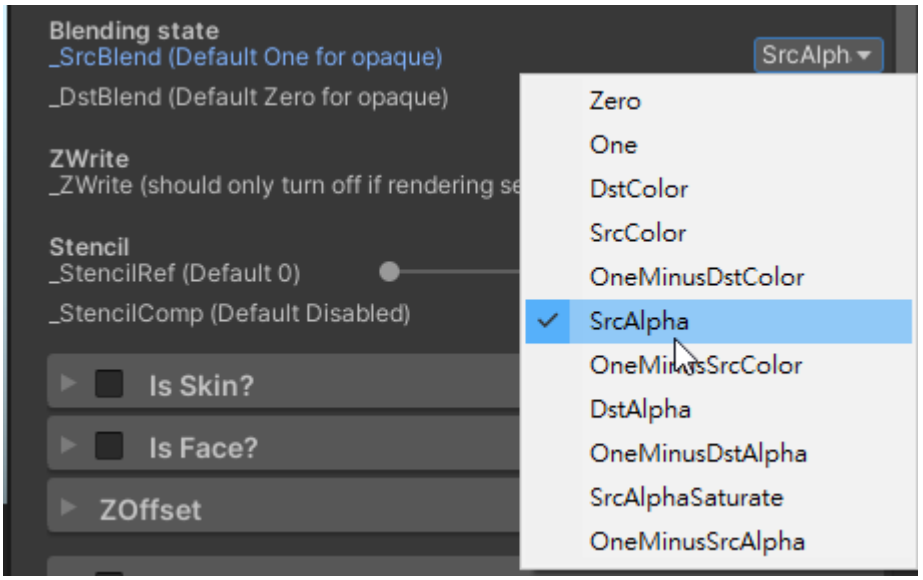
4.6 If you don’t like the color of the shadow, you can control shadow color in Calculate Shadow Color from Base Color section

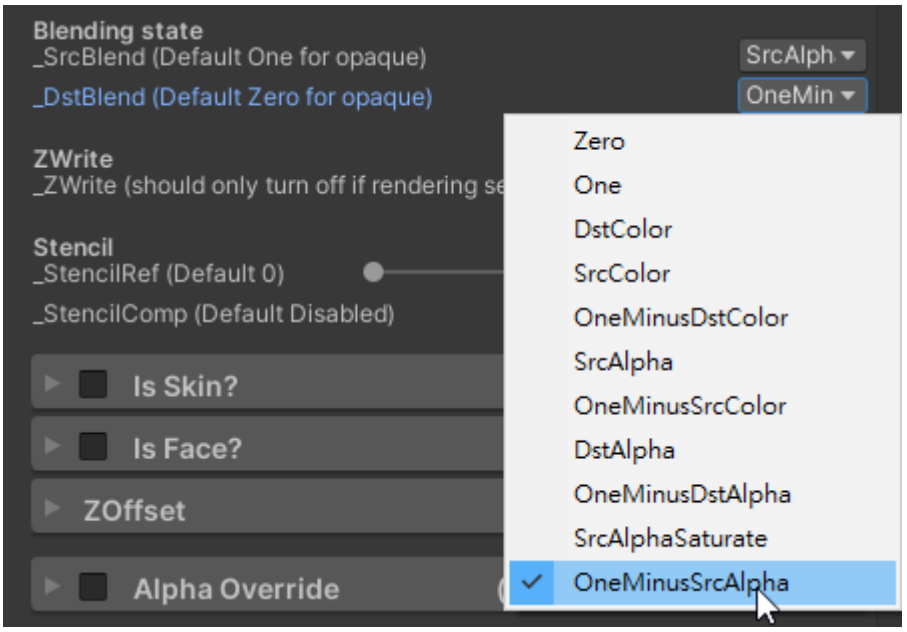


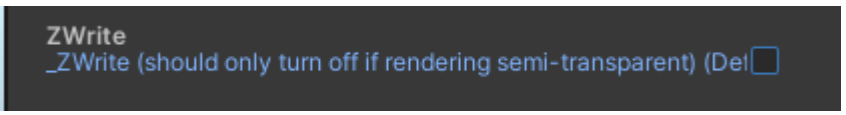
4.7 If you don’t like the style of the lighting, you can control shadow style in Lighting Style section



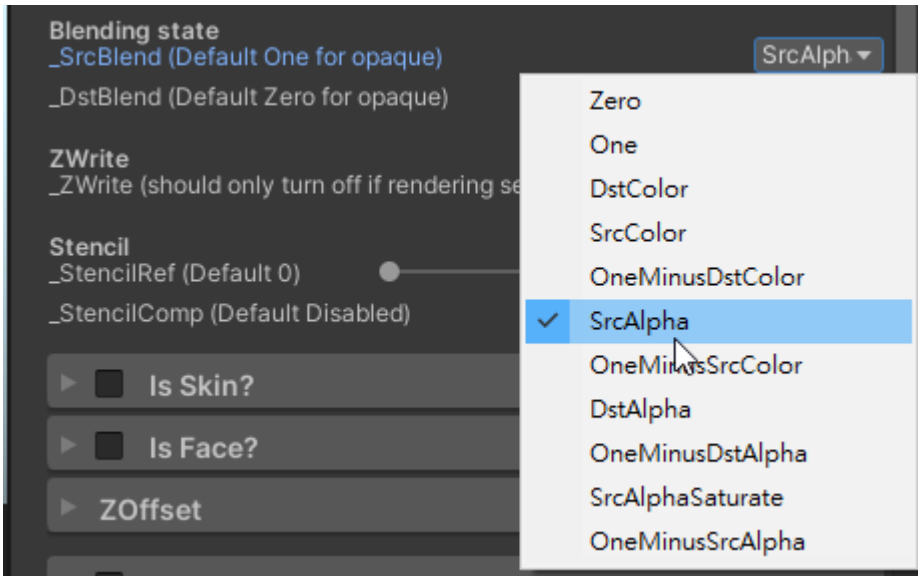
4.8a If the material should be semi transparent(**without** outline), use the following settings:
_SrcAlpha = **SrcAlpha**
_DstBlend = **OneMinusSrcAlpha**
_ZWrite = **off**
Outline = **off**
Render Queue = **Transparent**(3000)

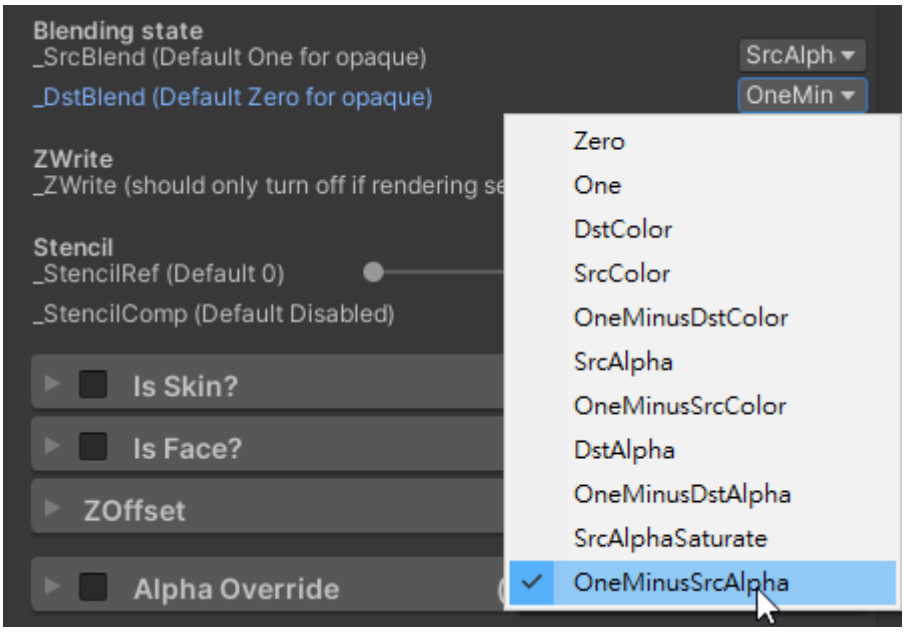


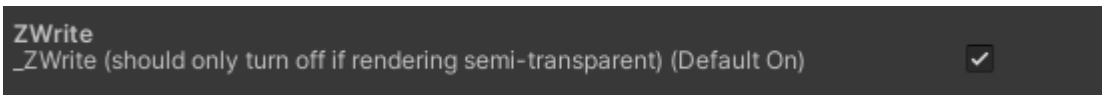




4.8b If the material should be semi transparent(**with** outline), use the following settings:
_SrcAlpha = **SrcAlpha**
_DstBlend = **OneMinusSrcAlpha**
_ZWrite = **on**
Outline = **on**
Render Queue = **2499**

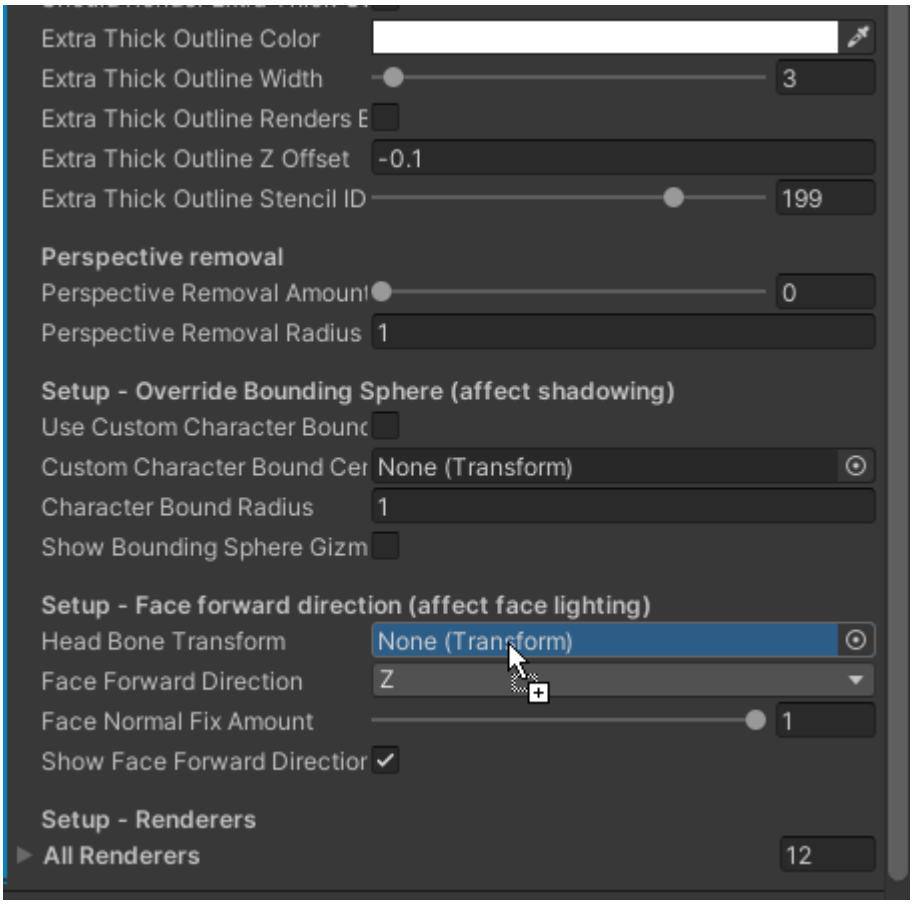




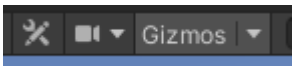


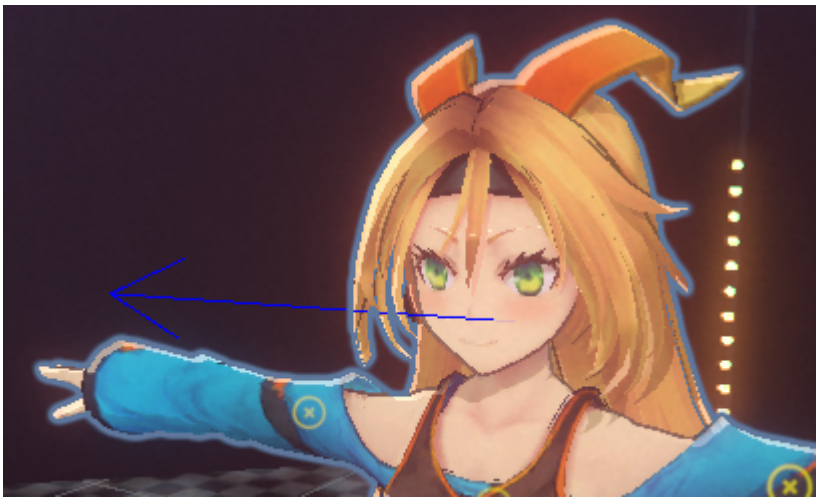
***But if the blending background is SkyBox, result may flicker/wrong**

5.1 Drag character's head bone to Head Bone Transform slot

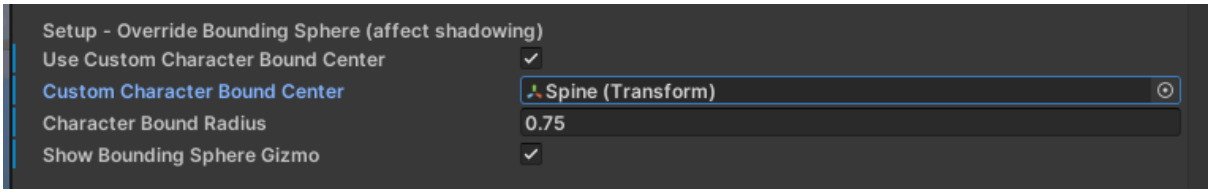


5.2 edit FaceForwardDirection until the 3D blue arrow is following character face's forward direction (you need to enable Gizmo to see the blue arrow)





5.3 Drag character's hip / pelvis bone to CustomCharacterBoundCenter slot
5.4 edit the radius until the red gizmo sphere tightly contain the character



6. per character setup DONE
you can now play the scene and try editing the param of:

- NiloToonPerCharacterRenderController (a script on the root of your character)
- character material's setting
- Post-process Volume's NiloToonAnimePostProcess setting
- Post-process Volume's NiloToonCharacterRenderer setting

FAQ:

How to update using NiloToonURP_[version].unitypackage?

1.commit all your changes in version control / backup your project
2.Delete NiloToonURP folder in your project
3.import NiloToonURP_[version].unitypackage
4.restart Unity if error appeared
5.(optional)open NiloToonCharacter_ExtendDefinesForExternalAsset.hlsl, re-enable the settings if you need them

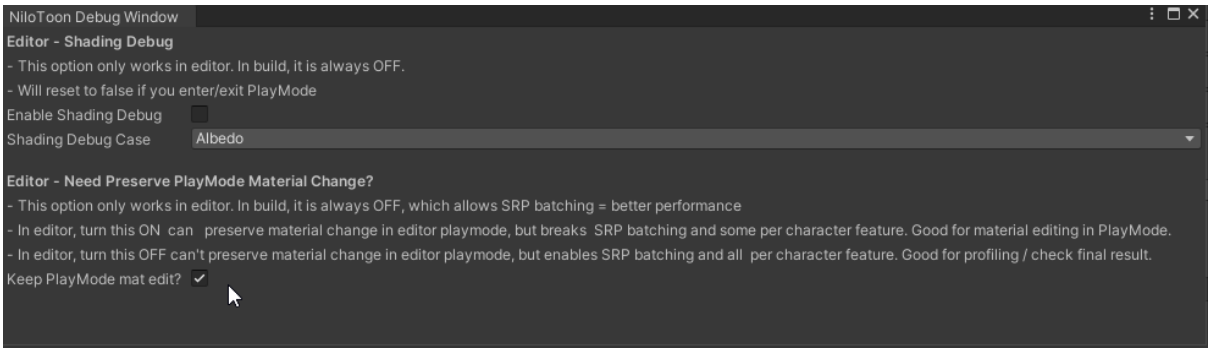
How to make NiloToonURP support AssetStore asset (e.g.VertExmotion)?

1.open NiloToonCharacter_ExtendDefinesForExternalAsset.hlsl
2.enable the setting to support that asset(by changing 0 to 1)

*if your target asset's support does not exist in your version, you can always contact us!

In Play mode, how to keep my character material changes?

open Window/NiloToonURP/Debug window, enable "Keep PlayMode mat edit?", but some features may be disabled if you enable this mode, usually **material artist** will want to enable this toggle when editing materials.
(By default, material instance will be created, which makes your change in Play mode NOT saved)



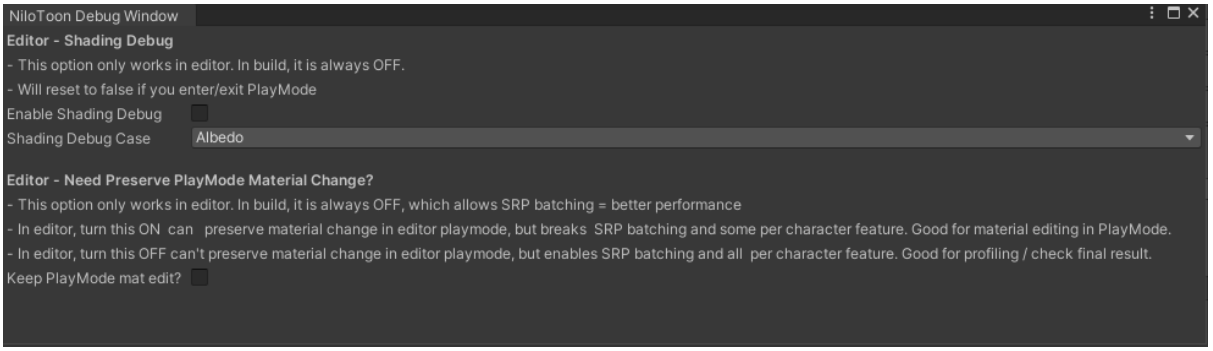
Is it normal that it takes hours to build (compiling shader variants)?

If you are doing your first build for a platform / first build after shader update, yes, it may take a long time.

*if it is still slow after the first build, it is not normal, contact us!

Why Editor always weirdly force focus to the scene window?

Try closing the NiloToonURP debug window first, it will solve the issue.

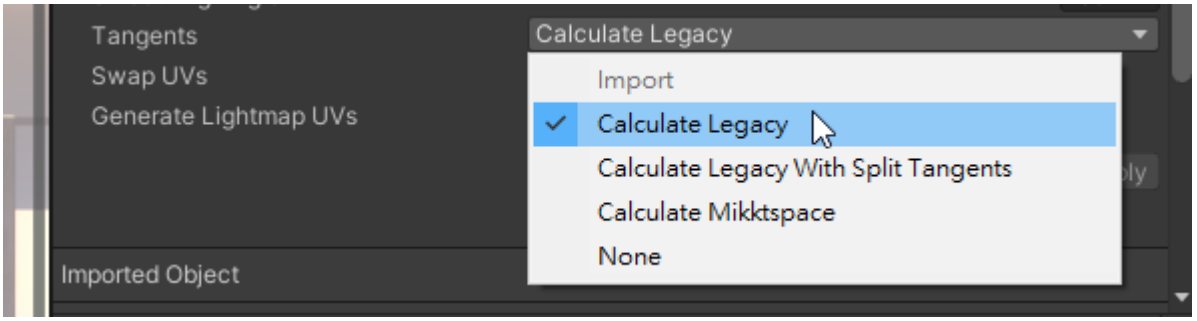


I can't focus on text field of material inspector

it is a known issue: LWGUI text(float) field under foldout group can't be focus in material inspector
https://github.com/Jason-Ma-233/JasonMaToonRenderPipeline/issues/3

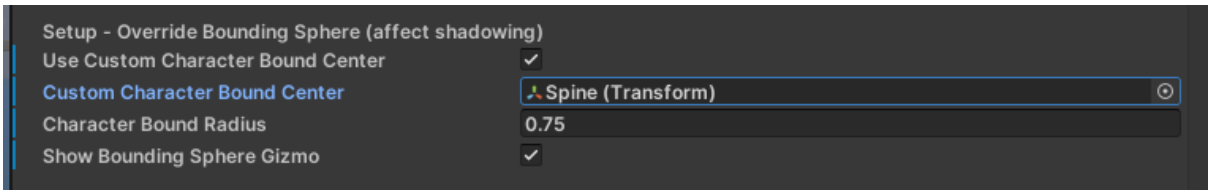
I see a “index out of bound” red error when importing a model

make sure your model has valid normal and tangent
(if your model has tangents in .fbx, use Import)
(if your model don’t have tangents in .fbx, even tangents calculated by Unity will help, using Calculate Legacy)



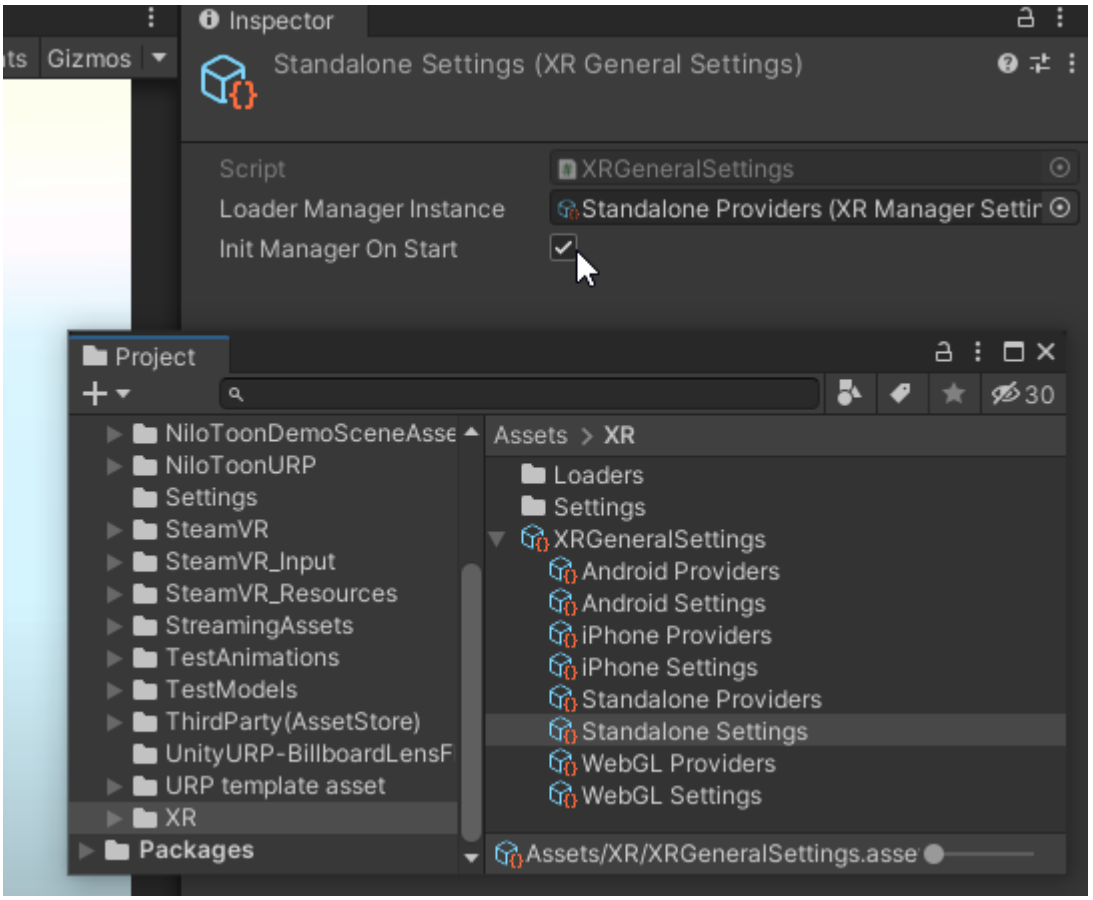
I see character average shadow fade in and out wrongly when camera moves

make sure per character script's bounding sphere is set up correctly if needed, make the red gizmo sphere contain the character tightly



How can I enable PCVR(editor play mode) in the demo project?

- find **Assets/XR/XRGeneralSettings** in project, click **Standalone Settings**, enable **Init Manager On Start**



- make sure your VR device(SteamVR) is ready
- open any NiloToon's scene
- click play, camera movement is now controlled by your headset
- you can still change scene in play mode, using your **mouse**(there is no control from the VR controllers)
- if you want to turn off VR, disable **Init Manager On Start**

Some shader features are missing in VR?

We disabled features below temporarily(if XRSettings.isDeviceActive) due to Single Pass Stereo rendering (Double-Wide rendering) issues in VR, we are solving them now.

- Anime PostProcess
- Character Self Shadow

Once we solve any of them, we will enable it again in VR, you don't need to do anything, just update to the lastest NiloToonURP.unitypackge will do the job.

Is there a summary of all NiloToonURP UI?

All UI images folder (may be not always the latest version):
https://drive.google.com/drive/u/3/folders/1SlOhvqCZrDBRkSgzwW0ZIzAkDqonpa26

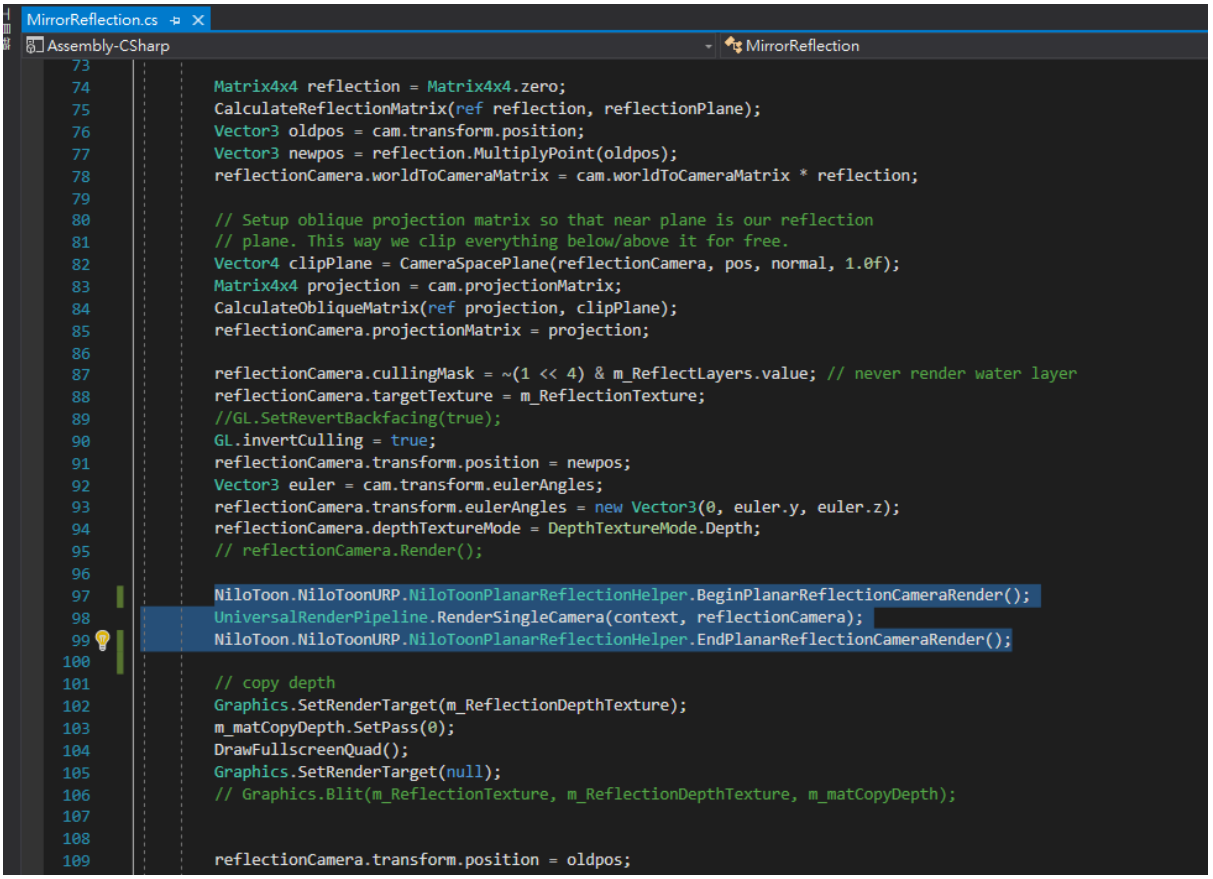
The rendering is not correct in OpenGLES3.0 or OpenGLES2.0

Since the shader needs SRP batcher, the minimum OpenGLES version is 3.1, not 3.0

When rendering NiloToon shader in planar reflection camera, some part of the model disappeared

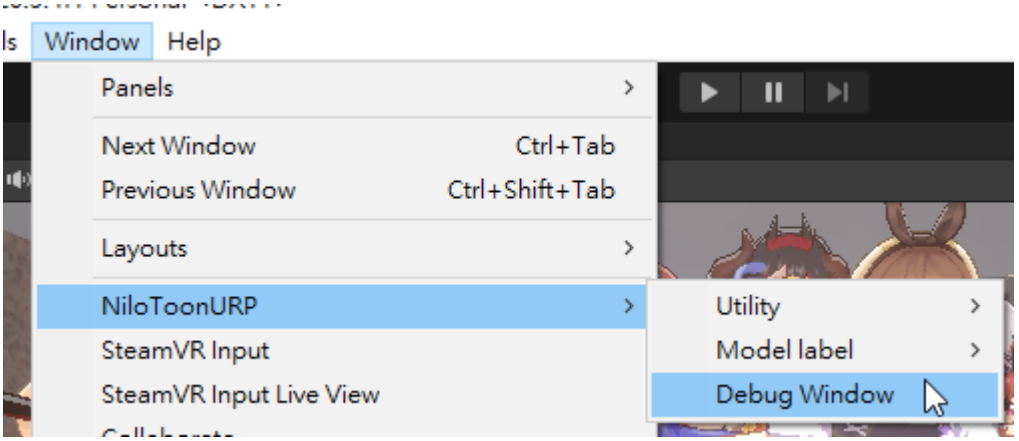
Add the following 2 lines in your reflection camera script:

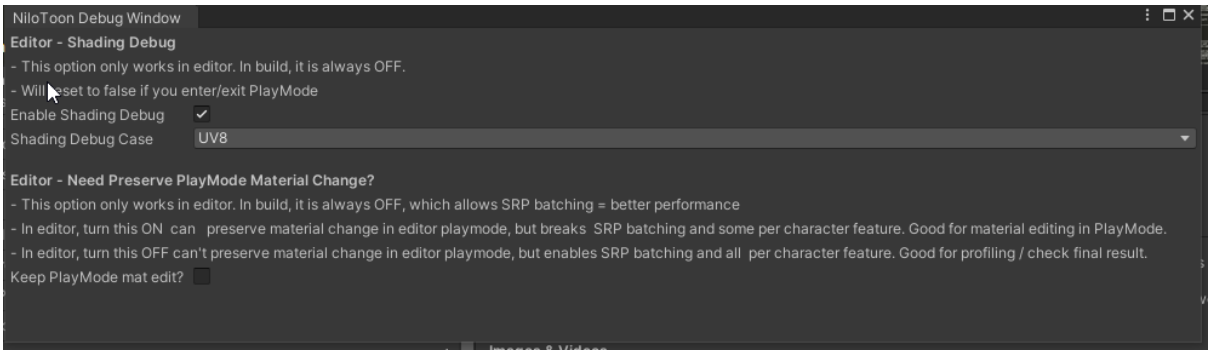
NiloToon.NiloToonURP.NiloToonPlanarReflectionHelper.BeginPlanarReflectionCameraRender();
UniversalRenderPipeline.RenderSingleCamera(context, reflectionCamera);
NiloToon.NiloToonURP.NiloToonPlanarReflectionHelper.EndPlanarReflectionCameraRender();

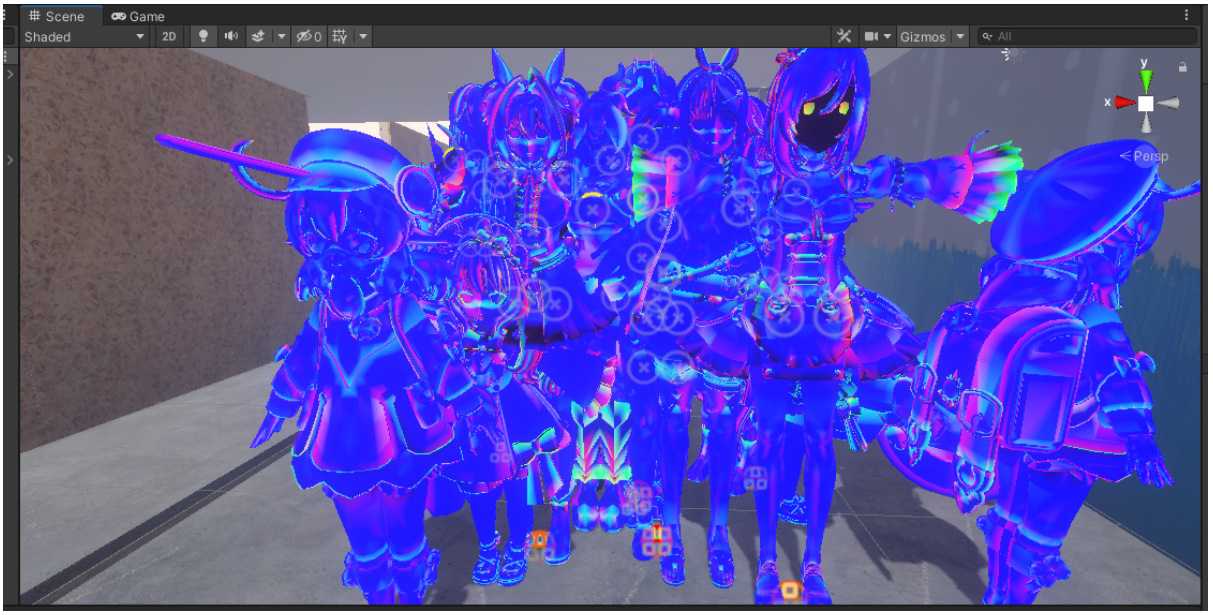


How to know if the model's smooth outline is generated correctly or not?

If you debug uv8 as color, and all the character's rendering becomes blue and purple (becomes colors like normal map, NOT red yellow and green), the smooth outline is generated correctly already.

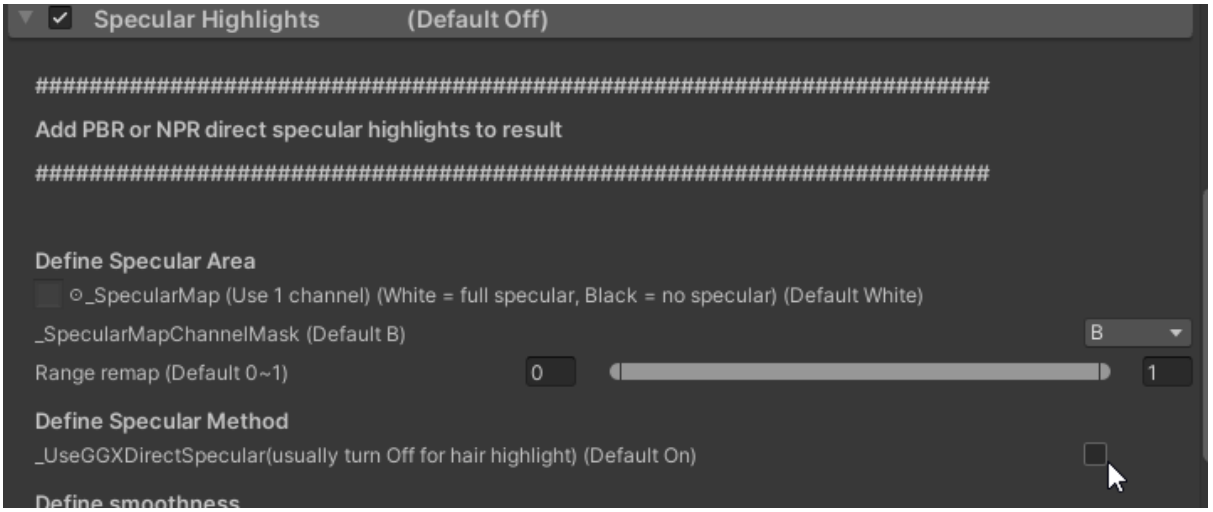






What are the usual settings for hair specular, if I have a specular mask?

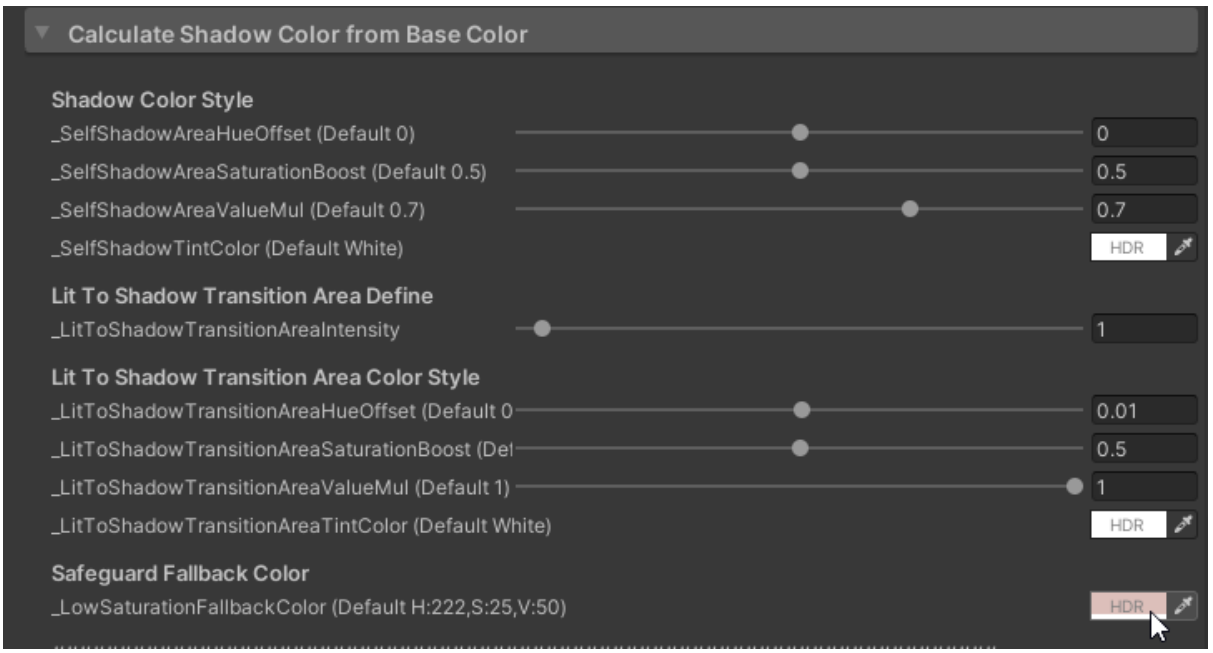
Usually disable GGXSpecular will provide better toon specular results, since it is easier to control artistically.

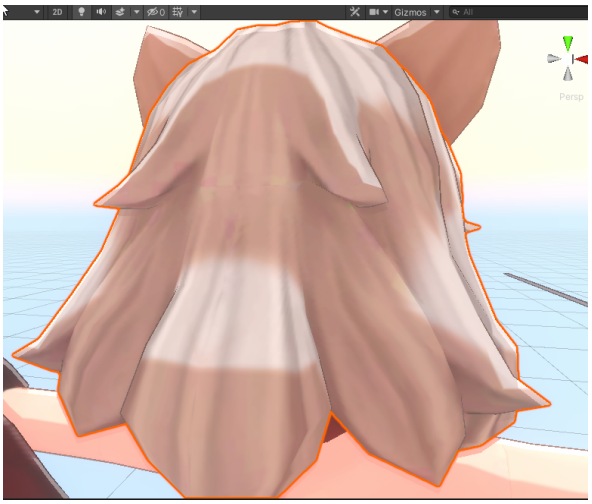


There are strange color artifacts only in the shadow area, how to remove it?

This problem usually exists when _BaseMap's saturation is low(white/gray color).
To solve it,

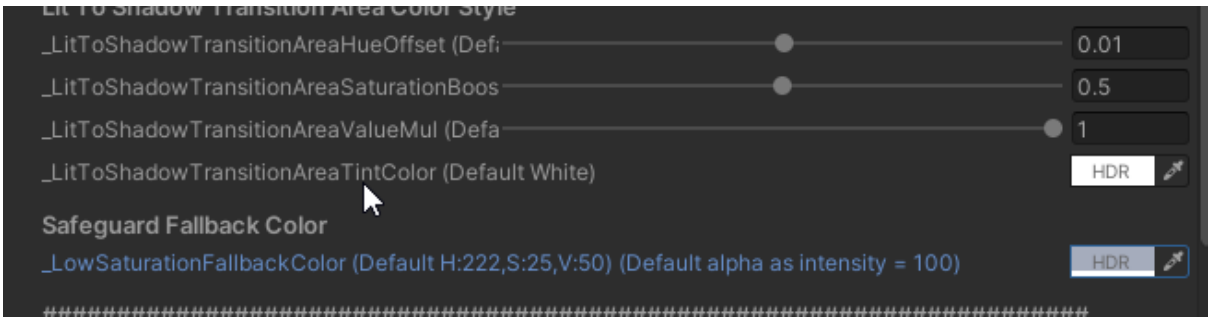
1)You can try using **high quality** compression for that color texture (_BaseMap), or **None** compression if you don't care about performance.
2)Set a better **_LowSaturationFallbackColor** in material to avoid artifacts





3) if the problem can’t be solved,

set **_SelfShadowAreaSaturationBoost** to 0

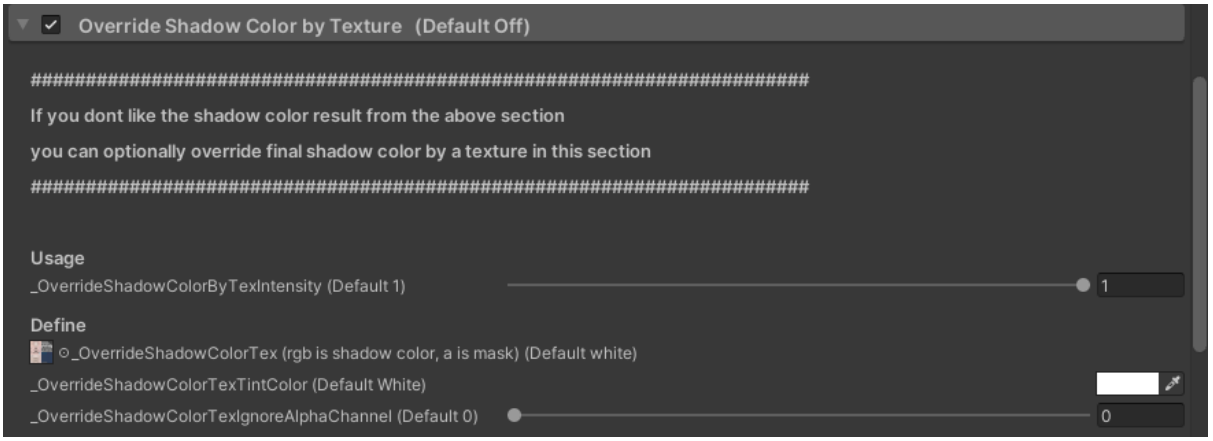


set **_LowSaturationFallbackColor**'s alpha to 0

4)Doing step (3) will make the shadow gray, but will not produce shadow color artifacts anymore. Then you can use other options to edit shadow color.

(option 1) Setting a uniform shadow tint color

(option 2) setting shadow color by a texture

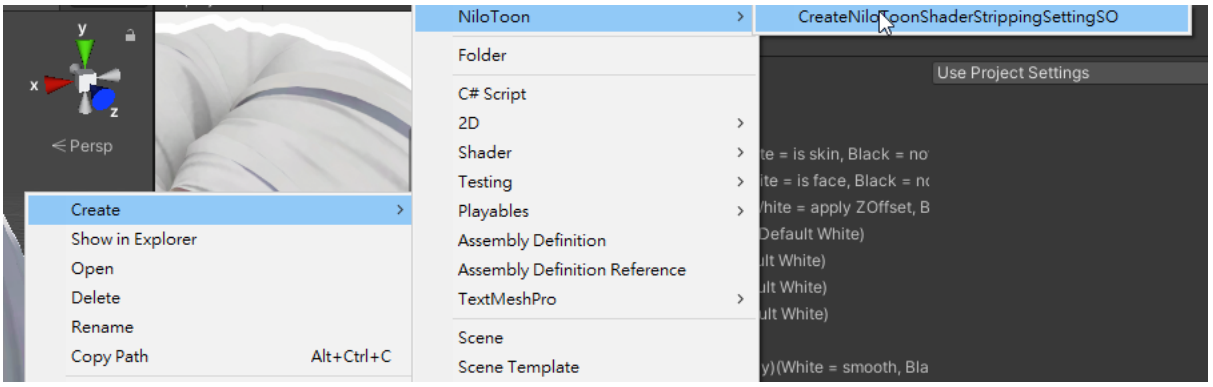


NiloToon shader is using too much memory, how to reduce it?

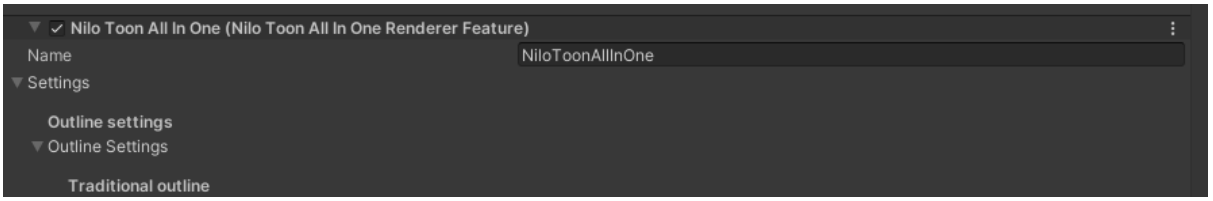
Similar to UTS2 or RealToon, NiloToonCharacter.shader use many
#pragma multi_compile _ _FEATURE
and
#pragma shader_feature_local _FEATURE
in shader to support different use cases.

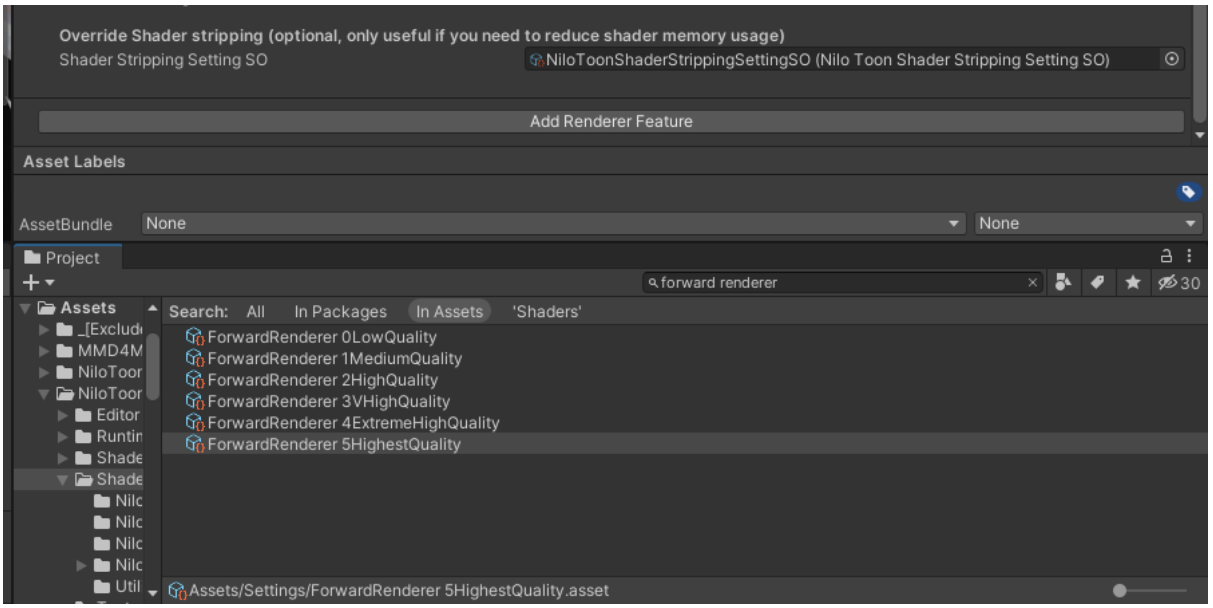
Shader memory usage will be 2^n, which goes up very fast.
The following page will introduce solutions to keep shader memory usage low.

To reduce shader memory usage of multi_compile:
1)right click in the project window, create a NiloToonShaderStrippingSettingSO

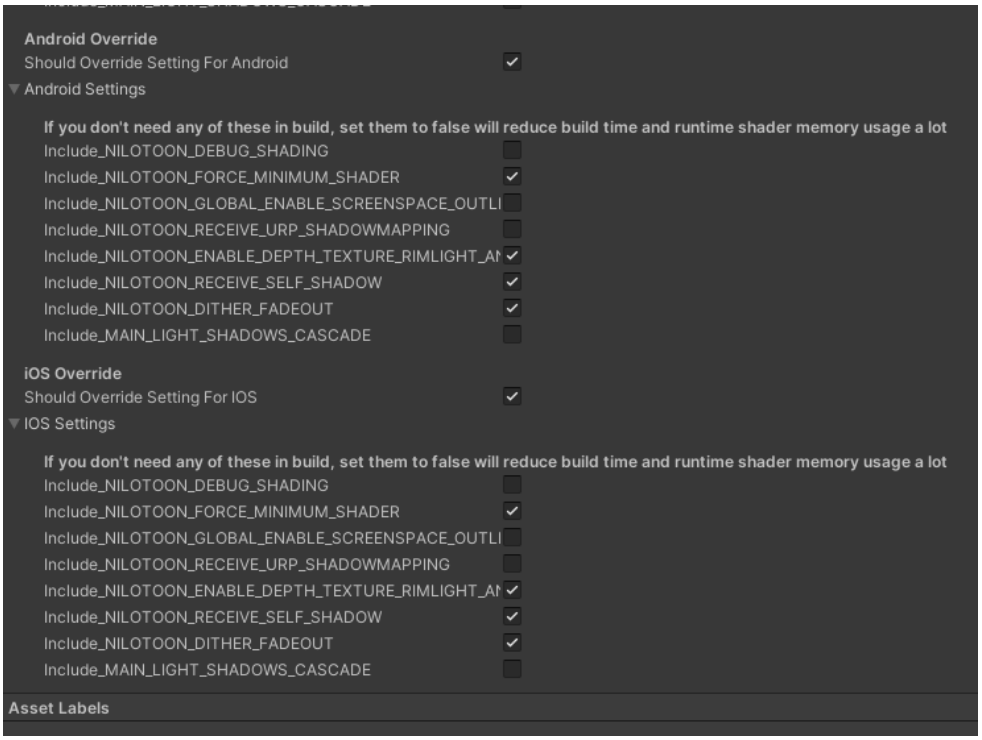


2)drag that NiloToonShaderStrippingSettingSO to all NiloToonAllInOne renderer features





3)you can turn off features that you don't need in build per platform, for each platform , turning each one off will save you 50% shader memory each.



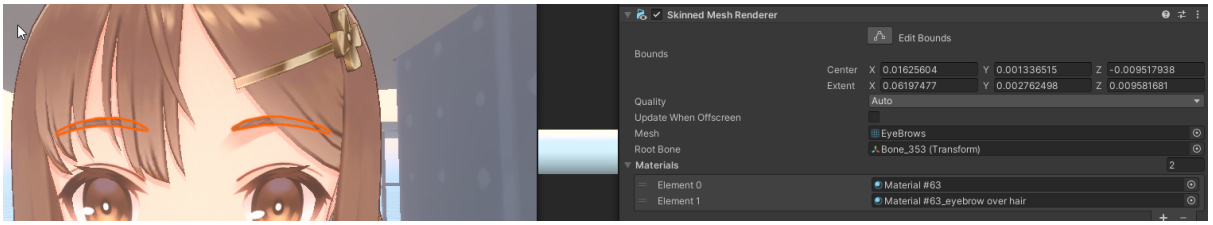
For shader_feature:
The more shader keyword combinations there are in all your materials(included in build/asset bundle), the more memory usage is needed in runtime, the only way to reduce memory usage is to reduce the number of combinations of shader keywords

in your materials. But before you do that, make sure you have done the multi_compile section’s method first.

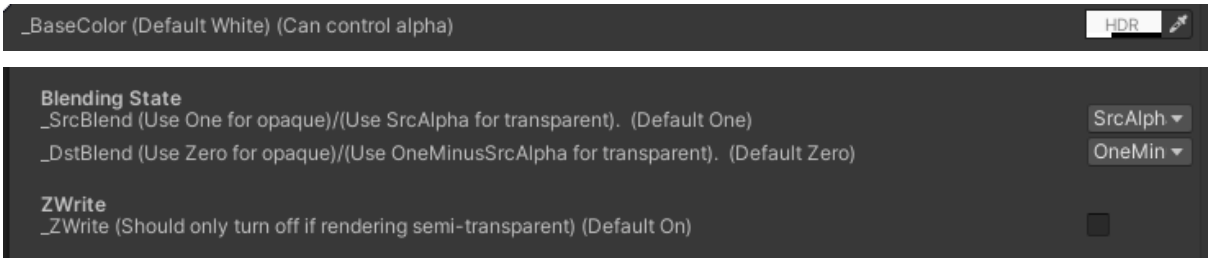
How to make eyebrows render on top of hair(in a semi transparent way)?

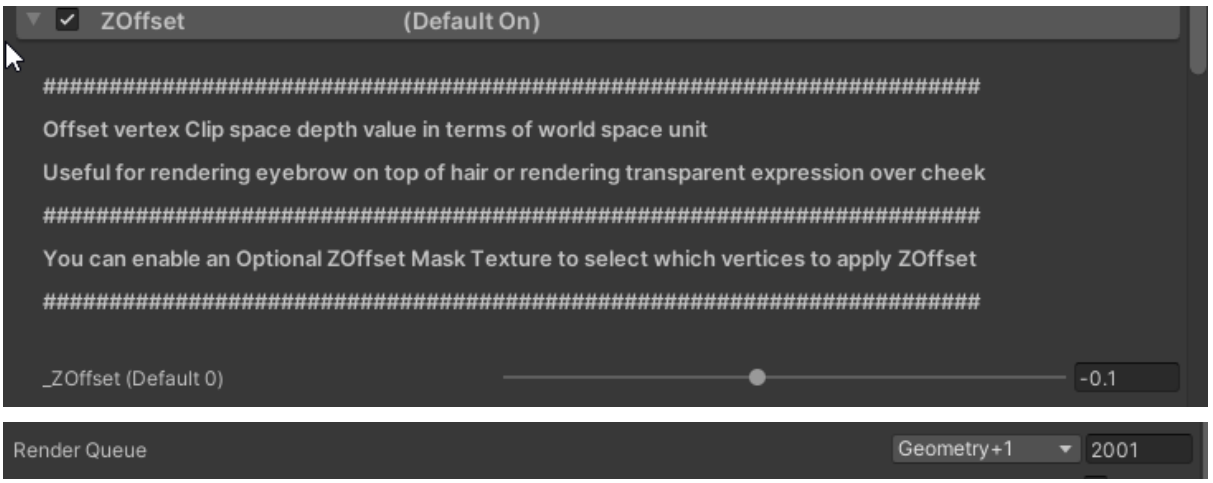
This will require you to:

- copy the eye brow material in your project
- drag the material that you copied, assign it to the eyebrow's renderer(total of 2 materials in a renderer, instead of 1)



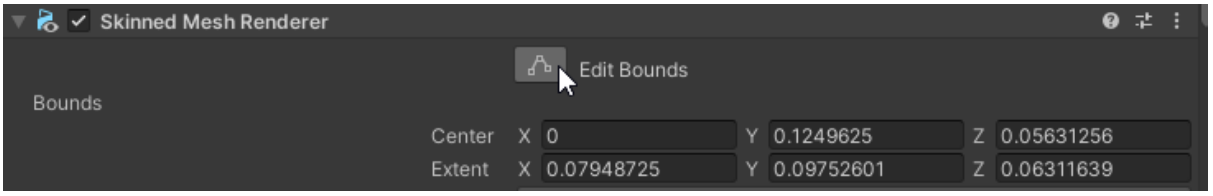
- edit the copied material to use the following transparent and ZOffsetsettings





You can also find semi transparent eyebrows materials in the example project for reference on how to do it (search t:material eyebrow).

After using perspective removal, some renderer's culling is wrong at the edge of the screen, how to solve it?



Try making the bound of Skinned Mesh Renderer bigger, making the bound bigger can avoid Unity's culling system wrongly cull your renderer, because Unity's culling system always use non-perspective removal geometry for culling, and there is no way to edit Unity's culling system unless you have access to Unity's source code.

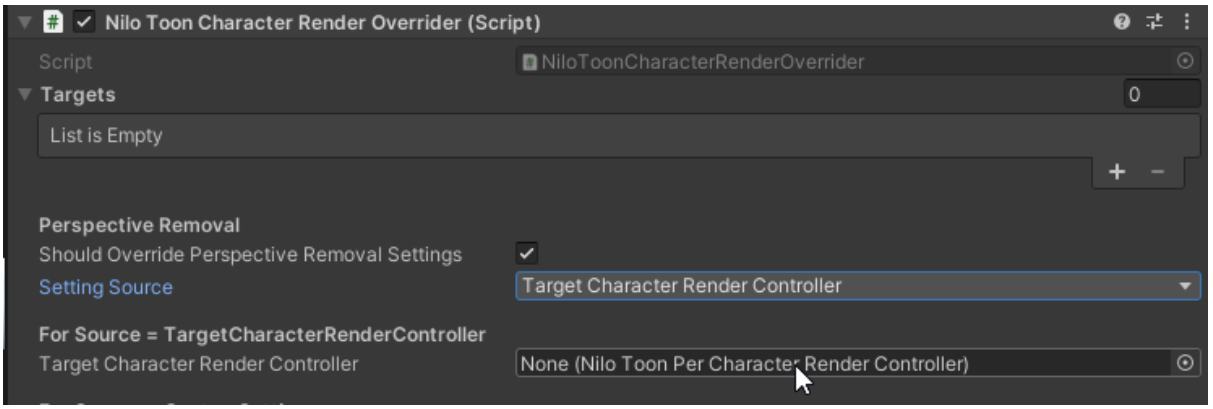
After using perspective removal, objects that I attached to characters are not having a perfectly matched vertex position (e.g. hand can't grab a weapon/microphone perfectly correct), how to solve it?

(Easier method)

1) Just drag target object's renderer to NiloToonPerCharacterRenderController script's attachmentRendererList (target object should be using NiloToon's character shader)

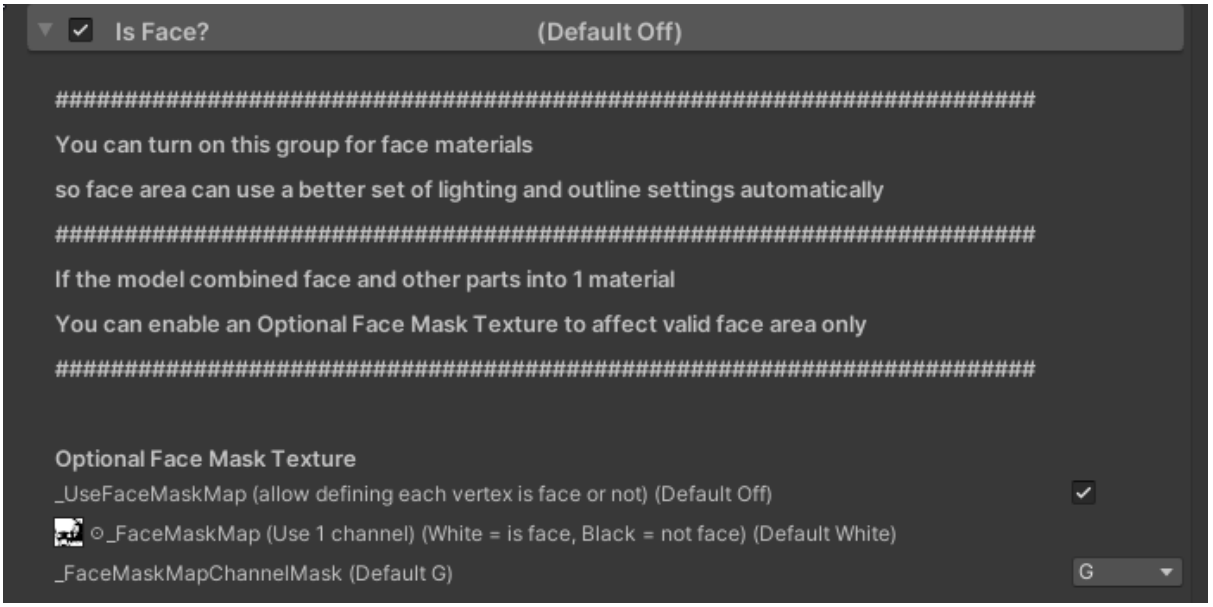
(Complex methd)

1) Add a script NiloToonCharacterRenderOverrider to any GameObject
2) Drag the character's root script to TargetCharacterRenderController slot
3) Drag all attached objects(e.g. weapon) to Targets



If renderers inside **Targets** are all using NiloToon_Character shader, all Target's perspective removal result will be sync to that character(perspective removal result will be the same)

How to separate IsFace, because I combine everything into 1 material

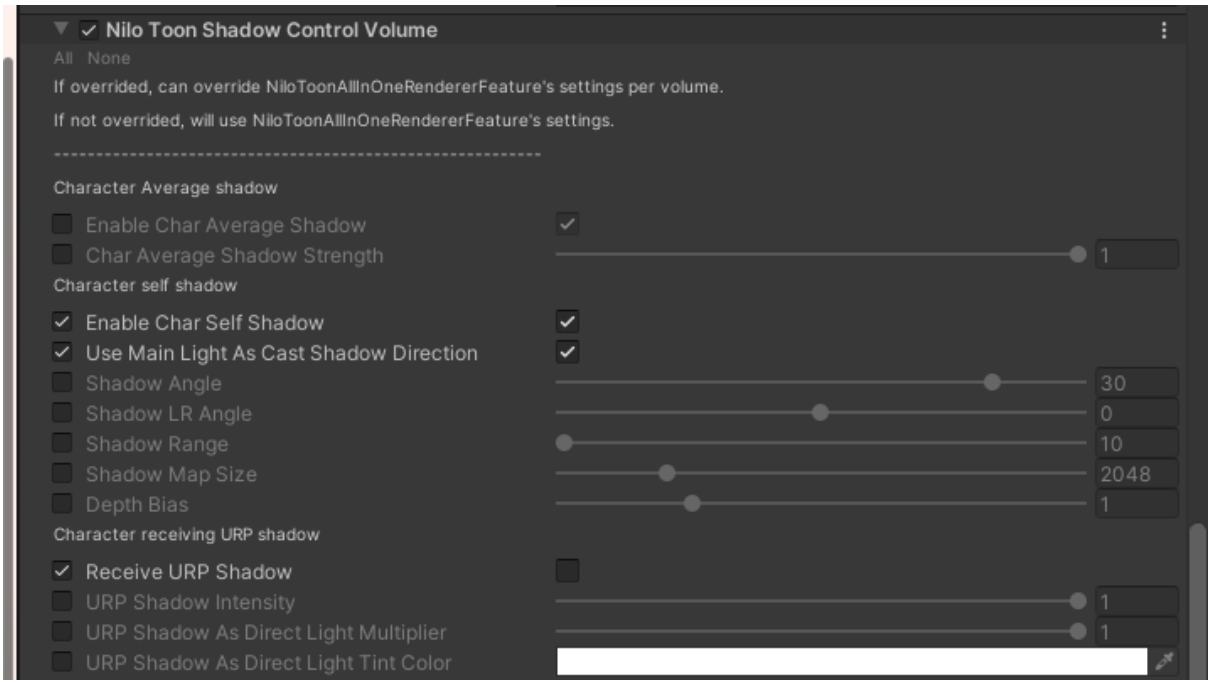


Use **_FaceMaskMap** to select valid face area, make sure to enable **_UseFaceMaskMap**

Some DepthTexture shadow is missing if shadow caster is very close to shadow receiving surface

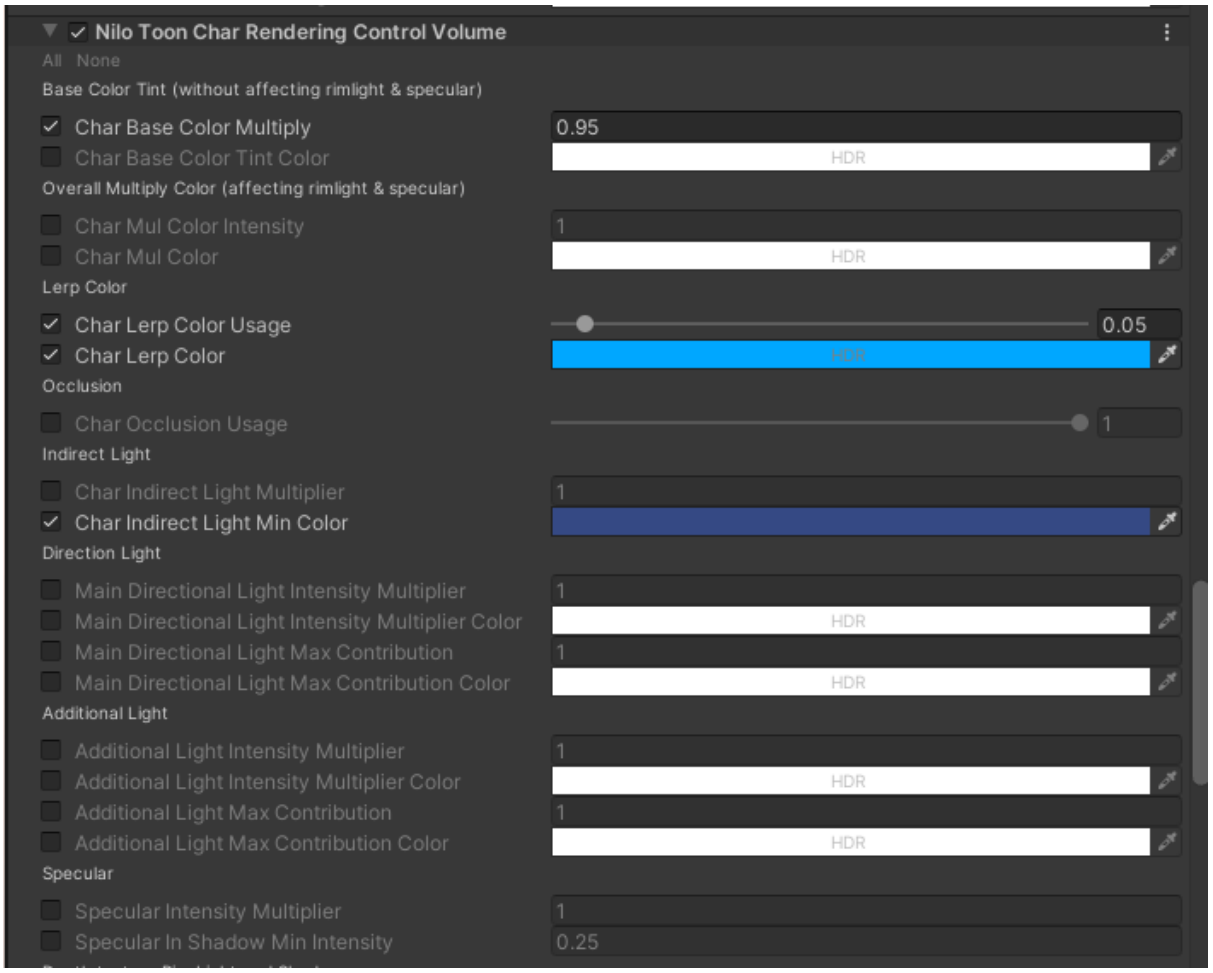
you can tweak **_DepthTexShadowThresholdOffset** and **_DepthTexShadowFadeoutRange**

How to control character shadow’s visual/color globally(volume)?



add **NiloToonShadowControlVolume** to a volume script in your scene if you didn’t, then you can control the shadow's visual/color globally. For example, you can use the “Character receiving URP shadow” section, to change how much light should be blocked by URP’s shadow system.

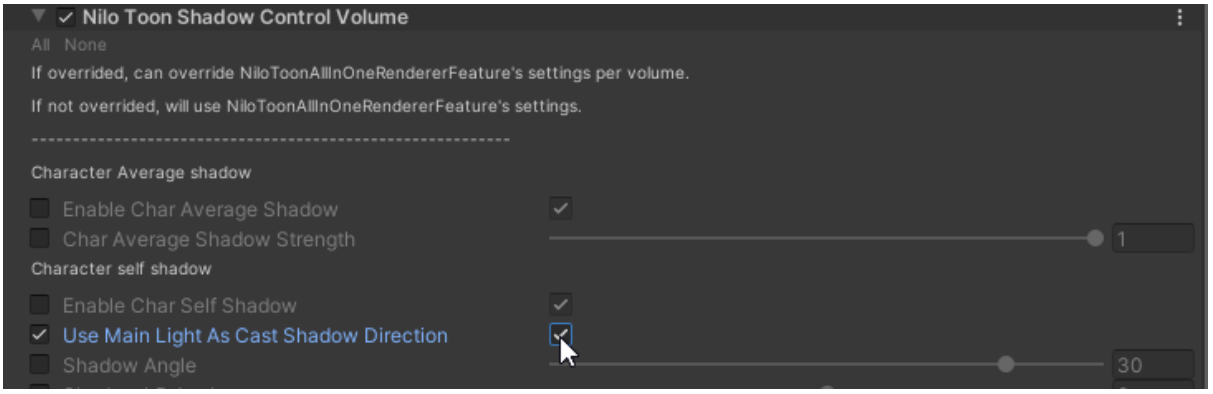
How to control character lighting's visual/style/color globally(volume)?



add **NiloToonCharRenderingControlVolume** to a volume script in your scene if you didn't, then you can control the character's visual/style/color globally.

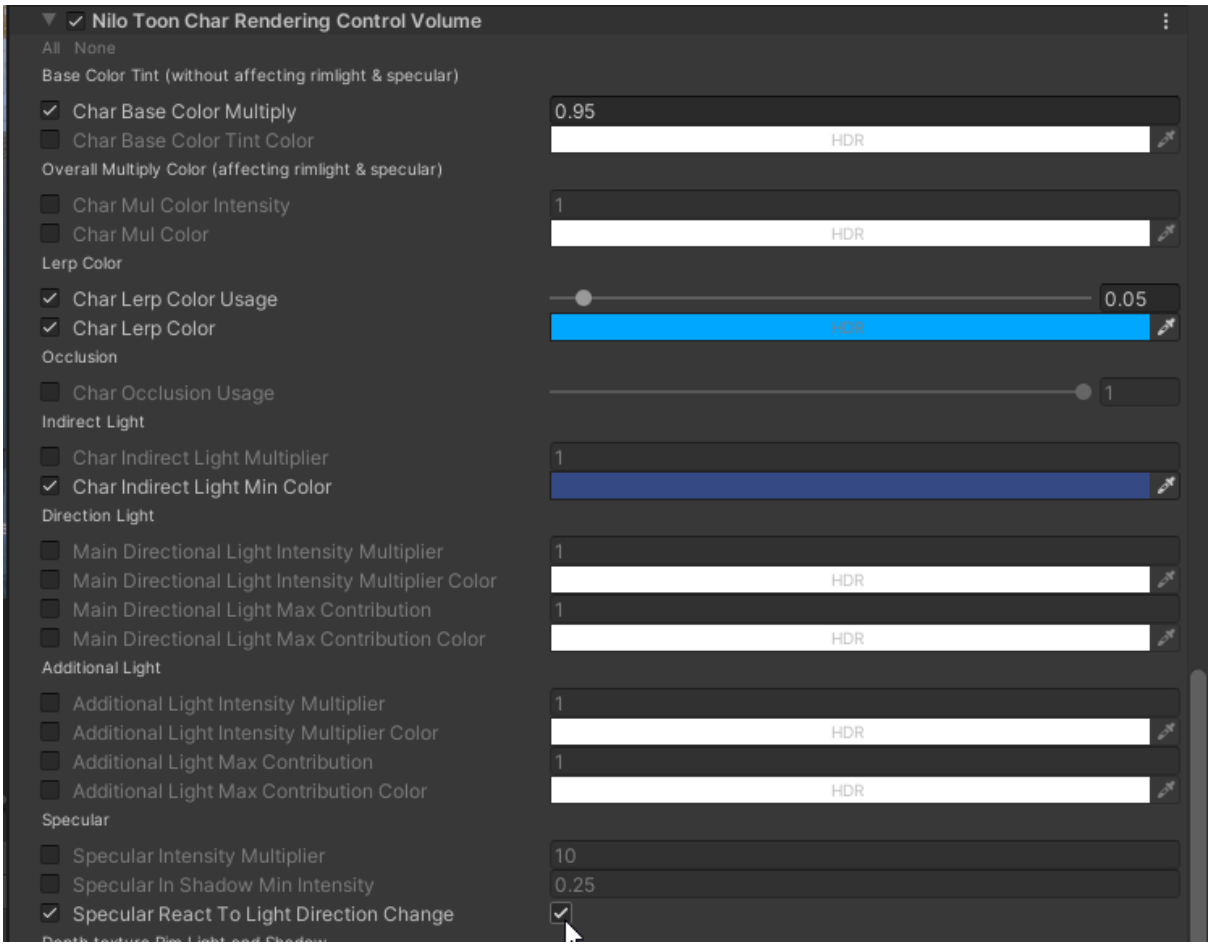
How to stop NiloToon's self shadow following the camera?

NiloToonAllInOneRendererFeature and NiloToonShadowControlVolume has a toggle useMainLightAsCastShadowDirection, you can enable it if you want NiloToon's self shadow system use scene's MainLight direction to cast shadow(same shadow casting direction as regular URP main light shadow, so shadow result will NOT be affected by camera rotation/movement anymore)



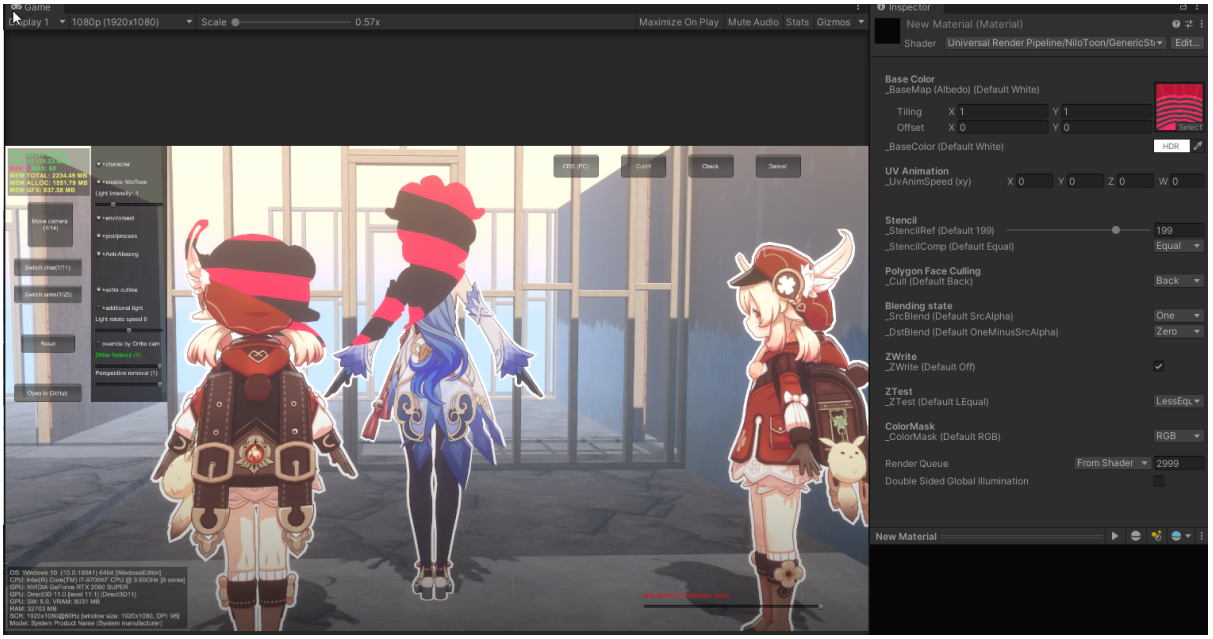
How to make specular results react to light direction change?

NiloToonCharRenderingControlVolume has a toggle specularReactToLightDirectionChange, you can enable it if you want NiloToon character shader's specular results react to the main light's direction change.



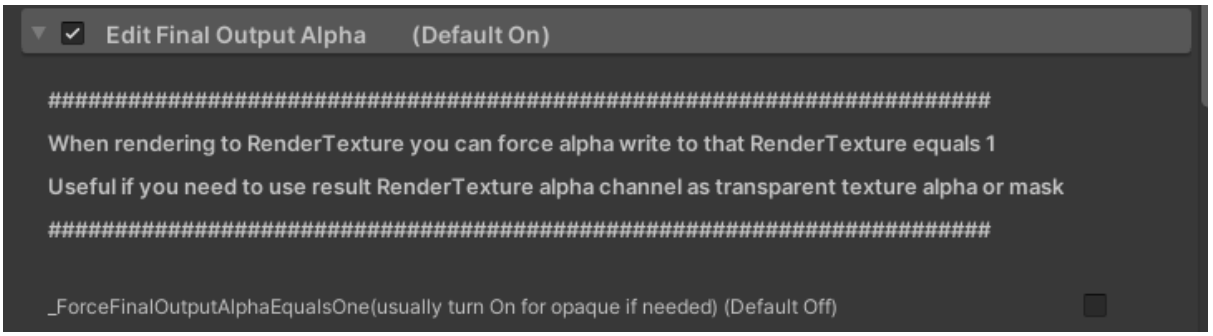
Can I render Stencil(masked) effect on characters?

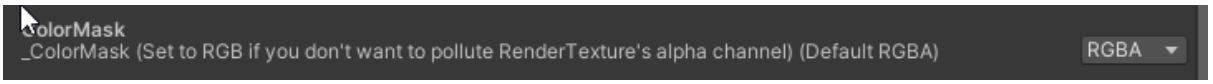
Use GenericStencilUnlit.shader, useful if you want to apply stencil effects that use drawn character pixels as a stencil mask, or just need an example shader for reference.



Can a NiloToon_character material always write white or not write to RenderTexture's alpha channel?

you can use the following setting in the material





There are some (you can ignore or delete it safely)xxx.fbx generated in the project window, what is it?

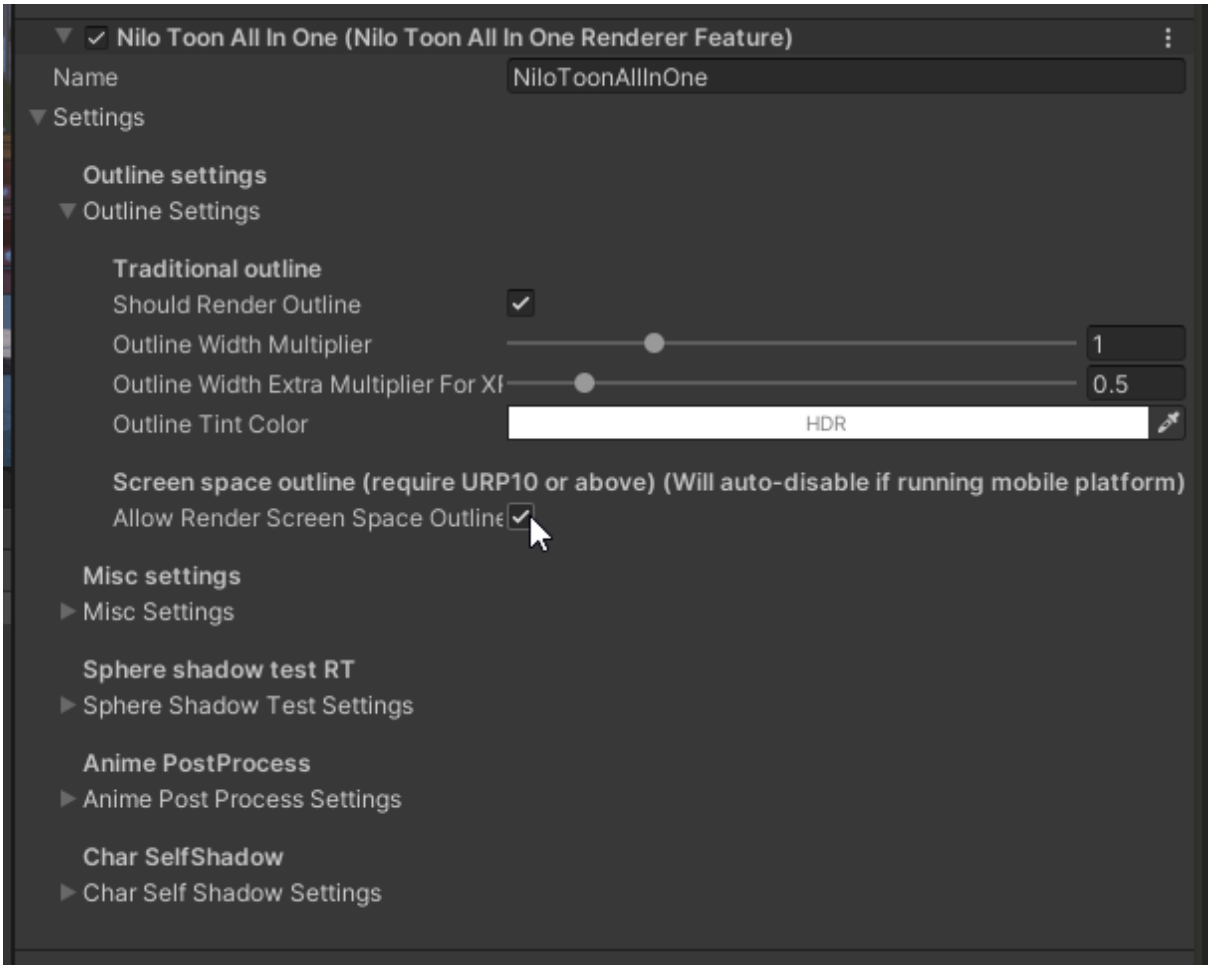
These are .fbx files generated by NiloToonEditor_AssetLabelAssetPostProcessor, you can delete these .fbx safely, they will not be generated after version 0.4.1

We have to switch character renderer parts in runtime/gameplay (switching hair/cloths), what should we do to make NiloToonURP works correctly?

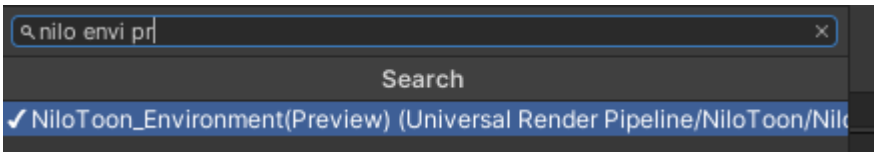
After switching renderers, set NiloToonPerCharacterRenderController's allRenderers count to 0, this will trigger the script to re-find all latest renderers.

How to use NiloToon's environment shader?

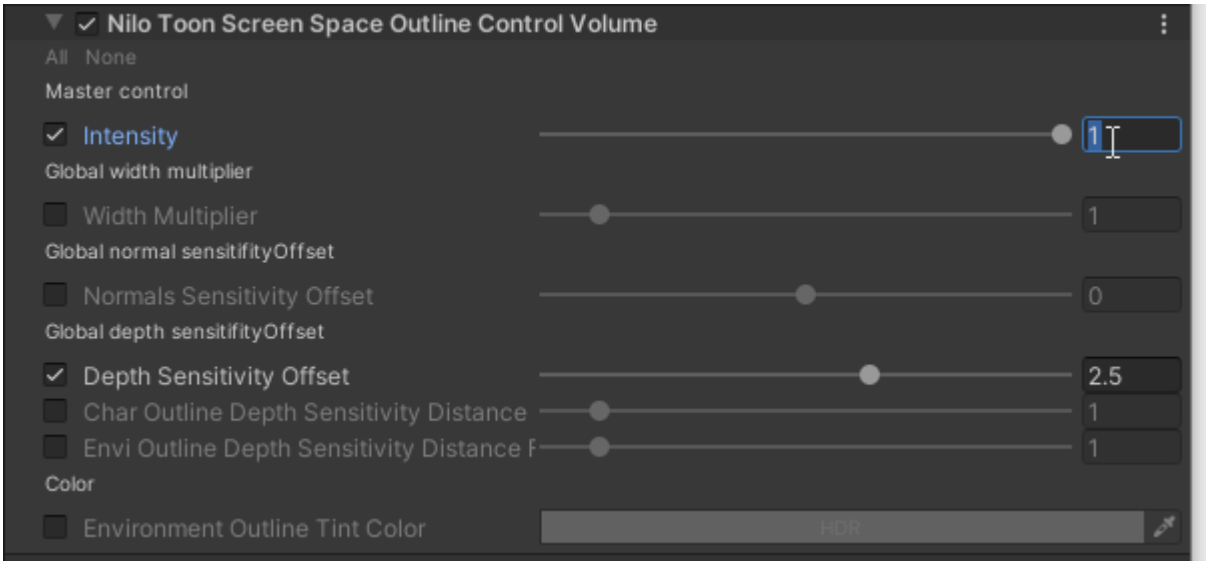
1)Click on your NiloToonAllInOne renderer feature, enable AllowRenderScreenSpaceOutline



2)Switch any environment material's shader from URP's Lit to NiloToon_Environment

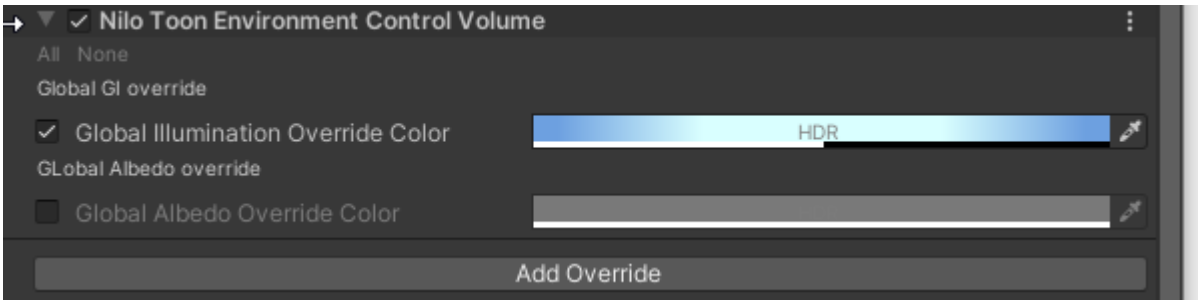


3)Add NiloToonScreenSpaceOutlineControlVolume to a volume component in scene, enable intensity and drag it to 1



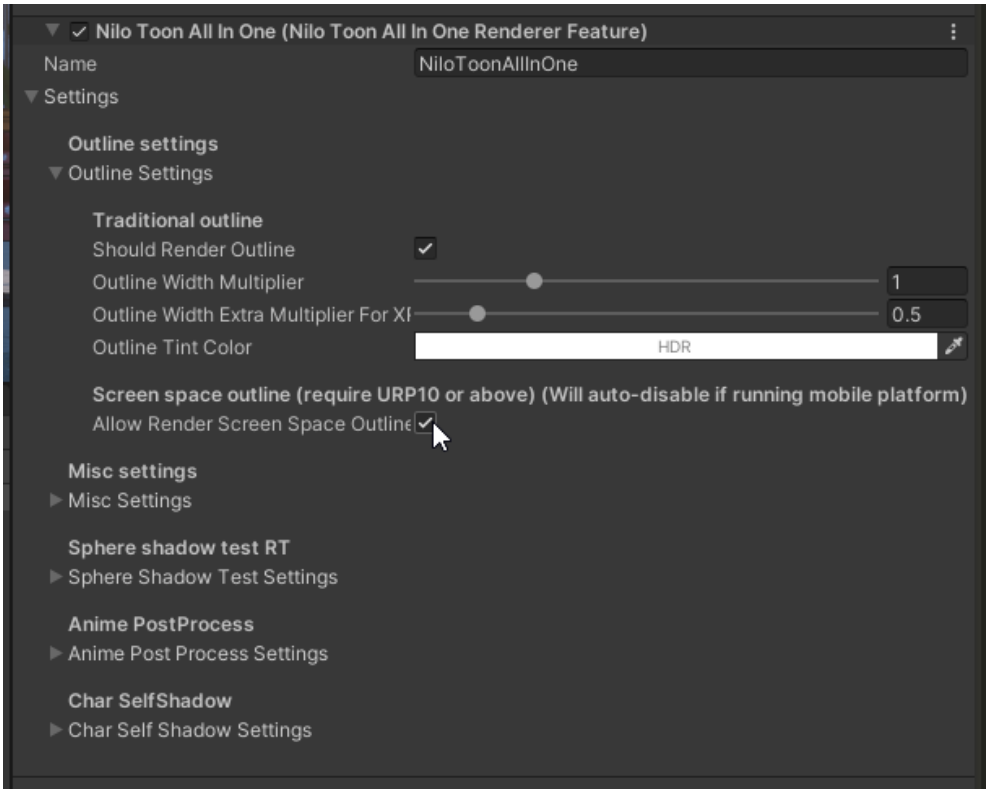
4)You should now see you environment renders the same as before, but having outline of them

5)(optional) Add NiloToonEnvironmentControlVolume to a volume component in scene, edit the color rgb and alpha settings to control environment color result

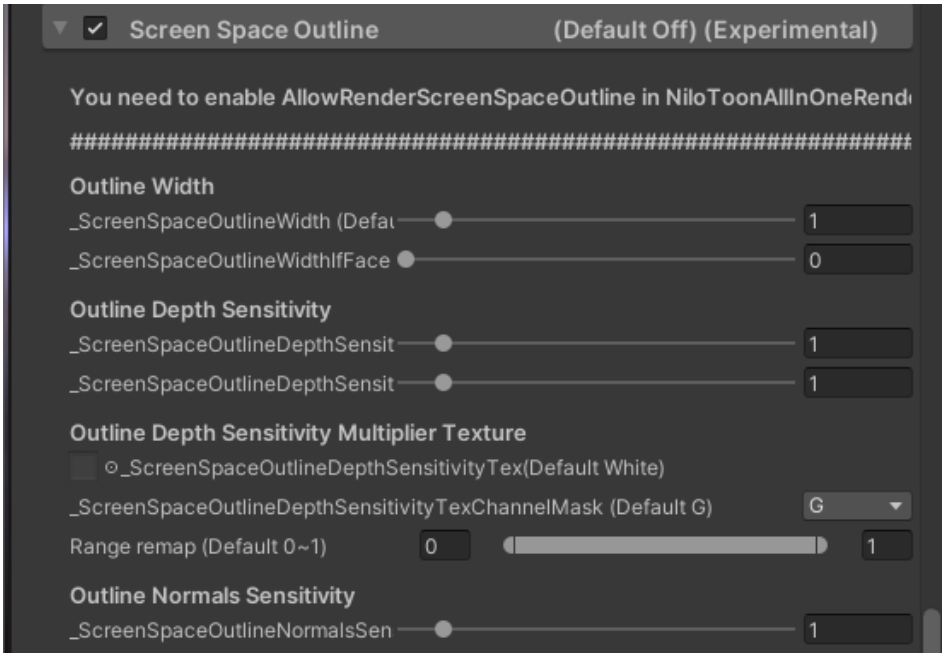


How to enable character shader's screen space outline?

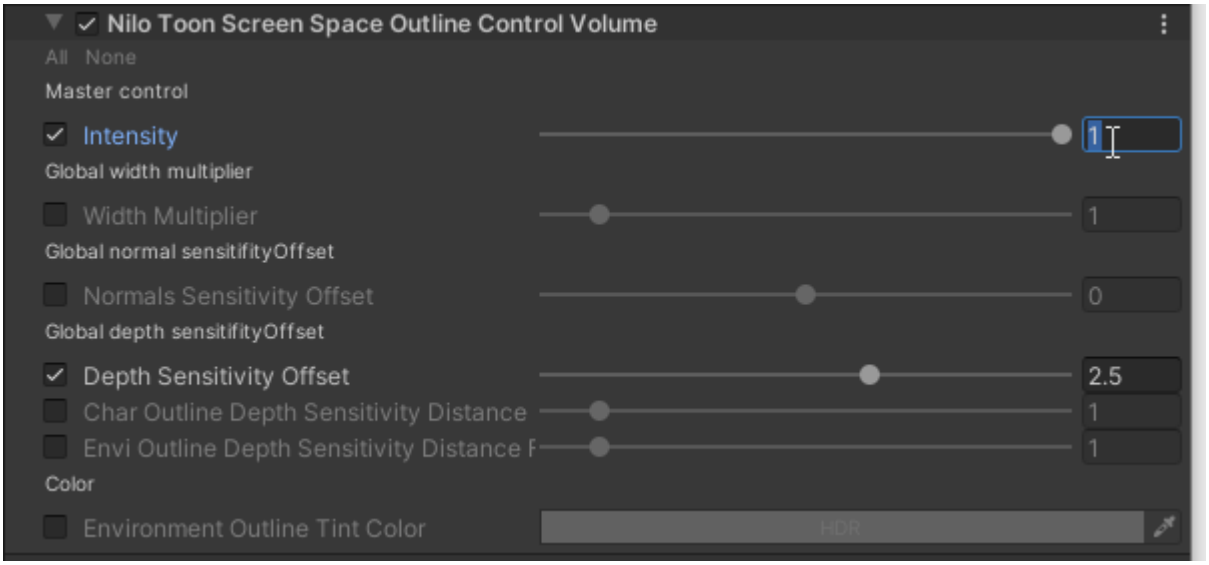
1)Click on your NiloToonAllInOne renderer feature, enable AllowRenderScreenSpaceOutline



2)In you character shader, enable Screen Space Outline section

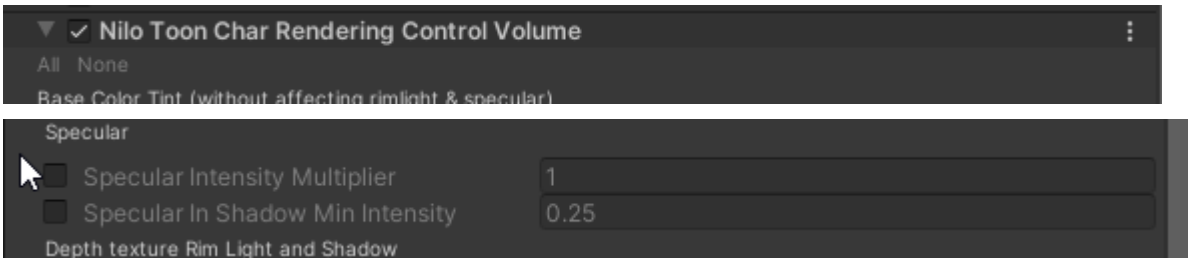


3)Add NiloToonScreenSpaceOutlineControlVolume to a volume component in scene, enable intensity and drag it to 1



How to control specular intensity in shadow area?

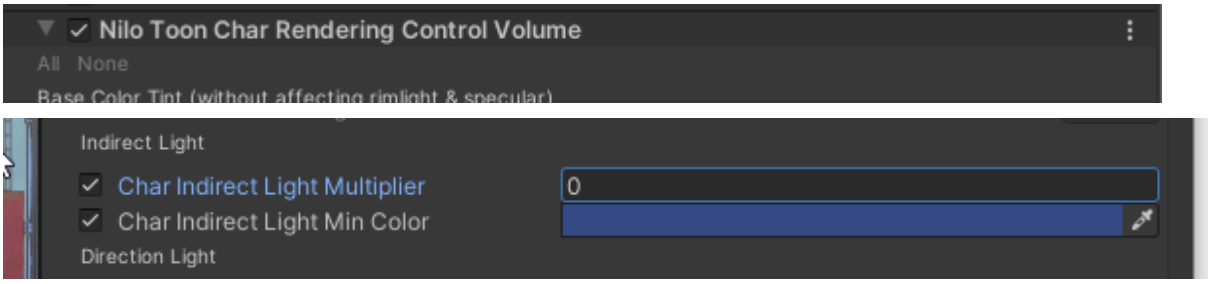
In NiloToonCharRenderingControlVolume, control specularInShadowMinIntensity



How to make the character ignore environment light (light probe)?

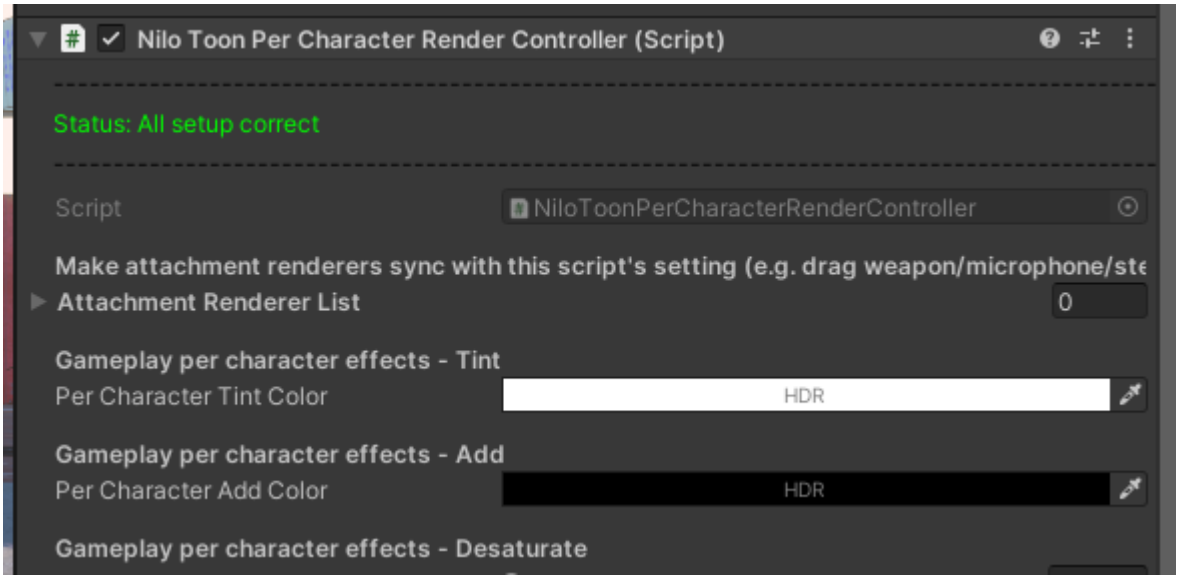
In NiloToonCharRenderingControlVolume, make:

- charIndirectLightMultiplier = 0
- charIndirectLightMinColor = a shadow color you like

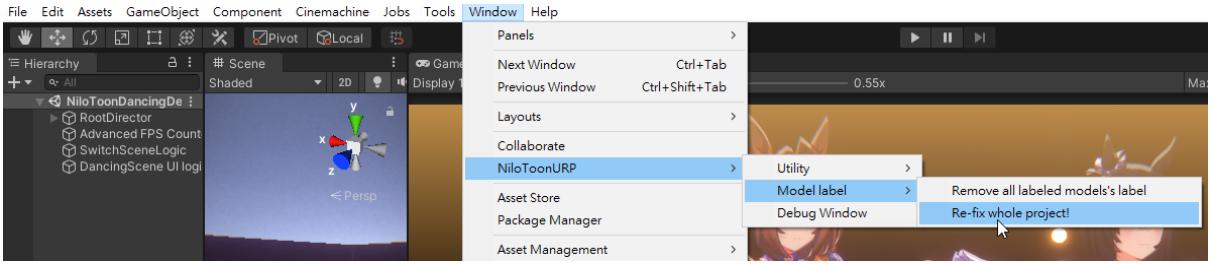


Sometimes my character outline disappeared after reimport or switching platform (This problem should be completely solved after version 0.4.1)

You can try click on that character's NiloToonPerCharacterRenderController script to trigger a rebake,



or click [Window/NiloToonURP/Model label/Re-fix whole project!] or rebake all character prefabs in project



This problem should be completely solved after version 0.4.1

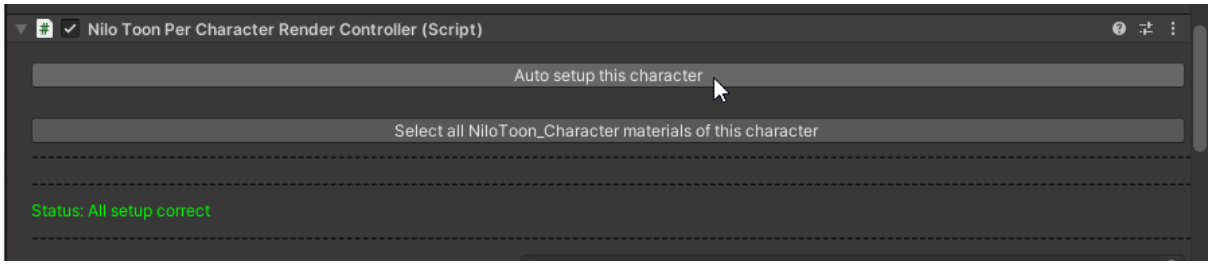
Screen space outline in scene window is flicking

It is a known bug, when you move your mouse, which triggers GUI update, will make the scene window's screen space outline flicker. We are looking for a solution to solve the problem.

Screen space outline result changes when Game window size or RenderScale changes

It is a known limitation for now, we are looking for ways to avoid this behavior

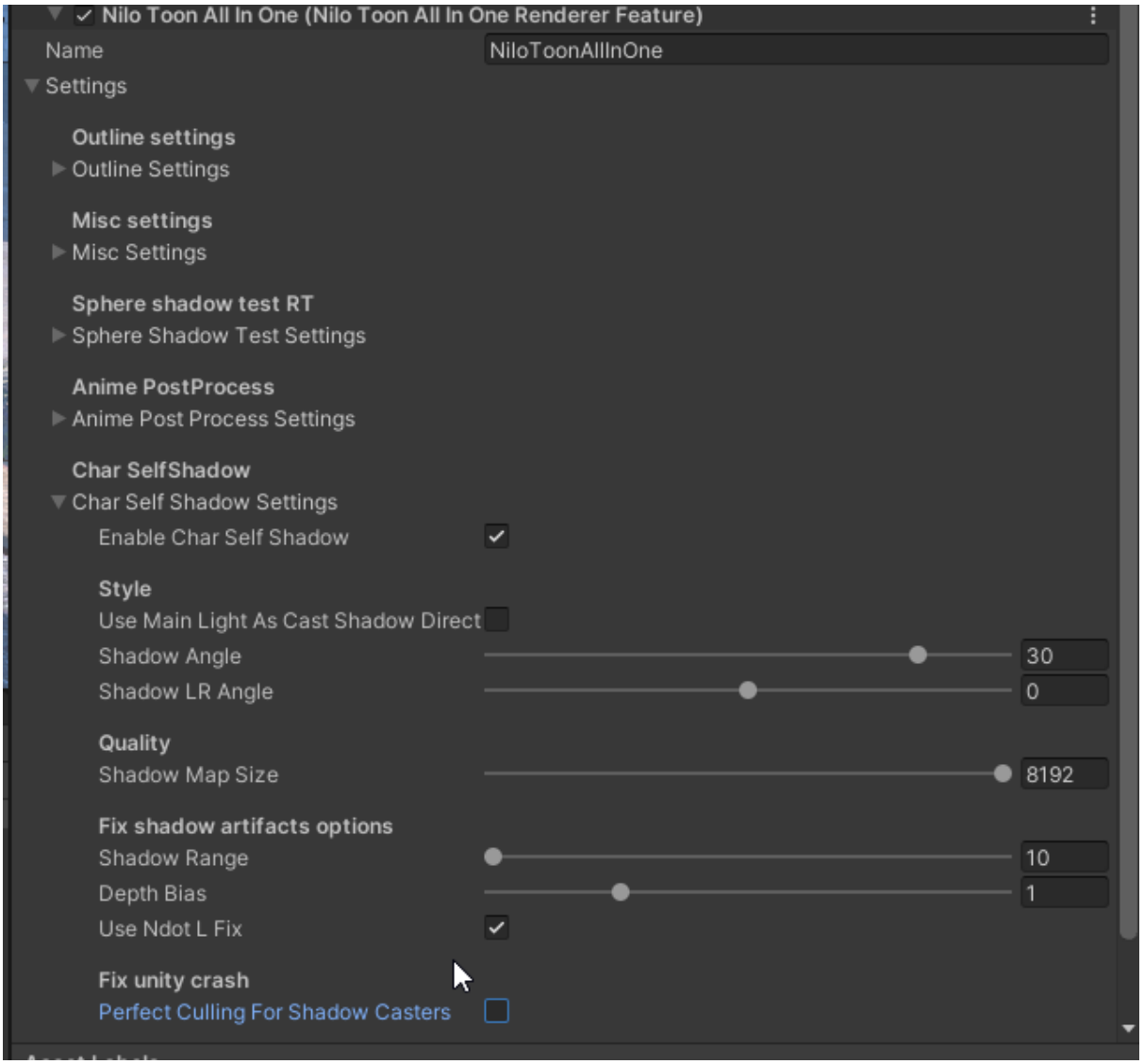
How to update NiloToonPerCharacterRenderController's AllRenderers list automatically?



click "Auto setup this character" button

Doing this will trigger an auto update once, NiloToon will find all valid renderers in all child gameobjects of this script, and put them to "All Renderers" list.

Adding a terrain in the scene makes Unity crash, what should I do?



We are waiting URP/Unity's fix, for now you can:
Disable **Perfect Culling For Shadow Casters** in **NiloToonAllInOneRendererFeature**, but disable it will make shadow culling not always correct if shadow caster is not existing on screen.

I need help / found a bug / have feedback / want to ask questions, what should I do?

contact:
email - nilotoon@gmail.com
skype - live:.cid.3b9d54776782296a
discord - KuronekoShaderLab#5938

with any information about you(invoice/email) that we can recognize you as a customer.

Change log
(a copy of CHANGELOG.md in NiloToonURP folder)

Changelog
All notable changes to NiloToonURP & demo project will be documented in this file.

The format is based on [Keep a Changelog](http://keepachangelog.com/en/1.0.0/)
and this project adheres to [Semantic Versioning](http://semver.org/spec/v2.0.0.html).

- (Core) means the change is part of NiloToonURP_[version].unitypackage (files inside NiloToonURP folder)
- (Demo) means the change is only changing the demo project, without changing NiloToonURP.unitypackage
- (Doc) means the change is only affecting any .pdf documents
- (InternalCore) means Core, but if you are only using NiloToonURP as a tool, and don't need to read/edit NiloToonURP's source code/files, you can ignore this change.

[0.8.10] - 2021-10-13

Changed
- (Demo) manifest.json: remove com.unity.toolchain.win-x86_64-linux-x86_64

[0.8.9] - 2021-10-11

Added
- (Core) NiloToonCharacter.shader: added _FaceShadowGradientMapUVScaleOffset & _DebugFaceShadowGradientMap for "Face Shadow Gradient Map" section

---
[0.8.8] - 2021-10-10

Added
- (Core) NiloToonCharacter.shader: add more tips and information for "Face Shadow Gradient Map" section

Fixed
- (Core) NiloToonToonOutlinePass.cs: added isPreviewCamera check for screen space outline, to solve "material preview window makes outline flicker" bug

---
[0.8.7] - 2021-10-8

Breaking Changes
- (Core) NiloToonCharacter.shader: fix a bug "normalmap can not affect lighting result"

[0.8.6] - 2021-10-4

Breaking Changes
- (Core) NiloToonPerCharacterRenderController.cs: fix a gamma/linear color bug that cause play/edit mode color is not the same

---
[0.8.5] - 2021-9-29

Added
- (Core) NiloToonCharacter.shader: added _DepthTexRimLightAndShadowWidthTexChannelMask and _OutlineWidthTexChannelMask option

Fixed
- (Core) NiloToonEditorPerCharacterRenderControllerCustomEditor.cs: + null check

---
[0.8.4] - 2021-9-28

Added
- (Core) NiloToonPerCharacterRenderController.cs: added allowCacheSystem, to let user control CPU optimization option
- (Core) NiloToonPerCharacterRenderController.cs: added API RequestForceMaterialUpdateOnce(), for user to call after changing material in playmode
- (Core) NiloToonPerCharacterRenderController.cs: OnEnable will now call RequestForceMaterialUpdateOnce()

[0.8.3] - 2021-9-27

Breaking Changes
- (Core) NiloToonPerCharacterRenderController.cs: combine allowRenderDepthOnlyPass and allowRenderDepthNormalsPass into 1 public bool allowRenderDepthOnlyAndDepthNormalsPass

Added
- (Core) NiloToonCharacter.shader: BaseMap Alpha Blending Layer 1 added UVScaleOffset, UVAnimSpeed, and optional mask texture. If it is useful, we will add these feature to other layers

Changed
- (Core) remove keyword _NILOTOON_ENABLE_DEPTH_TEXTURE_RIMLIGHT_AND_SHADOW in C# and shader, replaced by a new material float _NiloToonEnableDepthTextureRimLightAndShadow. In order to trade a small amount of fragment performance for 50% lower shader memory usage
- (Core) NiloToonPerCharacterRenderController.cs: _NiloToonEnableDepthTextureRimLightAndShadow will not be enabled if allowRenderDepthOnlyAndDepthNormalsPass is false, to prevent wrong rim light result when user disabled allowRenderDepthOnlyAndDepthNormalsPass
- (Core) NiloToonPerCharacterRenderController.cs: auto set up button will not upgrade particle and sprite material anymore

Fixed
- (Core) NiloToonPerCharacterRenderController.cs: now script will not miss material update(shadowTestIndex_RequireMaterialSet) due to cache logic when setting up a new character
- (Core) fixed a bug that triggers useless Debug.warning when setting up a new character using auto button
---
[0.8.2] - 2021-9-23

Added
- (Core) NiloToonCharacter.shader: added _DepthTexRimLightThresholdOffset and _DepthTexRimLightFadeoutRange, to let user control rim light area
---
[0.8.1] - 2021-9-21

Added
- (Core) NiloToonCharacter.shader: added "Face shadow gradient map" section, allow user to control face shadow's visual by a special threshold gradient grayscale texture
- (Core) NiloToonPerCharacterRenderController.cs: added "Face Up Direction", for user to setup. (will affect material's "Face shadow gradient map" result)
- (Core) NiloToonEditorShaderStripping.cs will strip _FACE_SHADOW_GRADIENTMAP if _ISFACE is off also
- (Core) NiloToonPerCharacterRenderController: added allowRenderShadowCasterPass,allowRenderDepthOnlyPass,allowRenderDepthNormalsPass,allowRenderNiloToonSelfShadowCasterPass,allowRenderNiloToonPrepassBufferPass for user side optimization option
- (Demo) Update Ganyu.prefab and Klee.prefab's face rendering(using new "Face shadow gradient map" feature)

Changed
- (Demo) upgrade URP from 10.5.0 to 10.5.1
- (Demo) optimize close shot scene's camera near far

Fixed
- (Core) optimize NiloToonPerCharacterRenderController.LateUpdate()'s CPU time cost (only call material.SetXXX when value changed) and "IEnumerable<Renderer> AllRenderersIncludeAttachments()"'s GC
- (Demo) fix bug: "multiple incorrect renderer feature data in forward renderers"

[0.7.3] - 2021-9-12

Changed
- (Core) NiloToonPerCharacterRenderController will not clear material property block every frame now

Fixed
- (Core) correctly support 'ClothDynamics' asset

[0.7.2] - 2021-9-10

Added
- (Core) NiloToonCharacter.shader: Emission section added _EmissionMapUseSingleChannelOnly and _EmissionMapSingleChannelMask
- (Core) NiloToonCharacter.shader: added "Support 'ClothDynamics' asset" section(just an on/off toggle)

- (InternalCore) Added NiloToonFullscreen_Shared.hlsl, to provide FullscreenVert() function for fullscreen shaders for URP9 or lower

Changed
- (Core) When EnableDepthTextureRimLightAndShadow is off, low quality fallback rim light will NOT consider normalmap contribution anymore, which can produce rim light that is much more similar to depth texture rim light

Fixed
- (Core) Fix shader bug to correctly support Unity 2019

[0.7.1] - 2021-9-6

Added
- (Core) Added NiloToonBloomVolume.cs, a bloom volume that is similar to URP's offical Bloom, but with more controls
- (Core) Added NiloToonRenderingPerformanceControlVolume .cs, a control volume that let you control performance per volume
- (Core) NiloToonCharacter.shader: Added "Allow NiloToonBloom Override?" section, and all required functions
- (InternalCore) NiloToonCharacter_Shared.shader: Added "Allow NiloToonBloom Override?" section required MACRO, uniforms and functions
- (InternalCore) Added new files NiloToonPrepassBufferRTPass.cs, NiloToonUberPostProcessPass.cs, NiloToonBloom.shader & NiloToonUberPost.shader
- (InternalCore) NiloToonAllInOneRendererFeature.cs now enqueue NiloToonPrepassBufferRTPass and NiloToonUberPostProcessPass
- (InternalCore) NiloToonCharacter.shader: Added NiloToonPrepassBuffer pass

Changed
- (Core) NiloToonCharacter.shader: _CelShadeSoftness minimum value is now 0.001, instead of 0, to avoid lighting direction flipped.
- (Core) Remove large amount of useless Debug.Log of NiloToonEditor_AssetLabelAssetPostProcessor.cs
- (InternalCore) Delete files that are not currently using: MathUtility.cs and NiloToonShaderStrippingSettingSO.cs(a duplicated file)

Fixed
- (Core) all character shader: all _DitherOpacity are now correctly replaced by_DitherFadeoutAmount, shader can compile correctly(material not pink anymore)
- (Core) fix NiloToonEditor_AssetLabelAssetPostProcessor's memory leak, which will produce fatal error when importing large amount of character
- (InternalCore) add namespace to NiloToonEditor_EditorLoopCleanUpTempAssetsGenerated.cs and NiloToonEditorSelectAllMaterialsWithNiloToonShader.cs

TODO
- (Core) Optimize NiloToonPerCharacterRenderController.LateUpdate() (only call material.SetXXX when value changed)

[0.6.3] - 2021-8-27

Added
- (Core) NiloToonCharacter.shader: Added a "BaseMap Stacking Layer 4-6" section
---
[0.6.2] - 2021-8-25

Changed
- (Core) change _DitherOpacity to _DitherFadeoutAmount (not just rename, but with logic change). This will fix a bug -> preview window can't render nilotoon character shader
---
[0.6.1] - 2021-8-24

Added
- (Core) NiloToonPerCharacterRenderController: Added a "Select all NiloToon_Character materials of this character" button
- (Core) Added NiloToonShaderStrippingSettingSO.cs, a scriptable object storing per platform NiloToon shader stripping settings
- (Core) NiloToonAllInOneRendererFeature: Added shaderStrippingSettingSO slot, user can assign a NiloToonShaderStrippingSettingSO to control NiloToon's shader stripping per platform
- (Core) NiloToonCharacter.shader: Added BaseMapStackingLayer section (1-3)
- (Core) NiloToonCharRenderingControlVolume: Added bool specularReactToLightDirectionChange
- (Core) NiloToonCharacter.shader: Added _NiloToonSelfShadowIntensityMultiplierTex in "Can Receive NiloToon Shadow?" section, useful if you want to control nilo self shadow intensity by a texture

- (Demo) Added NiloToonShaderStrippingSettingSO to project, which reduce all platform's shader memory usage by 50%, and android/iOS shader memory usage by 75%, this change will let demo apk run on low memory phones(1-2GB).
- (Demo) Added "Close Shot" scene, showing a close shot male character.
- (DOC) Added "How to separate IsFace, because I combine everything into 1 renderer/material" section
- (DOC) Added "Some DepthTexture shadow is missing if shadow caster is very close to shadow receiving surface"
- (DOC) Added a few section's about how to use volume to edit visual globally
- (DOC) Added "How to make specular results react to light direction change?" section

Changed
- (Core) delete all NiloToonURPFirstTimeOpenProject folder, scripts and files
- (Doc) rewrite "NiloToon shader is using too much memory, how to reduce it?" section, to explain how to use NiloToonShaderStrippingSettingSO

Fixed
- (Core) Fixed a bug -> when dither fadeout is 0% (completely invisible), depth/depthNormal texture pass will not render

---

[0.5.1] - 2021-8-16

Added
- (Core) NiloToonPerCharacterRenderController's dither fade out will now affect URP's shadowmap, will rely on URP's soft shadow filter to improve the final result.

Changed
- (Demo) Now demo project will dynamic load character from Resources folder, instead of just placing every character in scene. This will reduce memory usage a lot, which helps android build(.apk) to prevent out of memory crash.
- (Demo) keepLoadedShadersAlive in PlayerSetting is now false, to save some memory usage on scene change

Fixed
- (Core) Fix an important bug which NiloToonPerCharacterRenderController wrongly edit URP's default Lit material's shader. If any user were affected by version 0.4.1, please update to 0.5.1 and delete URP's Lit.material in the project's Library folder, doing this will trigger URP's regenerate default asset, which reset URP's Lit material and fixes the problem.
- (Core) Environment shader will NOT receive screen space outline if SurfaceType is Transparent

---

[0.4.1] - 2021-8-10

Breaking Changes
- (Core) NiloToonPerCharacterRenderController.cs: rename extraThickOutlineMaxiumuFinalWidth -> extraThickOutlineMaximumFinalWidth

Added
- (Core) NiloToonPerCharacterRenderController: Added "Auto setup this character" button, user can use click this button to quickly setup any character that is not using nilotoon
- (Demo) Added 4 new demo model, set up using NiloToon
- (Doc) Added section about "Auto setup this character" button

---

[0.3.5] - 2021-8-04

Added
- (Core) NiloToonCharRenderingControlVolume: +rim light distance fadeout params, you can use it if you want to hide rim light flicker artifact due to not enough pixel count for character(resolution low / character far away from camera)

Fixed
- (Core) now NiloToon will NOT leave any generated character .fbx in project (in older versions, NiloToon will generate .fbx that has (you can ignore or delete safely) prefix, polluting version control history)

[0.3.4] - 2021-8-02

Added
- (Core) character shader: Occlusion section added _OcclusionStrengthIndirectMultiplier
- (Core) character shader: depthtex rim light and shadow width can now optionally controlled by texture and vertex color
- (Doc) added "How to enable character shader’s screen space outline? section

Changed
- (Core) Now FrameDebugger will show NiloToon's passes correctly (Profiling scope)
- (Core) Now screen space outline can run on mobile platforms(android/iOS)
- (Core) screen space outline now support OpenGLES

Fixed
- (Core) NiloToonPerCharacterRenderController will now auto re-find allRenderers, if any null renderer is detected in allRenderers list
- (Core) LWGUI will now correctly not saving _ keyword in material, which will also fix screen space outline constantly flicking in scene window unless user's mouse is moving on GUI
- (Core) fix _GlobalIndirectLightMinColor not applied correctly, which ignored occlusion map
---
[0.3.3] - 2021-7-19

Added
- (Core) Environment shader/volume: +_NiloToonGlobalEnviSurfaceColorResultOverrideColor
- (Core) provide a new option in NiloToonAllInOneRendererFeature, "Perfect Culling For Shadow Casters", to fix terrain crash Unity bug
- (Doc) added section for "Perfect Culling For Shadow Casters (how to prevent terrain crash)"

Changed
- (Core) character shader: rewrite "Ramp texture (specular)" section
- (Core) update SpecularRampTexForEroSkin.psd

[0.3.2] - 2021-7-11

Added
- (Core) Improve XR rendering a lot! (by adding correct depth texture rim light and shadow in XR)
- (Core) NiloToonScreenSpaceOutlineControlVolume: add an extra outline width multiplier for XR
- (Core) NiloToonScreenSpaceOutlineControlVolume: add separated control for environment and character
- (Core) NiloToonCharacter shader: _LowSaturationFallbackColor's alpha can now control the intensity of _LowSaturationFallbackColor
- (Core) NiloToonCharacter shader: rewrite specular ramp method
- (Core) NiloToonPerCharacterRenderController: + _PerCharacterOutlineColorLerp
- (Core) NiloToonEnvironmentControlVolume: +_NiloToonGlobalEnviGITintColor , _NiloToonGlobalEnviGIAddColor , _NiloToonGlobalEnviShadowBorderTintColor
- (Demo) NiloToonEnviJPStreetScene now support playing in XR
- (Demo) Some example character models + MatCap(Additive) for metal reflection
- (Demo) Add version number on OnGUI (bottom right of the screen when playing)
- (Demo) Add UI text background transparent black quad, to make OnGUI text easier to read

Fixed
- (Core) Fixed an environmment shader bug, NiloToonURP can support 2019.4 (URP 7.6.0) now
- (Core) Fixed a bug "After switching platform or reimport character model .fbx assets, baked smooth normal outline data in character model's uv8 will sometimes disappear"
- (Core) Fixed a bug "focusing on NiloToonPerCharacterRenderController is very slow due to wrongly call to AssetDataBase.Refresh()""
- (Core) Fixed a bug "NiloToonPerCharacterRenderController running very slow and allocate huge GC"

[0.3.1] - 2021-7-05

Breaking Changes
- (Core) NiloToonCharacter_Shared.hlsl: rename struct LigthingData to ToonLightingData, so now NiloToonURP can also run on Unity2021.1 (URP11) or Unity2021.2 (URP12)
- (Core) NiloToonPerCharacterRenderController.cs: remove useCustomCharacterBoundCenter, now assigning customCharacterBoundCenter transform will treat as enable
- (Core) All screen space outline related feature, will be auto-disabled if running on mobile platform(android / iOS) due to performance and memory impact is high

Known Issues
- (Core) when inspector is focusing on any NiloToon_Character materials, screen space outline in editor will always keep flickering in scene/game window
- [Done in 0.3.2] (Core) (this bug already exist in 0.2.4) After switching platform or reimport character model assets, baked smooth outline data in character model's uv8 will sometimes disappear. You will need to click on that character's NiloToonPerCharacterRenderController script to trigger a rebake, or click "Windows/NiloToonUrp/Model Label/Re-fix whole project!" button to rebake every character
- (Core) (this bug already exist in 0.2.4) Sometime (you can ignore or delete it safely)xxx.fbx will be generated in project, and not correctly deleted by NiloToonURP automatically

Added

- (Core) Added NiloToonEnvironment.shader (Universal Render Pipeline/NiloToon/NiloToon_Environment), you can switch any URP's Lit shader to this shader, they are early stage proof of concept toon shader for environment (Don't use it for production! still WIP/in proof of concept stage, will change a lot in future). Added these envi shader because lots of customers request to include it first(even the shader is far from complete)
- (Core) Added NiloToonEnvironmentControlVolume.cs, to provide extra per volume control for NiloToonEnvironment.shader
- (Core) Added NiloToonScreenSpaceOutlineControlVolume.cs, for controlling NiloToonCharacter.shader and NiloToonEnvironment.shader's screen space outline's settings
- (Core) NiloToonToonOutlinePass.cs added "AllowRenderScreenSpaceOutline" option, you can enable it in NiloToonAllInOne renderer feature if you need to render any screen space outline(default is off)
- (Core) Character shader: Added a WIP and experimental "Ramp Texture (Specular) section"
- (Demo) Add NiloToonEnviJPStreetScene.scene (and all related assets), it is a new scene to demo the new environment shader
- (Doc) Added CustomCharacterBoundCenter section
- (Doc) Added a simple environment shader's document

Changed
- (Core) now support URP11.0 and URP12.0, because all NiloToon shader renamed struct LightingData to ToonLightingData (solving Shader error in URP11 -> 'Universal Render Pipeline/NiloToon/NiloToon_Character': redefinition of 'LightingData')
- (Core) Character shader: screen space outline(experimental) section completely rewrite (new algorithm, adding depthSensitifity texture, normalsSensitifity, normalsSensitifity texture, extra control for face....)
- (Core) Character shader: screen space outline use multi_compile now(to allow on off by different quality setting using renderer feature)
- (Core) Character shader: rename Outline to Traditional Outline, to better separate it from Screen space outline
- (Core) make screen space outline not affected by RenderScale,screen resolution (scale outline size to match resoltion)
- (Core) global uniform "_GlobalAspectFix" now use camera RT width height as input, instead of screen width height
- (Core) extract screen space outline's code to a new .hlsl (now shared by character shader and environment shader)
- (Core) NiloToonPerCharacterRenderController: optimize shader memory and build time for mobile, but increase GPU shading pressure a bit
- (Core) NiloToonPerCharacterRenderController: optimize C# cpu time spent, and reduce GC
- (Core) NiloToonPerCharacterRenderController: better warning in Status section, if something not set up correctly
- (Core) NiloToonEditorShaderStripping.cs: screen space outline will get stripped when building for mobile(android / iOS)
- (Demo) upgrade demo project to Unity 2020.3.12f1
- (Demo) Upgrade demo project to URP 10.5

Fixed
- (Core) NiloToonEditor_AssetLabelAssetPostProcessor: handle KeyNotFoundException: The given key was not present in the dictionary. when reimporting a model. now will produce a warning message for tracking which model will produce this error

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[0.2.4] - 2021-6-23

Added
- (Core)NiloToonPerCharacterRenderController: Add "attachmentRendererList" for user to attach any other renderer to the current character, these attachment renderers will use that NiloToonPerCharacterRenderController script's setting(e.g. sync weapon/microphone's perspective removal with a character)

Changed
- (Core)NiloToonPerCharacterRenderController: better ToolTip
- (Core)GenericStencilUnlit shader: rewrite to support attachmentRendererList and SRP batching

Fixed
- (Core)NiloToonPerCharacterRenderController: handle null renderer

---

[0.2.3] - 2021-6-21

Added
- (Core)Character shader: Add "Override Shadow Color by texture" section
- (Core)Character shader: Add "Override Outline Color by texture" section

Changed
- (Core)Character shader: better material GUI

Fixed
- (Core)Character shader: GGX specular use float instead of half to avoid precision problem on mobile platform
- GenericStencilUnlit.shader support SRP batching and VR

[0.2.2] - 2021-6-16

Changed
- (Core)Character shader: better material GUI's note
Fixed
- (Core)Character shader: fixed a bug which makes SRP batching not working correctly
- (Core)Character shader: fixed a bug which makes Detail albedo not used by specular amd emission

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[0.2.1] - 2021-6-15

Breaking Changes
- (Core)(IMPORTANT)Character shader: not using all roughness related settings in "Specular" section anymore, add a new shared "Smoothness" section. This change is made to make NiloToon character shader matches URP Lit.shader's smoothness data convention, and now "Smoothness" section's data can be shared/used by multiple features such as "Environment reflection" and "Specular(GGX)". ***If you are using "Specular" section's roughness setting in your project's materials already, after this update you will have to set up it again in the new "Smoothness" section***
- (Core)(IMPORTANT)Character shader: "Matcap Mask" section merged into "MatCap(alpha blend)" and "MatCap(additive)" section. This change is made due to the old design will force user to combine 2 mask textures into 1 texture, which is not flexible enough. This change will break old materials's "Matcap Mask" section. ***If you are using "MatCap mask" section's settings in your project's materials already, you will have to set up it again in the "MatCap(alpha blend)" and "MatCap(additive)" section's Optional mask setting***
- (Core)rename class NiloToonPerCharacterRenderControllerOverrider to NiloToonCharacterRenderOverrider, to avoid confusion when adding a NiloToonCharacterRenderOverrider script to GameObject
- (Core)rename shader internal MACRO NiloToonIsOutlinePass to NiloToonIsAnyOutlinePass, you can ignore this change if you didn't edit NiloToon's shader code
- (Core)rename shader internal MACRO NiloToonIsColorPass to NiloToonIsAnyLitColorPass, you can ignore this change if you didn't edit NiloToon's shader code

Added
- (Core)(IMPORTANT): NiloToonAllInOneRendererFeature and NiloToonShadowControlVolume added a new toggle "useMainLightAsCastShadowDirection", you can enable it if you want NiloToon's self shadow system use scene's MainLight direction to cast shadow(same shadow casting direction as regular URP main light shadow, which means shadow result will NOT be affected by camera rotation/movement)
- (Core)Add GenericStencilUnlit.shader, useful if you want to apply stencil effects that uses drawn character pixels as a stencil mask
- (Core)Character shader: in "Specular" section, add _MultiplyBaseColorToSpecularColor slider, useful if you want to mix base color into specular result
- (Core)Character shader: in "Specular" section, add "Extra Tint by Texture" option, useful if you want to mix any texture into specular result
- (Core)Character shader: in "Emission" section, add _EmissionIntensity, _MultiplyBaseColorToEmissionColor, to allow more Emission color control
- (Core)Character shader: add ColorMask option (RGBA or RGB_), useful if you don't want to pollute RenderTexture's alpha channel for semi-transparent materials
- (Core)Character shader: MatCap(additive) add _MatCapAdditiveMaskMapChannelMask and _MatCapAdditiveMaskMap's remap minmax slider
- (Core)Character shader: MatCap(alpha blend) add _MatCapAlphaBlendMaskMapChannelMask and _MatCapAlphaBlendMaskMap's remap minmax slider
- (Core)Character shader: MatCap(alpha blend) add _MatCapAlphaBlendTintColor and _MatCapAlphaBlendMapAlphaAsMask
- (Core)Character shader: add a new "Environment Reflections" section
- (Core)Character shader: in "Lighting Style" section,added _IndirectLightFlatten, to allow more control on how to display lightprobe result
- (Core)Character shader: in "Outline" section, added _UnityCameraDepthTextureWriteOutlineExtrudedPosition, you can disable it to help removing weird 2D white line artifact on material
- (Core)Character shader: in "Can receive NiloToon Shadow?" section, add _NiloToonSelfShadowIntensityForNonFace(Default 1) and _NiloToonSelfShadowIntensityForFace(Default 0). Face can receive NiloToon's self shadow map now.
- (DEMO)Add MMD4Mecanim folder
- (DEMO)Add some MMD model for testing(only exist in project window)
- (DEMO)Bike Mb1MotorMd000001 add a prefab variant for showing "Environment Reflection" material

Changed
- (Core)Character shader: hide stencil option (stencil options are not being used in all versions)
- (Core)Sticker shader: use ColorMask RGB now, to not pollute RT's alpha channel
- (Core)NiloToonAnimePostProcessPass set ScriptableRenderPass.renderPassEvent = XXX directly, internally NiloToonAllInOneRendererFeature don't need to create 2 renderpass now

- (Core)Internal shader code big refactor without changing visual result, if you didn't edit NiloToon's shader source code, you can ignore this change
- (DEMO)Update model materials (IsSkin and Smoothness)
- (DEMO)CRS scene use main light as NiloToon self shadow casting direction (enable useMainLightAsCastShadowDirection in NiloToonSelfShadowVolume)

Fixed
- (Core)Character shader: fixed a bug where _OcclusionStrength and _GlobalOcclusionStrength is not applied in a correct order
- (Core)Debug window: Fix a bug where NiloToon Debug window always wrongly focus project/scene window
- (Core)Anime postProcess shader: Fix Hidden/NiloToon/AnimePostProcess produce "framgent shader output doesn't have enough component" error in Metal graphics API

[0.1.3] - 2021-5-19

Breaking Changes
- (Core)Change namespace of all NiloToonURP C# script to "using NiloToon.NiloToonURP;", please delete your old NiloToonURP folder first before importing the updated NiloToonURP.unitypackage
- (Core)Change shader path of Character shader to "Universal Render Pipeline/NiloToon/NiloToon_Character"
- (Core)Change shader path of Sticker shader to "Universal Render Pipeline/NiloToon/xxx"

Known Issues
- (Demo)Planar reflection in CRS scene (VR mode) is not correct

Added
- (Core)Character Shader: Add "IsSkin?" toggle in material, you can enable this toggle if a material is skin(hand/leg/body...), enable it will make the shader use an optional overrided shadow color for skin, optional skin mask can be enabled also if your material is a mix of skin and cloth
- (Core)Character Shader: Add _OverrideByFaceShadowTintColor,_OverrideBySkinShadowTintColor,_OutlineWidthExtraMultiplier
- (Core)Character Shader: Add _ZOffsetEnable to allow on off ZOffset by a toggle
- (Core)Character Shader: Add _EditFinalOutputAlphaEnable to allow on off EditFinalAlphaOuput by a toggle
- (Core)Character Shader: Add _EnableNiloToonSelfShadowMapping to allow on off NiloToonSelfShadowMapping by a toggle
- (Core)Character Shader: Add _NiloToonSelfShadowMappingDepthBias to allow edit NiloToonSelfShadowMapping's depth bias per material
- (Core)Character Shader: Add RGBAverage and RGBLuminance to RGBAChannelMaskToVec4Drawer, you will see it if you click the RGBA channel drop list in material UI
- (Core)Sticker Shader: Add override alpha by a texture (optional)
- (Core)Correctly support Unity 2019.4.0f1 or above (need to use URP 7.4.1 or above, NOT URP 7.3.1, you can upgrade URP to 7.4.1 in the package manager)
- (Core)Add NiloToonPlanarReflectionHelper.cs, for planar reflection camera support, you need to call NiloToonPlanarReflectionHelper.cs's function in C# when rendering your planar reflection camera (see MirrorReflection.cs in CRS demo scene), user document has a new section about it, see "When rendering NiloToon shader in planar reflection camera, some part of the model disappeared"
- (Core)Add NiloToonPerCharacterRenderControllerOverrider.cs, to sync perspective removal result from a source to a group of characters
- (Core)Add SimpleLit debug option in NiloToon debug window
- (Core)NiloToonAllInOneRendererFeature: Add useNdotLFix to hide self shadowmap artifact, you can turn it off if you don't like it
- (Core)NiloToonCharRenderingControlVolume: + depthTextureRimLightAndShadowWidthMultiplier
- (Core)NiloToonPerCharacterRenderController: + perCharacterOutlineWidthMultiply , perCharacterOutlineColorTint
- (Demo)Add CRS(Candy rock star) demo scene, with a planar reflection script(MirrorReflection.cs)
- (Demo)Add more demo models
- (Demo)Add .vrm file auto prefab generation editor script, inside ThirdParty(VRM) folder. You can drag .vrm files into demo project and prefab will be generated
- (Demo)Add 4ExtremeHighQuality and 5HighestQuality quality settings, PC build now default use 4ExtremeHighQuality
- (Doc)Add section for how to correctly use NiloToonURP in 2019.4 (need to enable URP's depth texture manually and install URP 7.4.1 or above)
- (Doc)Add section for setting up semi-transparent alpha blending material
- (Doc)Add section for changing VRM(MToon)/RealToon material to NiloToon material

Changed
- (Core)remove _vertex and _fragment suffixes in multi_compile and shader_compile, in order to support 2019.4 correctly
- (Core)Character Shader: Now the minimum supported OpenGLES version is 3.1, not 3.0, due to support SRP Batching correctly
- (Core)package.json: Now the minimum supported URP version is 7.4.1, not 7.6.0

- (Core)package.json: Now the minimum supported editor version is 2019.4.0f1, not 2019.4.25f1
- (Core)NiloToonPerCharacterRenderController.cs: now auto disable perspective removal in XR
- (Core)Smooth normal editor baking: Will skip baking if model don't have correct tangent, and better import error message if model don't have tangent data
- (Core)if _ZWrite = 0, disable all _CameraDepthTexture related effects (e.g.auto disable depth texture 2D rim light of a ZOffset enabled eyebrow material)
- (Core)now use global keyword SHOULD_STRIP_FORCE_MINIMUM_SHADER in demo's enable NiloToon toggle
- (Demo)change demo script to use namespace using NiloToon.NiloToonURP;
- (Demo)now limit Screen height to maximum 1080, to increase fps in 4k monitors
- (Demo)optimize some model's texture max resolution for android, to avoid using too much memory in .apk
- (Doc)improve user document with more FAQ

Fixed
- (Core)fix SRP batcher mode linear gamma bug
- (Core)fixed NiloToonCharacterSticker shaders return alpha not equals 1 problem, these shader will not pollute RT's alpha channel anymore (always return alpha == 1)
- (Core)fixed some shader and C# warning (no harm)
- (Core)fixed a bug that make SRP batcher not working (add _PerCharacterBaseColorTint in NiloToonCharacter.shader's Properties section)

[0.1.2] - 2021-5-3

Added
- (Core)Add NiloToonShadowControlVolume for Volume, you can use it to control and override shadow settings per volume instead of editing NiloToonAllInOneRendererFeature directly
- (Core)All shaders add basic XR support, but many shader features are now auto disabled in XR in this version temporarily, because we are fixing them
- (Core)In XR, due to high fov, outline width is default 50% (only in XR), you can change this number in NiloToonCharRenderingControlVolume or NiloToonAllInOneRendererFeature
- (Core)character shader: Add DepthNormal pass, URP's SSAO renderer feature(DepthNormals mode) will work correctly now
- (Core)character shader: Add "screen space outline" feature in material (experimental, need URP's _CameraDepthTexture enabled), enable it in material UI will add more detail outline to character, useful for alphaclip materials where the default outline looks bad
- (Core)character shader: Add "Dynamic eye" feature in material, for users who need circular dynamic eye pupil control
- (Core)character shader: Add VertExmotion support, you can enable it in NiloToonCharacter_ExtendDefinesForExternalAsset.hlsl
- (Core)character shader: Add _ZOffsetMaskMapChannelMask,_ExtraThickOutlineMaxFinalWidth,_DepthTexShadowThresholdOffset,_DepthTexShadowFadeoutRange,_GlobalMainLightURPShadowAsDirectResultTintColor in material
- (Core)NiloToonAnimePostProcessVolume: add anime postprocess effect draw height and draw timing control
- (Core)Add per character and per volume extra BaseColor tint
- (Core)Can install from PackageManager(install from disk) using NiloToonURP folder's package.json file
- (Core)Add auto reimport and message box when using NiloToonURP the first time
- (Demo)All demo shader add XR support
- (Demo)All scene add steam XR support, see user document pdf for instruction on how to try it in editor play mode (steam PCVR)
- (Demo)Add NiloToonDemoDanceScene_UI.cs, adding more user control in NiloToonDancingDemo.unity

Changed
- (Core)NiloToonAnimePostProcess: Reduce default top light intensity from 100% to 75%
- (Core)improve UI display and tooltips
- (Demo)player settings remove Vulkan API for Android, now always use OpenGLES3 to support testing on more devices
- (Demo)UnityChan edit skin material to have better shadow color(in 0.1.1 shadow color is too dirty and grey)
- (Doc)improve user document with more FAQ

Fixed
- (Core) Fixed bake smooth normal UV8 index out of bound exception if .fbx has no tangent, will now produce error log only
- (Core) Fixed NoV rimlight V matrix not corerct bug (now use UNITY_MATRIX_V instead of unity_CameraToWorld)
- (Core) Fixed a missing abs() bug in NiloZOffsetUtil.hlsl
- (Demo) Fixed multi AdvanceFPS script in scene bug

[0.1.1] - 2021-4-19

Added
- (Core)Add change log file (this file)
- (Core)character shader: Add "MatCap (blend,add and mask)" section, which mix MatCap textures to Base map

- (Core)character shader: Add "Ramp lighting texture" section, which override most lighting params by a ramp texture
- (Core)character shader: Add "Final output alpha" section, to allow user render opaque character to custom RT without alpha problem
- (Core)character shader: "Detail Maps" section add uv2 toggle and albedo texture white point slider
- (Core)character shader: "Calculate Shadow Color" section add _FaceShadowTintColor
- (Core)character shader: "Calculate Shadow Color" section add _LitToShadowTransitionAreaTintColor, LitToShadowTransitionArea HSV edit
- (Core)character shader: "Outline" section add _OutlineOcclusionAreaTintColor, _OutlineReplaceColor
- (Core)character shader: "Depth texture shadow" section add _DepthTexShadowUsage
- (Core)character shader: NiloToonCharacter_ExtendFunctionsForUserCustomLogic.hlsl add more empty functions for user
- (Core)character shader: Add support to VertExmotion asset (no change to NiloToon shader name) (add NiloToonCharacter_ExtendDefinesForExternalAsset.hlsl for user to enable VertExmotion support if they need it)
- (Core)volume: NiloToonCharRenderingControlVolume.cs add Directional Light, Additional Light, Specular's volume control to allow better control light intensity on character
- (Core)character root script: NiloToonPerCharacterRenderController.cs Add perCharacterDesaturation
- (Core)character root script: NiloToonPerCharacterRenderController.cs Add extra think outline view space pos offset, usually for stylized color 2D drop shadow
- (Demo)Add GBVS Narmaya model and setup her using NiloToon (face material not ready for 360 light rotation)
- (Demo)Add NiloToonCutinScene.unity to show GBVS Narmaya model
- (Demo)Add bike (using NiloToonURP) in NiloToonSampleScene.unity
- (Demo)Include XR related files, preparing for future XR support
- (Demo)Add 4HighestQuality, it will now ignore performance limit, using the best possible setting (only for PC build, WebGL and editor)

Changed
- (Core)NiloToonAllInOneRendererFeature: Unlock self shadow's shadow map resolution limit from 4096 to 8192
- (Core)NiloToonAverageShadowTestRT.shader: add sampling pos offset to prevent over generating average shadow due to near by objects/characters
- (Core)revert indirectLightMultiplier's default setting from 2 to 1
- (Demo)Upgraded dmeo project to 2020.3.4f1
- (Demo)Optimize 0~3 quality settings for mobile, while allow best quality(4) for PC/Editor/WebGL
- (Demo)Allow every scene to switch to another in play mode, no matter user start playing in which scene
- (Demo)Refactor and rename some files and folder

Fixed
- (Core)character root script: NiloToonPerCharacterRenderController.cs fix can't edit material in pause play mode bug

Know Issues
- (Core)Depth texture rim light is not correct in PCVR Editor
- (Core)Shader variant(memory usage) too much in mobile build
- (Core)Outline render incorrectly if camera is too close
- [DONE in 0.3.2] (Core)per character scirpt's editor script is too slow
- (Demo)Switching scene in editor play mode takes a very long time, due to editor script

TODO
- (Core)Finish detail document on material properties, NiloToon UI params
- (Core)Charcter shader can't receive point or spot light shadow (need to support URP11 first, since point light shadow only exist in URP11)
- [DONE in 0.1.2] (Core)depth texture sobel outline shader_feature
- [DONE in 0.1.2] (Core)control URP shadow intensity remove directional light contribution (as volume)
- (Demo)Add moving tree shadowmap demo scene
- (Demo)GBVS Narmaya's face material not yet setup correctly to support all light direction

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[0.0.3] - 2021-4-06
Added
- (Demo)Add MaGirlHeadJsonTransformSetter.cs
- (Demo)Add random face & ear animation for MaGirl using MaGirlHeadJsonTransformSetter.cs

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[0.0.2] - 2021-4-03
Added
- (Demo)Add MaGirl3.prefab and it's variants, setup her using NiloToon
- (Demo)Add MaGirl2.prefab and it's variants, setup her using NiloToon
- (Demo)Add NiloToonDancingDemo.unity scene

[0.0.1] - 2021-3-28
Added

- (Core)First version to record in change log.
- (Demo)First version to record in change log.