Thank you for your purchase! The most recent documentation can be found online. If you have any questions feel free to post on the forums or email support@opsive.com.

Introduction

The Third Person Controller is the ultimate third person, networking, and mobile framework. The Third Person Controller is extremely flexible and can be used with Behavior Designer for lifelike AI agents.

The base directory has the following structure:

Third Person Controller/Demos
Third Person Controller/Editor
Third Person Controller/Integrations
Third Person Controller/Scripts

The Demos folder contains the various genre demos. The Demos folder does not contain any of the Third Person Controller folder and can safely be removed if you aren't using any of the assets within that folder. If you delete the Demos folder ensure you have replaced all of the animations within the Animator Controller to your own animations.

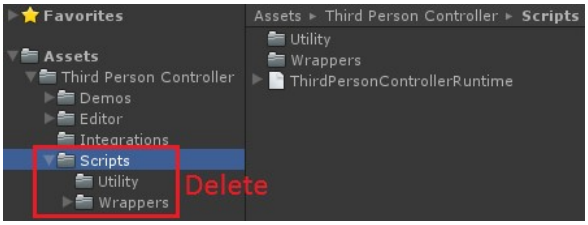
The full source code can be downloaded from this page. Before you import the source code ensure that you have first read this page. In addition, you'll notice that the Third Person Controller includes wrapper components which allow you to easily switch between the assembly and source code version without losing any references.

Importing Source Code

When the Third Person Controller is downloaded from the Asset Store or Opsive it uses an assembly instead of the source code. If you want to download the source code you can download it from this page. We hate to have to package the Third Person Controller this way, but this is done to reduce piracy. Before you import it you must make sure you delete the scripts folder located at

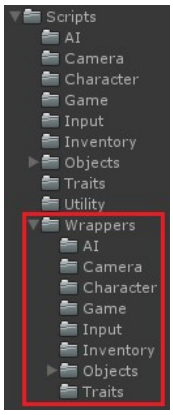
/Third Person Controller/Scripts

If you do not delete this folder and import the source code package you will receive compiler errors.



Wrappers

As you are working with the source code you'll notice that there are two sets of components with the same name. This is done to allow you to easily move between the assembly and the source code version without Unity losing any component references. When you add a new Third Person Controller component make sure you are using the "Wrapper" version of the component. These components can be found in the /Third Person Controller/Scripts/Wrappers folder and use the namespace Opsive.ThirdPersonController.Wrappers. If you do not use these components there is a chance that Unity will lose references to the component within your scene or prefabs if you switch to the source code version.



Camera

The CameraController component controls the camera's position and rotation for a third person, top down, or 2.5D view. When the camera is in third person mode, the camera will smoothly follow the character as the character moves. If the the RigidbodyCharacterController is in combat mode, the camera will always be behind the player. When the controller is in adventure mode the camera will be able to freely rotate around the character. Top down mode will follow the character from a birds eye view. RPG mode allows the camera to interact with the mouse to decide how to position/rotate itself. 2.5D view mode places the camera in a 2.5D perspective.

When the character dies the CameraController will receive the OnDeath event. The CameraController will then either go into a death orbit mode or in a LookAt mode. The death orbit will smoothly circle around the character's position. If the death orbit mode is disabled then the CameraController will just continue to look at the character and not change positions.

The Camera Controller uses camera states in order to determine the current properties. This allows the camera to change settings at runtime without having to manually script each change. New camera states can be triggered by abilities or items.

The character can fade out if the camera gets too close to the character, thus eliminating the chance of the camera clipping with the character. The fading will occur if FadeCharacter is enabled. In addition, the camera has the option of locking onto a target. UseTargetLock must be enabled and that will allow your character to stay focused on a particular object.

The CameraController component works with the CameraMonitor component in order to communicate to other components about the camera's current state. For example, CharacterIK uses to a SharedMethod to communicate with the camera to know which direction to aim. If you want to use your own custom camera you can assign the CameraMonitor component and everything else will continue to work.

Camera States
A list of all possible CameraStates

Init Character On Start
Should the character be initialized on start?

Character
The character that the camera is following

Anchor
The transform of the object to look at

Auto Anchor
Should the anchor be assigned automatically based on the bone?

Auto Anchor Bone
The bone in which the anchor will be assigned to if automatically assigned

Fade Transform
The Transform to use when determining how much to fade

Death Anchor
Optionally specify an anchor point to look at when the character dies. If no anchor is specified the character's position will be used

Use Death Orbit
When the character dies should the camera start rotating around the character? If false the camera will just look at the player

Death Orbit Rotation Speed
The speed at which the camera rotates when the character dies. Used by both the death orbit and regular look at

Death Orbit Move Speed
The speed at which the death orbit moves

Death Orbit Distance
How far away the camera should be orbiting the character when the character dies

Character Fade

The character can fade out if the camera gets too close to the character, thus eliminating the chance of the camera clipping with the character. The fading will occur if FadeCharacter is enabled within the CameraController. In order for the character to fade, the character must be using Unity's Standard Shader. Any items being held by the character will also fade if they are using the Standard Shader.

Fade Character
Fade the character's material when the camera gets too close to the character. This will prevent the camera from clipping with the character

Fade Transform
The Transform to use when determining how much to fade

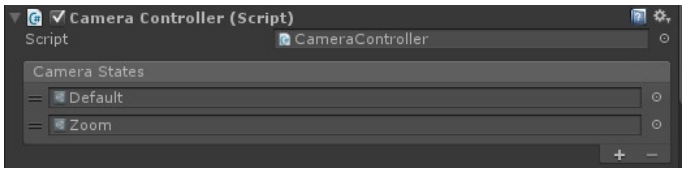
Start Fade Distance
The distance that the character starts to fade

End Fade Distance
The distance that the character is completely invisible

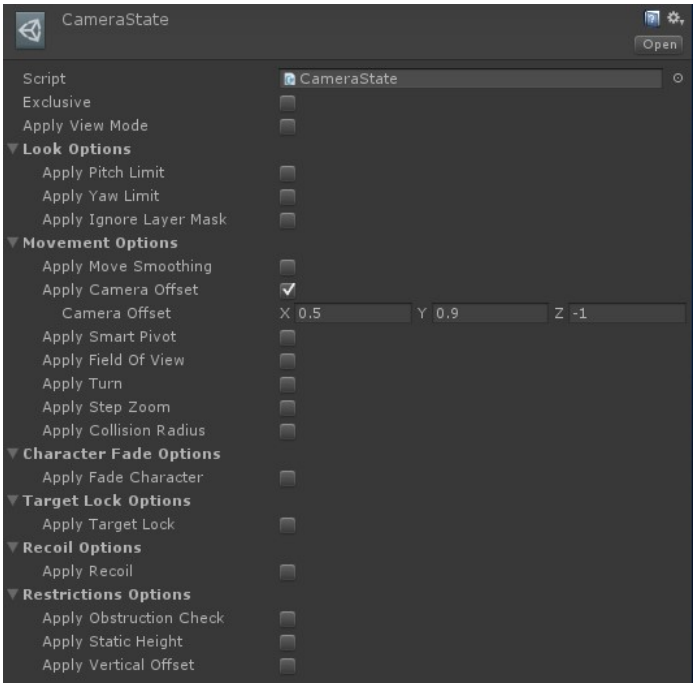
States

Camera States allow you to specify various Camera Controller properties without having to script the changes by hand. This allows for flexibility in that you can change any of the Camera Controller properties at runtime just by specifying which state should play. Both the Ability system and the Item system has access to camera states so you can for example restrict the yaw angle while in cover or switch to a scope for a sniper rifle.

After the Camera Controller has been added to a scene it will contain two states: Default and Zoom. The Zoom state is (optionally) activated by the Camera Handler when the camera should zoom.



New camera states can be added by clicking on the plus button on the bottom right of the state list. When a new state is created you have the option of selecting which Camera Controller properties are affected by the Camera State. For example, if you wanted to create a new state which just changes the camera's offset then you'd enable "Apply Camaera Offset" and change the offset to your desired value.



At the very top of the Camera State inspector is an option to set the state to "Exclusive". An exclusive state means that no other states can override the current state until that state is finished. This is useful in the case of a sniper rifle scope. Lets say that the Zoom state has a field of view of 40, but with a sniper you want it to be 20. The Camera Handler component isn't aware that the sniper is equipped so it will try to switch to the Zoom state when the character is aiming. However, the Sniper Rifle's camera state specifies a field of view of 20 so it should be exclusive so it does not get overridden by the Zoom state.

Exclusive
Is the camera state exclusive of all of the other states?

View Mode
Specifies if the camera should use a Third Person, RPG, Top Down, or 2.5D (Pseudo3D) view mode

Min Pitch Limit
The minimum pitch angle (in degrees)

Max Pitch Limit
The maximum pitch angle (in degrees)

Min Yaw Limit
The minimum yaw angle while in cover (in degrees)

Max Yaw Limit
The maximum yaw angle while in cover (in degrees)

Ignore Layer Mask Move Smoothing
Ignore the specified layers when determining if the camera view is being obstructed

Camera Offset
The offset between the anchor and the location of the camera

Smart Pivot
If the camera collides with the ground should a smart pivot be applied?

Field Of View
The camera field of view

Field Of View Speed
The speed at which the FOV transitions field of views

Turn Smoothing
The amount of smoothing to apply to the pitch and yaw. Can be zero

Turn Speed
The speed at which the camera turns

Rotation Speed
The rotation speed when not using the third person view

View Distance
The distance to position the camera away from the anchor when not in third person view

Look Direction
The number of degrees to adjust if the anchor is obstructed by an object when not in third person view

Step Zoom Sensitivity
The 2.5D target look direction

Min Step Zoom
The sensitivity of the step zoom

Max Step Zoom
The minimum amount that the camera can step zoom

Collision Radius
The maximum amount that the camera can step zoom

Fade Character
The radius of the camera's collision sphere to prevent it from clipping with other objects

Start Fade Distance
Fade the character's material when the camera gets too close to the character. This will prevent the camera from clipping with the character

End Fade Distance
The distance that the character starts to fade

Use Target Lock
The distance that the character is completely invisible

Target Lock Speed
Should the crosshairs lock onto enemies?

Break Force
If target lock is enabled, specifies how quickly to move to the target (0 - 1)

Use Humanoid Target Lock
If target lock is enabled, specifies how much force is required to break the lock

Humanoid Target Lock Bone
If target lock is enabled and the target is a humanoid, should the target lock onto a specific bone?

Recoil Spring
If target lock is enabled and the target is a humanoid, specifies which bone to lock onto

Recoil Dampening
The speed at which the recoil increases when the weapon is initially fired

Obstruction Check
The speed at which the recoil decreases after the recoil has hit its peak and is settling back to its original value

Static Height
Should the camera perform an obstruction check?

Vertical Offset
Should the y-position be a static value? The amount of vertical offset to apply

Target Lock

Target Lock allows the character to circle around the target object while the character is aiming. Target Lock works with the Crosshairs Monitor component in order to determine the object that is in front of the crosshairs. The target lock can be broken by changing the camera position quickly or by the character no longer aiming. If the target object is a humanoid the lock can optionally lock onto a specific bone.

Use Target Lock
Should the crosshairs lock onto targets?

Target Lock Speed
If target lock is enabled, specifies how quickly to move to the target (0 - 1)

Break Force
If target lock is enabled, specifies how much force is required to break the lock

Use Humanoid Target Lock
If target lock is enabled and the target is a humanoid, should the target lock onto a specific bone?

Humanoid Target Lock Bone
If target lock is enabled and the target is a humanoid, specifies which bone to lock onto

Handlers

The Third Person Controller framework contains many components which have the word “Handler” in their name. These classes are designed to take input from the keyboard and pass it on to their respective controller class. As an example, the CameraController component uses the CameraHandler component to get the pitch and yaw input for the camera. The handler components do not know that the controller component exists. The framework is designed this way to easily allow it to be used for AI. The AI isn’t controlled by player input so it does not need the corresponding handler class.

AI Integration

The Third Person Controller is integrated with Behavior Designer to allow your character to be controlled by an AI within behavior trees. For those who are new to behavior trees, AAA games use behavior trees to create a lifelike AI. The full integration task list is available on the Behavior Designer documentation page. A description of the sample behavior tree created for this integration is listed on this page.

If your character is going to be used for AI then it does not need to respond to human player input. Therefore the PlayerInput component does not need to be added to the character. The Character Builder will not add the PlayerInput component if the Is AI Agent option is enabled.

Networking

The Third Person Controller supports Unity's networking solution introduced with Unity 5.1. Networking is a complex topic so it is highly recommended that you first go through Unity's networking documentation before continuing. The Third Person Controller network integration uses an authoritative server on Unity's HLAPI layer. Unity 5.1.2 or later is required for the networking integration to work.

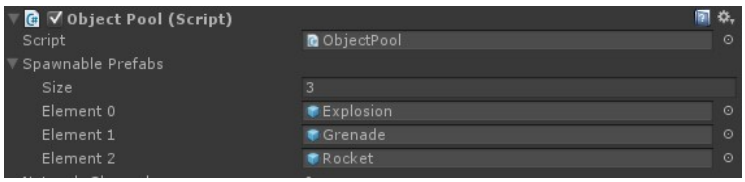
There are two extra steps to make your character a networked character. The first step is to add the NetworkIdentity, NetworkTransform, and NetworkAnimator components to your character. The Character Builder will automatically add these components if Is Networked Character is enabled within the first step of the wizard. The second step is to add the ENABLE_MULTIPLAYER compiler definition to your PlayerSettings. This definition can be added manually or automatically added by clicking the "Add Multiplayer Symbol" button within the RigidbodyCharacterController component:

Once your character is setup the final step is to add two networking components to your scene GameObjects. The first component that should be added is the NetworkEventManager. This component should be added instead of the Unity NetworkManager component and can be added to any GameObject within your scene. The NetworkEventManager inherits from NetworkManager and allows the EventHandler to notify interested components about network events. You will also need to add the NetworkIdentity component to your Game GameObject, which was created with "Setup Scene" from the Start Window.

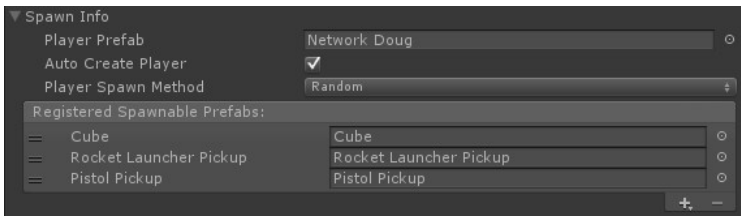
If you are converting an already created character to a networked game you'll want to add the following four components to your character: NetworkMonitor, NetworkIdentity, NetworkTransform, and NetworkAnimator.

The Third Person Controller includes a demo scene to help get you started with networking. This demo scene can be setup by:

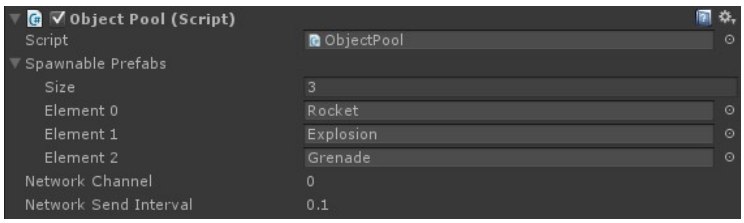
1. Import the Third Person Controller into a Unity 5.1.2+ project
2. **Import the source code**
3. Open the Third Person Controller/Demos/Network scene
4. Add the ENABLE_MULTIPLAYER symbol (see above)
5. Add the Explosion, Grenade, and Rocket prefabs from the Third Person Controller/Demos/Network/Prefabs directory to the Object Pool. This must be done manually because when the Third Person Controller is submitted to the Asset Store it does not have the ENABLE_MULTIPLAYER symbol defined. See the image below for an example.
6. Play



The network scene was created using the steps above. One thing to note about this scene is that there are two different sets of spawnable prefab registration locations. The first set is specified within the Unity NetworkManager component:



And the second set is specified within the ObjectPool component:



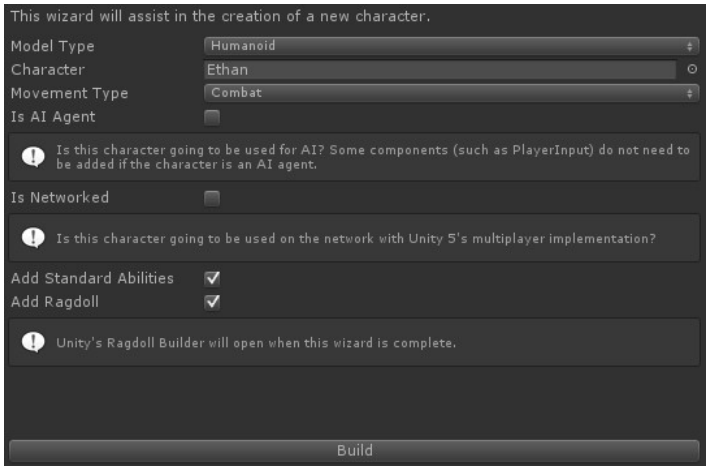
If your prefabs can be spawned by the ObjectPool, then the prefabs should be registered by the ObjectPool component. From the sample scene the Rocket, Explosion, and Grenade prefabs are spawned using the ObjectPool. This does not include *every* object spawned by the ObjectPool, only those that should be spawned over the network. For example, a muzzle flash does not need to be spawned over the network so it does not need to be a registered prefab. Any prefabs spawned over the network which do not use the ObjectPool should be specified within the NetworkManager component.

Object Builders

The disadvantage of having very modular components is that there are a lot of components and it can take some work to initially setup your objects. To help alleviate this problem the Third Person Controller includes the Character Builder, Item Type Builder, and Item Builder. These builders will walk you through the most commonly changed options and add all of the components for you. These values can be changed at any point in time after you have created the object.

Character

The Character Builder is an editor script which will add all of the character-related components to your new character. The Character Builder can be accessed from the Start Window or the Tools menu. The Character Builder consists of two steps in order to create your character.



Model Type
Is a humanoid or a generic model going to be used? If a humanoid is going to be used the avatar bones must first be configured.

Character
The GameObject that will be used at the character. This is the base layer of your character and will have the majority of the components added to it.

Movement Type
Combat movement allows the character to move backwards and strafe. If the character has a camera following it then the character will always be facing in the same direction as the camera. Adventure movement always moves the character in the direction they are facing and the camera can be facing any direction. Top down movement moves rotates the character in the direction of the mouse and moves relative to the camera. More information is available on the controller page.

Is AI Agent
Is this character going to be used for AI? Some components (such as PlayerInput) do not need to be added if the character is an AI agent.

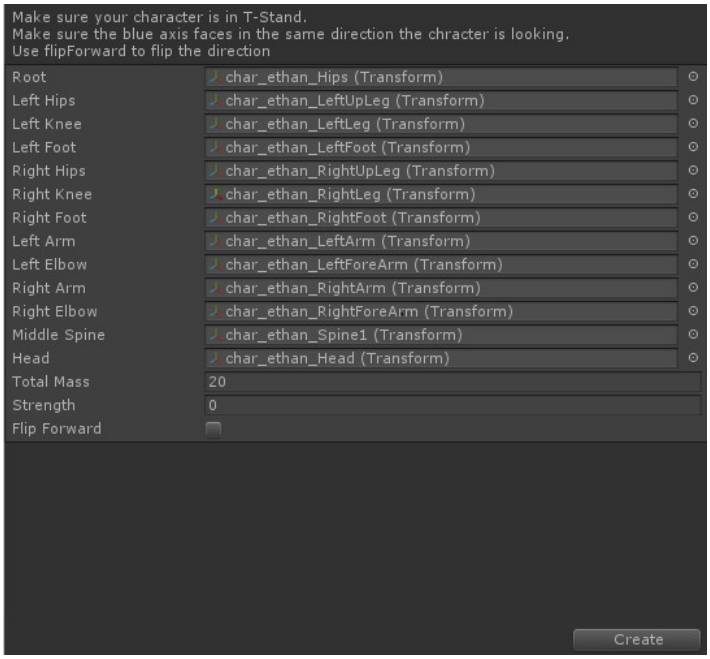
Is Networked
Is this character going to be used on the network with Unity 5's networking implementation?

Add IK
Should the CharacterIK component be added?

Add Standard Abilities
Should the Jump and Fall abilities be added?

Add Ragdoll
Do you want to add a ragdoll to the character?

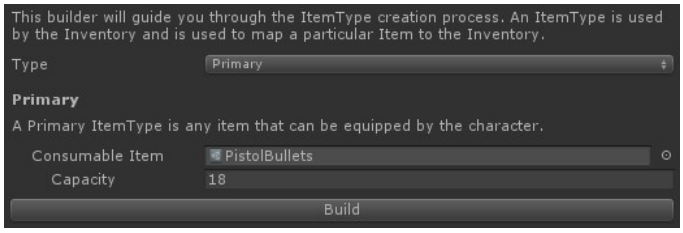
If Add Ragdoll is enabled, as soon as Build is clicked the Character Builder will open Unity's Ragdoll Builder. All of the character's transforms will automatically be added to the Ragdoll Builder fields:



Your character is now created and is ready to be used!

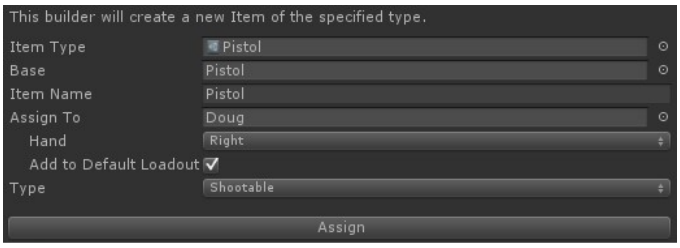
Item Type

An ItemType is used by the Inventory and Animator to identify a particular Item. The Item Type Builder will create this ItemType for you. The Item Type Builder can create any of the three ItemTypes: Primary, Consumable, and Secondary. The PrimaryItemType is shown below:



Item

An Item is anything that can be used by the character. The Item Builder will add the required components and can add the Item to the character automatically.



Item Type
The ItemType asset used to identify the item for the Inventory and Animator

Base
The base GameObject of the Item. This GameObject can be empty if creating a ThrowableItem

Name
The Item Name specifies the name of the Animator substate machine. It should not be empty unless you only have one item type

Assign To
The GameObject of the character that the Item should be assigned to

Hand
The hand that the Item should be assigned to

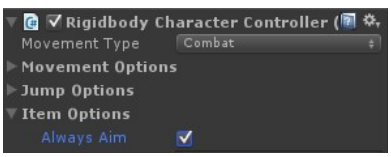
Add to Default Loadout
Should the ItemType be added to the character's Default Loadout?

Type
The type of item, a shootable, throwable, or melee

Positioning

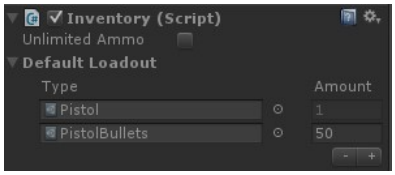
After the Item has been created it will need to be correctly positioned in the character's hand. If you assigned the Item to the character with the Item Builder it will already be parented to the dominant hand specified with the Character Builder. If the Item is stored as a prefab within your project you have the option of assigning it to an existing character within the Item's inspector:

Now the item can be positioned. When positioning the Item the goal is to have the Item aiming at the crosshairs. The first step to accomplish this is to turn on the AlwaysAim property on the RigidbodyCharacterController. This will make the character always extend his arms to aim and is easier to orient the weapon.



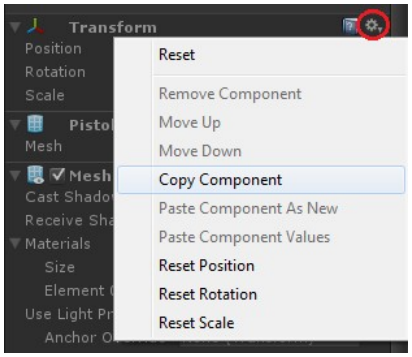
In addition to enabling AlwaysAim, the CharacterIK component should be disabled. This will prevent the IK from rotating the limbs while positioning the Item.

The next step is to assign the Item's ItemType to the Inventory's default loadout so the character will have the Item at the start.



Now that the controller is set to AlwaysAim and the ItemType has been added to the Inventory's Default Loadout the Item is ready to be positioned. Start the game within Unity and find your character and the Item. It should be enabled and the character's arms should be in the aim position. The next step is to manually position the Item so it is facing forward.

Once you are satisfied with the Item's position and rotation go to the Item's Transform component and copy the values (available under the gear icon). This will copy the position and rotation values to the clipboard.



End the game and select the gear icon again. Instead of copying the values select "Paste Component Values". Your item will now be positioned correctly the next time you start the game.

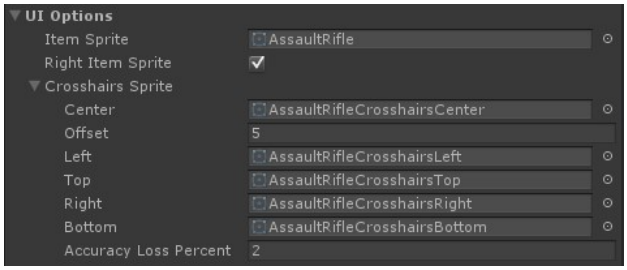
How To

The following sections describe how to setup a particular feature. Please post on the forum if you'd like to suggest a new How To topic.

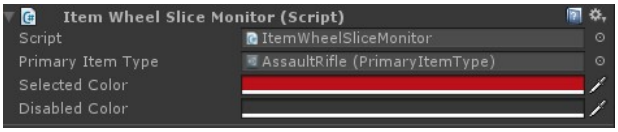
Add the UI to a New Scene

The Third Person Controller UI is designed to be as easy as possible to bring into your own scene. The first step in bringing the existing UI to a new scene is to copy the Canvas GameObject from a demo scene.

You can then paste this GameObject in your own scene. When you hit play the UI components will automatically point towards the character who has the "Player" tag. If the item or crosshairs is not showing make sure you have referenced the sprite within the Item component of the equipped item.



Most of the UI components do not need any modification for a new scene. The one component which you may need to modify is the Item Wheel. Each slice within the Item Wheel needs to know which ItemType it is referencing. If you have created new ItemTypes then you'll need to make sure you update this component.



Create a new Ability

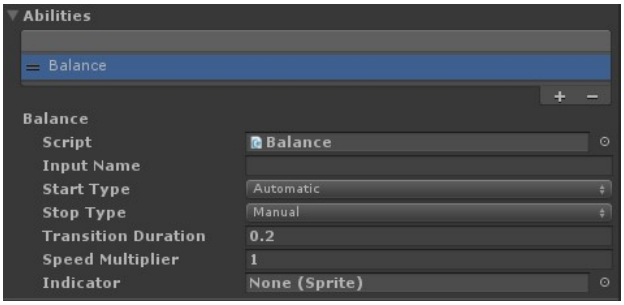
The Third Person Controller is structured in a way that you can easily add new animation states without changing the core Third Person Controller classes. The Third Person Controller uses the term "Ability" to describe these new animation states. Abilities are extremely powerful in that they can give your character completely new and original functionality. There are no limitations in what you can do with abilities - cover, swimming, wall running, and flying is all possible with the ability system. This document will walk you through creating your own ability.

The ability that we are going to create is a Balance ability. The balance ability allows the character to walk carefully over a narrow platform, such as a tightrope. This ability will give a great overview into how the ability system works. It will add a new blend tree which is transitioned to using the implicit transition system. It will also give an example of using the normal Animator Controller transition system (we use the term "explicit transition" to describe this type of transition). The final feature that this ability will demonstrate is overriding a couple of the optional Ability methods.

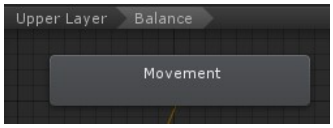
The first step to adding a new ability is to create a new class derived from the Ability class. This class contains all of the base functionality for all of the abilities, as well as contains some common helper variables and methods. Our new Balance ability will consist of overriding the Ability methods. The Third Person Controller transitions to new abilities using an implicit transition so the first method that we will override is the GetDestinationState method. This method is called when the ability is activated and it specifies which state should play. For this ability we are going to return the "Balance.Movement" state:

```
using UnityEngine;
using Opsive.ThirdPersonController.Abilities;

public class Balance : Ability
{
    public override string GetDestinationState(int layer)
    {
        return "Balance.Movement";
    }
}
```

This is the minimum needed for a new ability and with this code you'll be able to select the ability within the RigidbodyCharacterController:



We specified the "Balance.Movement" ability rather than just "Movement" because we want to transition to the "Movement" state within the "Balance" substate. Within your Animator Controller the state will look like:



No explicit transitions are necessary - the AnimatorMonitor will take care of transitioning to the "Balance.Movement" state. With the current GetDestinationState implementation the "Balance.Movement" state will play on each layer within the Animator Controller. For this ability we only want it to play on the lower and upper body layers. The base Ability class caches the AnimatorMonitor component so we can easily prevent the ability from playing on unwanted layers:

```
    public override string GetDestinationState(int layer)
    {
        if (layer != m_AnimatorMonitor.BaseLayerIndex && layer != m_AnimatorMonitor.UpperLayerIndex &&
            !m_AnimatorMonitor.ItemUsesAbilityLayer(this, layer)) {
            return string.Empty;
        }

        return "Balance.Movement";
    }
```

With this ability in place we can now test it out to see how it functions. If we hit play within Unity the ability will automatically start because it has an Start Type of Automatic. We'll see that the "Balance.Movement" state plays on the lower and upper body layers, and the remaining layers play their default state.

This works well for what it is, but we now want to add more functionality to it so the ability will only start when the character is over a narrow object that they can balance on. If we look at the list of virtual Ability methods we'll find CanStartAbility. This method is called when the ability is tried to be started, and it will return a true or false value indicating if the ability can be started.

We only want this balance ability to start if the following conditions are true:

1. The character is on the ground.
2. There is a drop to the left of the character.
3. There is a drop to the right of the character.

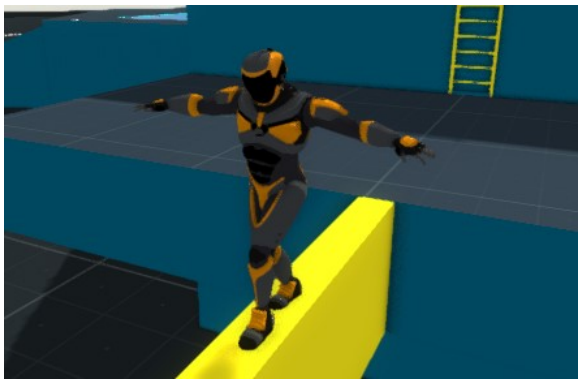
With those three conditions defined we can implement the CanStartAbility method:

```
    public override bool CanStartAbility()
    {
        var front = m_Controller.CapsuleCollider.radius * Mathf.Sign(m_Transform.InverseTransformDirection(m_Controller.Velocity).z);

        if (!Physics.Raycast(m_Transform.TransformPoint(0, m_Controller.CapsuleCollider.center.y -
                m_Controller.CapsuleCollider.height / 2 + 0.1f, front), -m_Transform.up, m_MinDropHeight)) {
            return false;
        }

        if (Physics.Raycast(m_Transform.TransformPoint(-m_Controller.CapsuleCollider.radius - m_SidePadding,
                m_Controller.CapsuleCollider.center.y - m_Controller.CapsuleCollider.height / 2 + 0.1f, front),
                -m_Transform.up, m_MinDropHeight)) {
            if (Physics.Raycast(m_Transform.TransformPoint(-(m_Controller.CapsuleCollider.radius * 2) - m_SidePadding,
                     m_Controller.CapsuleCollider.center.y - m_Controller.CapsuleCollider.height / 2 + 0.1f, front),
                    -m_Transform.up, m_MinDropHeight)) {
                return false;
            }
        }

        if (Physics.Raycast(m_Transform.TransformPoint(m_Controller.CapsuleCollider.radius + m_SidePadding,
                m_Controller.CapsuleCollider.center.y - m_Controller.CapsuleCollider.height / 2 + 0.1f, front),
                -m_Transform.up, m_MinDropHeight)) {
            if (Physics.Raycast(m_Transform.TransformPoint(m_Controller.CapsuleCollider.radius * 2 + m_SidePadding,
                    m_Controller.CapsuleCollider.center.y - m_Controller.CapsuleCollider.height / 2 + 0.1f, front),
                    -m_Transform.up, m_MinDropHeight)) {
                return false;
            }
        }

        if (Physics.Raycast(m_Transform.TransformPoint(0, m_Controller.CapsuleCollider.center.y -
                    m_Controller.CapsuleCollider.height / 2 + 0.1f, front), -m_Transform.right, m_MinDropHeight)) {
                return false;
        }
        if (Physics.Raycast(m_Transform.TransformPoint(0, m_Controller.CapsuleCollider.center.y -
                    m_Controller.CapsuleCollider.height / 2 + 0.1f, front), m_Transform.right, m_MinDropHeight)) {
            return false;
        }

        return true;
    }
```

The first part of this method ensures the character is on the ground. The second part of this method casts two raycasts to the left of the character. If both of those raycasts hit an object then the character is not on a narrow object and should not balance. Two raycasts are used because the character could be on the edge of a non-narrow object and just one raycast would return success when the object is actually narrow so it should return failure. The third part is the same as the second part except is casts a ray to the right of the character rather than the left. The last part of this method ensures there is not a wall to the left or right of the character. This method uses a couple new variables that we first must define and initialize:

```
public class Balance : Ability
{
    [SerializeField] private float m_MinDropHeight = 1;
    [SerializeField] private float m_SidePadding = 0.1f;
```

A fully commented version of this ability is added at the bottom of this page. This ability and animations are also included in the Third Person Controller package. When we test this ability out we will see that the ability only starts when the character is over a narrow object:

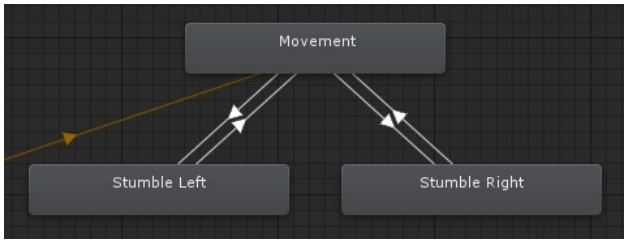


Now that the ability starts correctly, it's time to get the ability to stop. By default the Stop Type is set to Manual. This means that the ability must be stopped within code - whether that be through the ability itself or through an event. For the Balance ability we want to set the Stop type to Automatic - this will tell the RigidbodyCharacterController that the ability should be asked if it can be stopped. The RigidbodyCharacterController asks by calling the CanStopAbility method. This method is very similar to the CanStartAbility method, except instead of asking to start the ability it instead asks to stop the ability.

The Balance ability should be stopped when the character is not on a narrow object or not on the ground - which is the opposite of the CanStartAbility. For this we can move the CanStartAbility implementation to a new method, and then call that method from both CanStartAbility and CanStopAbility. This implementation will look like:

```
public override bool CanStartAbility()
{
    return IsOnBalanceObject();
}

private bool IsOnBalanceObject()
{
    var front = m_Controller.CapsuleCollider.radius * Mathf.Sign(m_Transform.InverseTransformDirection(m_Controller.Velocity).z);

    if (!Physics.Raycast(m_Transform.TransformPoint(0, m_Controller.CapsuleCollider.center.y -
            m_Controller.CapsuleCollider.height / 2 + 0.1f, front), -m_Transform.up, m_MinDropHeight)) {
        return false;
    }

    if (Physics.Raycast(m_Transform.TransformPoint(-m_Controller.CapsuleCollider.radius - m_SidePadding,
            m_Controller.CapsuleCollider.center.y - m_Controller.CapsuleCollider.height / 2 + 0.1f, front),
            -m_Transform.up, m_MinDropHeight)) {
        if (Physics.Raycast(m_Transform.TransformPoint(-(m_Controller.CapsuleCollider.radius * 2) - m_SidePadding,
                m_Controller.CapsuleCollider.center.y - m_Controller.CapsuleCollider.height / 2 + 0.1f, front),
                -m_Transform.up, m_MinDropHeight)) {
            return false;
        }
    }

    if (Physics.Raycast(m_Transform.TransformPoint(m_Controller.CapsuleCollider.radius + m_SidePadding,
            m_Controller.CapsuleCollider.center.y - m_Controller.CapsuleCollider.height / 2 + 0.1f, front),
            -m_Transform.up, m_MinDropHeight)) {
        if (Physics.Raycast(m_Transform.TransformPoint(m_Controller.CapsuleCollider.radius * 2 + m_SidePadding,
                m_Controller.CapsuleCollider.center.y - m_Controller.CapsuleCollider.height / 2 + 0.1f, front),
                -m_Transform.up, m_MinDropHeight)) {
            return false;
        }
    }

    if (Physics.Raycast(m_Transform.TransformPoint(0, m_Controller.CapsuleCollider.center.y -
                m_Controller.CapsuleCollider.height / 2 + 0.1f, front), -m_Transform.right, m_MinDropHeight)) {
            return false;
    }
    if (Physics.Raycast(m_Transform.TransformPoint(0, m_Controller.CapsuleCollider.center.y -
                m_Controller.CapsuleCollider.height / 2 + 0.1f, front), m_Transform.right, m_MinDropHeight)) {
        return false;
    }

    return true;
}

public override bool CanStopAbility()
{
    return !IsOnBalanceObject();
}
```

If we play the game we'll see that the ability correctly starts, plays, and stops itself. This is great and it could be considered a complete ability. However, we want to more to it to show the ability system works. When the character tries to move to the left or the right we want to play a stumble animation. For this animation we are going to add an explicit transition to the stumble left and right states. This transition will then be triggered within the ability.



The Third Person Controller uses a minimal parameter list to keep everything as clean and straight forward as possible. For this ability we are going to use one of those parameters to describe which state the Balance ability should be in. We can do this by overriding the UpdateAnimator method:

```
public override bool UpdateAnimator()
{
    if (m_Controller.InputVector.x > m_StumbleMagnitude) {
        m_BalanceID = BalanceID.StumbleRight;
    } else if (m_Controller.InputVector.x < -m_StumbleMagnitude) {
        m_BalanceID = BalanceID.StumbleLeft;
    } else {
        m_BalanceID = BalanceID.Movement;
    }
    m_AnimatorMonitor.SetStateValue((int)m_BalanceID);

    return true;
}
```

There are two new concepts introduced within this method: the return status and the Animator parameters. As you go through the virtual Ability methods you'll noticed that many of the key movement methods return a bool value. This value indicates if the RigidbodyCharacterController should continue its execution of that method. The RigidbodyCharacterController works by going through many methods which update the state of the controller: velocity, rotation, Animator parameters, etc. When an ability returns a true value it tells the RigidbodyCharacterController that it should update its own method corresponding to that ability method. For example, if we return false within the UpdateAnimator method then the RigidbodyCharacterController will not run its UpdateAnimator implementation. In the case of the Balance ability we return true so the RigidbodyCharacterController will execute its UpdateAnimator implementation.

The second concept introduced within this method is setting the Animator paremter. We used a couple new variables: the Balance ID and Stumble Magnitude. The Balance ID is an enum which describes which state the Balance ability should be in. This enum is cast to an int and is then set to the State parameter within the Animator. When we transition between the Movement, Stumble Left, and Stumble Right states we will use this State parameter to determine the transition condition. The Stumble Magnitude is a normalized value indicating how much horizontal input needs to be applied in order for the character to stumble. These variables are defined at the top of the Balance class:

```
private enum BalanceID { Movement, StumbleLeft, StumbleRight }

[SerializeField] private float m_StumbleMagnitude = 0.5f;

private BalanceID m_BalanceID;
```

When the ability starts we want to make sure we reset the Balance ID to its default value:

```
protected override void AbilityStarted()
{
    m_BalanceID = BalanceID.Movement;

    base.AbilityStarted();
}
```

With this change the character will stumble when the horizontal input is greater than the Stumble Magnitude. If you look at the Animator Controller you'll see it moving through the explicit transitions to the stumble states. The last thing that we want to add to this ability is to prevent the character from carrying an item while the ability is active. This can be accomplished by overriding the CanHaveItemEquipped method:

```
public override bool CanHaveItemEquipped()
{
    return false;
}
```

That's all that it takes to add a reasonably complex ability! We tried to make this ability system as easy as possible to use while also making sure your ability can take complete control of the character controller if it wants to. With this ability complete the next step is to go through the Ability class and see what other methods can be overridden. Take a look at the other abilities as well - they provide an excellent example in how to use each method. Every ability is extremely well commented so it should help walk you through how the ability works. This entire ability (with comments) has been copied below:

```
using UnityEngine;
using Opsive.ThirdPersonController.Abilities;

///

/// When on a narrow object the Balance ability will slow the character's movements down and
/// stretch the character's hands out to balance on the object.
///

public class Balance : Ability
{
    // The current Animator state that balance should be in.
    private enum BalanceID { Movement, StumbleLeft, StumbleRight }

    [Tooltip("Any drop more than this value can be a balance object")]
    [SerializeField] private float m_MinDropHeight = 1;
    [Tooltip("Extra padding applied to the left and right side of the character when determining if over a balance object")]
```

```
[SerializeField] private float m_SidePadding = 0.1f;
[Tooltip("Start stumbing if the horizontal input value is greater than this value")]
[SerializeField] private float m_StumbleMagnitude = 0.5f;

// Internal variables
private BalanceID m_BalanceID;

///

/// Can the ability be started?
///

/// True if the ability can be started.
public override bool CanStartAbility()
{
    return IsOnBalanceObject();
}

///

/// Is the character on a object that they can balance on?
///

/// True if the character is on a balance object.
private bool IsOnBalanceObject()
{
    var front = m_Controller.CapsuleCollider.radius * Mathf.Sign(m_Transform.InverseTransformDirection(m_Controller.Velocity).z);

    // The character is not over a balance object if they are in the air.
    if (!Physics.Raycast(m_Transform.TransformPoint(0, m_Controller.CapsuleCollider.center.y -
            m_Controller.CapsuleCollider.height / 2 + 0.1f, front), -m_Transform.up, m_MinDropHeight)) {
        return false;
    }

    // The character is not over a balance object if there is an object just to the left of the character.
    if (Physics.Raycast(m_Transform.TransformPoint(-m_Controller.CapsuleCollider.radius - m_SidePadding,
            m_Controller.CapsuleCollider.center.y - m_Controller.CapsuleCollider.height / 2 + 0.1f, front),
            -m_Transform.up, m_MinDropHeight)) {
        // Do not assume that because there is nothing immediately to the left of the character that they are not on a balance object.
        // If the object is not narrow then the character is not on a balance object.
        if (Physics.Raycast(m_Transform.TransformPoint(-(m_Controller.CapsuleCollider.radius * 2) - m_SidePadding,
                m_Controller.CapsuleCollider.center.y - m_Controller.CapsuleCollider.height / 2 + 0.1f, front),
                -m_Transform.up, m_MinDropHeight)) {
            return false;
        }
    }

    // The character is not over a balance object if there is an object just to the right of the character.
    if (Physics.Raycast(m_Transform.TransformPoint(m_Controller.CapsuleCollider.radius + m_SidePadding,
            m_Controller.CapsuleCollider.center.y - m_Controller.CapsuleCollider.height / 2 + 0.1f, front),
            -m_Transform.up, m_MinDropHeight)) {
        // Do not assume that because there is nothing immediately to the right of the character that they are not on a balance object.
        // If the object is not narrow then the character is not on a balance object.
        if (Physics.Raycast(m_Transform.TransformPoint(m_Controller.CapsuleCollider.radius * 2 + m_SidePadding,
                m_Controller.CapsuleCollider.center.y - m_Controller.CapsuleCollider.height / 2 + 0.1f, front),
                -m_Transform.up, m_MinDropHeight)) {
            return false;
        }
    }

    // The character is not over a balance object if there is a wall to the left of the character.
    if (Physics.Raycast(m_Transform.TransformPoint(0, m_Controller.CapsuleCollider.center.y -
            m_Controller.CapsuleCollider.height / 2 + 0.1f, front), -m_Transform.right, m_MinDropHeight)) {
        return false;
    }

    // The character is not over a balance object if there is a wall to the right of the character.
    if (Physics.Raycast(m_Transform.TransformPoint(0, m_Controller.CapsuleCollider.center.y -
            m_Controller.CapsuleCollider.height / 2 + 0.1f, front), m_Transform.right, m_MinDropHeight)) {
        return false;
    }
    return true;
}

///

/// The ability has been started.
///

protected override void AbilityStarted()
{
    m_BalanceID = BalanceID.Movement;

    base.AbilityStarted();
}

///

/// Returns the destination state for the given layer.
///

/// The Animator layer index.
/// The state that the Animator should be in for the given layer. An empty string indicates no change.
public override string GetDestinationState(int layer)
{
        // The ability only affects the base, upper, and any layers that the item specifies.
```

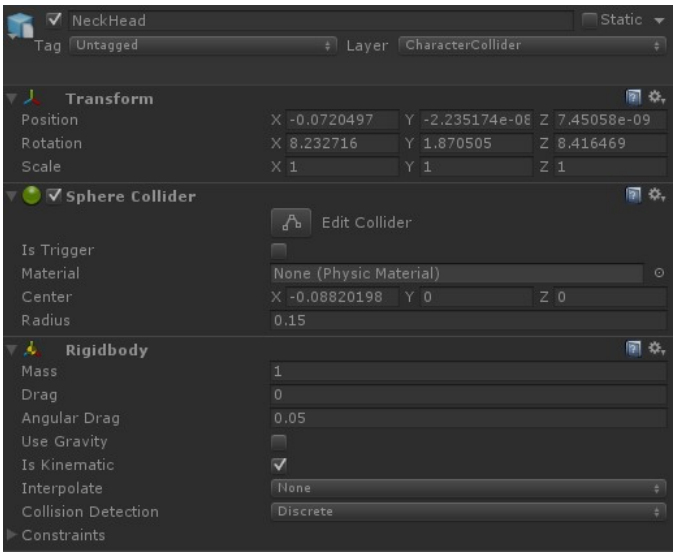
```
        if (layer != m_AnimatorMonitor.BaseLayerIndex && layer != m_AnimatorMonitor.UpperLayerIndex &&
            !m_AnimatorMonitor.ItemUsesAbilityLayer(this, layer)) {
            return string.Empty;
        }

        return "Balance.Movement";
    }

    ///

    /// Update the Animator.
    ///

    /// Should the RigidbodyCharacterController stop execution of its UpdateAnimator method?
    public override bool UpdateAnimator()
    {
        if (m_Controller.InputVector.x > m_StumbleMagnitude) {
            m_BalanceID = BalanceID.StumbleRight;
        } else if (m_Controller.InputVector.x < -m_StumbleMagnitude) {
            m_BalanceID = BalanceID.StumbleLeft;
        } else {
            m_BalanceID = BalanceID.Movement;
        }
        m_AnimatorMonitor.SetStateValue((int)m_BalanceID);

        return true;
    }

    ///

    /// Can the character have an item equipped while the ability is active?
    ///

    /// True if the character can have an item equipped.
    public override bool CanHaveItemEquipped()
    {
        return false;
    }

    ///

    /// Can the ability be stopped?
    ///

    /// True if the ability can be stopped.
    public override bool CanStopAbility()
    {
        return !IsOnBalanceObject();
    }
}
```

Detect Headshots

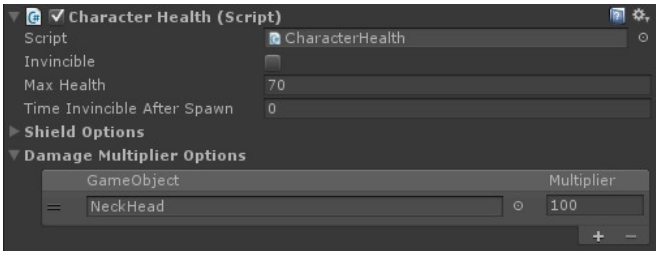
The Health component is able to identify between a hit on the regular collider versus a hit on a collider that is placed on a specific body part. This allows the character to take more damage when hit in the head.

Headshots can be detected by first adding a collider to the head GameObject:

This collider should be on the CharacterCollider layer with a kinematic Rigidbody:



The last step is to setup the Health component so it applies an extremely high multiplier when the character gets hit. This will effectively be a instant kill when the character gets hit in the head. Under Damage Multiplier Options the head is specified with a multiplier of 100:



Note that if you are using the Die ability you'll need to make sure you add the head collider to the "Ignore Colliders" list of the ability to prevent the head collider from being disabled.

Disable Input

During your game you may want to completely disable input to prevent the user from having control. Use cases for this include during a pause menu, a dialogue conversation, or a cut scene. The user input can easily be disabled by sending the following event:

```
EventHandler.ExecuteEvent(character, "OnAllowGameplayInput", allow);
```

The following parameters are used:

character
Specifies which GameObject that you want to set the input for.

"OnAllowGameplayInput"
The name of the event. This should not be changed.

allow
Specifies if the input should be enabled (true) or disabled (false).

Fix "Unable to Transition to" Error

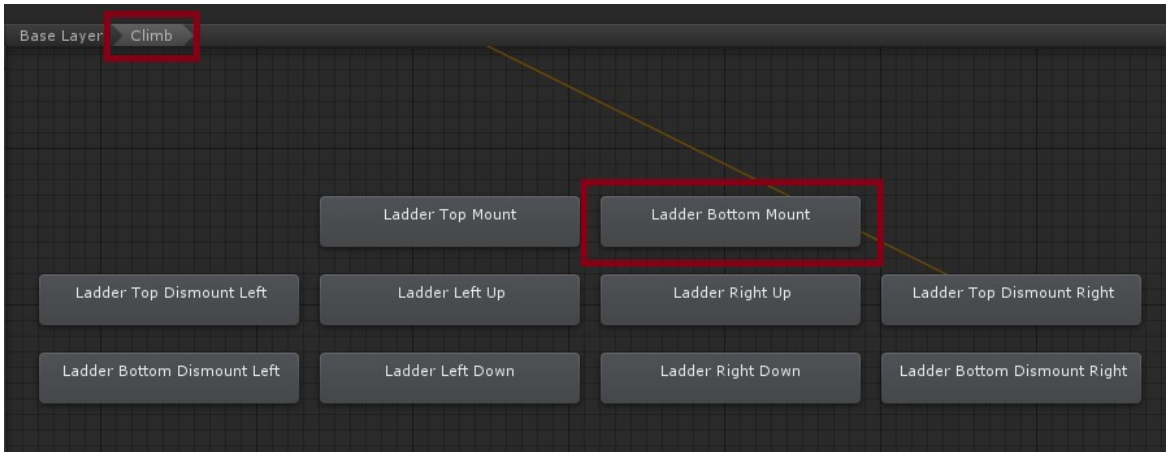
As you are adding abilities or items you may hit an error similar to the following:

Error: Unable to transition to *LayerName.StateName* because the state doesn't exist.

Where *LayerName* is the name of the Animator Controller layer and *StateName* is the name of a state which doesn't exist. In this example we are going to fix the following error:

Error: Unable to transition to Base Layer.Climb.Ladder Bottom Mount within because the state doesn't exist.

Although this error relates to an ability the same concept applies to items. You will hit this error if the ability or item is trying to play a state that doesn't exist in the Animator Controller. For this example it is trying to play the Climb.Ladder Bottom Mount state within the base layer (layer 0). I can fix this by creating a new state or by copying the state from an existing controller. In this example I only need to copy the climb substate machine from the Adventure controller.



Modify Code for Easy Updating

The ability and item system reduces the amount of code modifications needed to add in your own functionality. However, changes to the core Third Person Controller code is inevitable for some games so we recommend that you inherit from the Third Person Controller classes rather than directly modifying them. This makes updating to new Third Person Controller versions extremely easy because you don't have to do any merging. By inheriting classes you are able to add in your own functionality, expose variables, and override methods without having to change any of the core classes.

As an example, lets say that you want to access the m_Force field within the Jump ability. This field is protected so to access it without any core class changes you'll want to inherit the Jump class. From there you can a public property to this inherited class and access the Force field by getting a reference to your inherited class. The code for this would look like:

```
using Opsive.ThirdPersonController.Abilities;

public class InheritedJump : Jump
{
    public float Force { get { return m_Force; } set { m_Force = value; } }
}
```

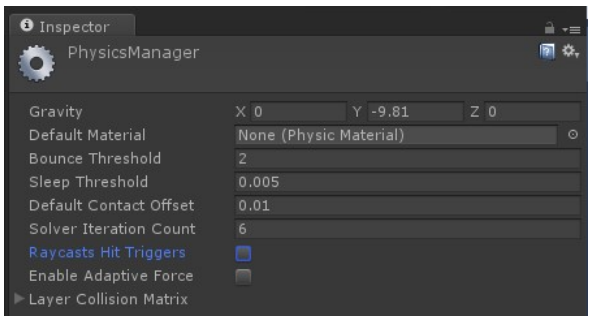
From here you can add your InheritedJump class to your character and now access the Force field:

```
character.GetComponent< InheritedJump >().Force = 5;
```

Prevent the Character from Colliding with Triggers

As you place triggers within your scene you may notice that the character collides with it as if it is a regular collider. The controller uses various forms of Physics.Raycast for some of its collision detection and by default the raycast will hit a trigger. There is a separate raycast method which can ignore triggers but this version allocates memory so we avoid it. There are two ways to prevent the raycast from hitting the trigger:

1. Set your trigger collider to have a layer of Ignore Raycast
2. In Unity's Physics Manager you can completely disable raycasts from hitting triggers by disabling "Raycasts Hit Triggers"



Receive Custom Item Events

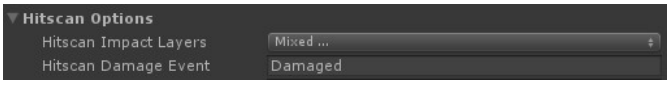
When an Item hits an object it can optionally execute a custom event on that object as well. This allows you to add in new functionality without having to change or subclass any of the Third Person Controller code. As an example, when an object is hit by an Item you could play a new particle effect or new animation. For this example we are just going to apply a new debug output to the Explosive Barrel in the Third Person Shooter scene.

The first step is to create a new component which subscribes to the custom event. For example, if our custom event is named "Damaged" then we can use the component below.

```
using UnityEngine;
using Opsive.ThirdPersonController;

public class Damaged : MonoBehaviour {
```

```
    private void Awake()
    {
        EventHandler.RegisterEvent< float, Vector3, Vector3, GameObject >(gameObject, "Damaged", LogOutput);
    }

    private void LogOutput(float amount, Vector3 point, Vector3 normal, GameObject originator)
    {
        Debug.Log("Barrel took " + amount + " damaged at location " + point + " with normal " + normal + " from object " + originator);
    }
}
```

As soon as we attach this component to the barrel it will start to listen for the "Damaged" event. We still need to tell the Item to call this event so on the ShootableWeapon component on your Assault Rifle specify "Damaged" in the Hitscan Damage Event field.

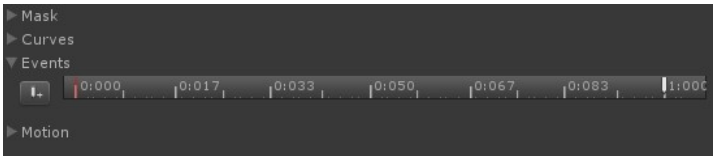


Now whenever you shoot an Explosive Barrel with the Assault Rifle the LogOutput method will execute.

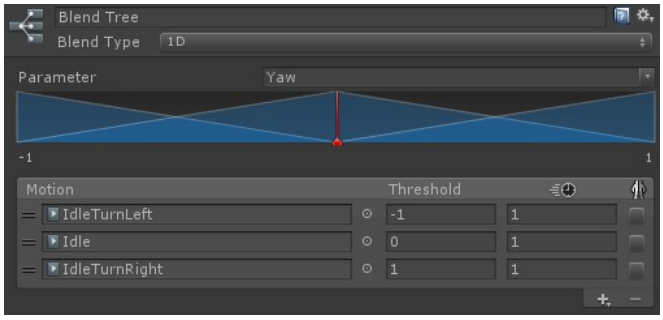
Barrel took 7 damage at location (8.5, 5.7, -2.1) with normal (-0.1, 0.0, -0.1) from object Doug

Replace Animations

The Third Person Controller uses Unity's Animator Controller to control all of its animations. The Animator Controller (formally called Mecanim) makes it extremely easy to replace the built-in Third Person Controller animations with your own. If you have never used the Animator Controller before take a look at these short Unity Learn videos. These videos will give you an overview of the Animator Controller as well as how to setup your own animations. Most of this work is already taken care of for you with the Third Person Controller, you'll just need to replace the animation clips with your own. Unity also did a live training video which goes into depth for how to setup a humanoid character with the Animator Controller.



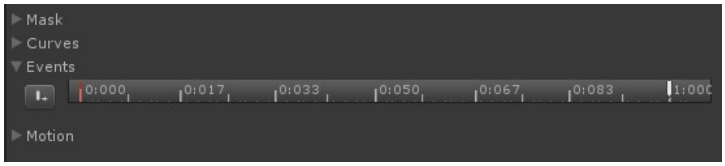
As you are replacing the animation clips there are two things to keep in mind. The first is to first look to see if the animation has any animation events. The main ones which have those events are the aim and use animations. You'll want to make sure you add these animation events again with your new animation clip.



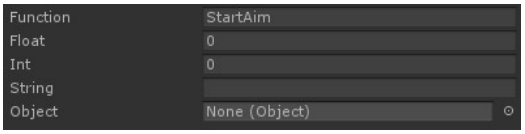
The second thing to keep in mind is that the default Animator Controller has multiple layers and if you replace an animation within the lower body layer you'll also want to make sure you replace it within the upper body layer.

Replace the Aim Animation

Changing an animation is as easy as replacing the clip within the Animator Controller's state or blend tree. There is one additional step necessary in order to get the aim animation to work. When the character starts to aim, the controller needs to know when the aim animation is done playing so the item can then be used. This notification is sent through Animation Events. If we look at one of the aiming animations, such as the Assault Rifle Aim, we'll see that there is an animation event setup (indicated by the vertical white line near 1:00 on the timeline):



Opening this event we'll see:

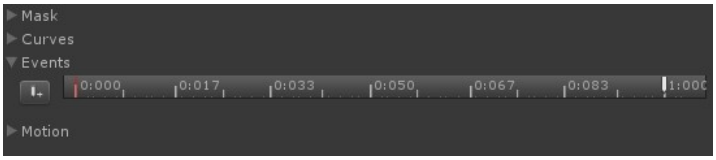


Function: StartAim

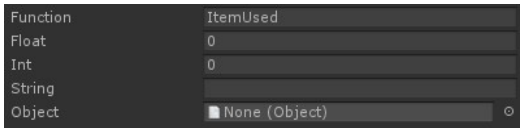
These parameters let the controller know that the character is done aiming and is ready to use the item.

Replace the Used Animation

Changing an animation is as easy as replacing the clip within the Animator Controller's state or blend tree. There is one additional step necessary in order to get the used animation to work. When the character uses an item (such as firing a weapon), the controller needs to know when the actual used event takes place. This prevents the character from using the item too early. This notification is sent through Animation Events. If we look at one of the used animations, such as the Assault Rifle Attack, we'll see that there is an animation event setup (indicated by the vertical white line near 1:00 on the timeline):



Opening this event we'll see:



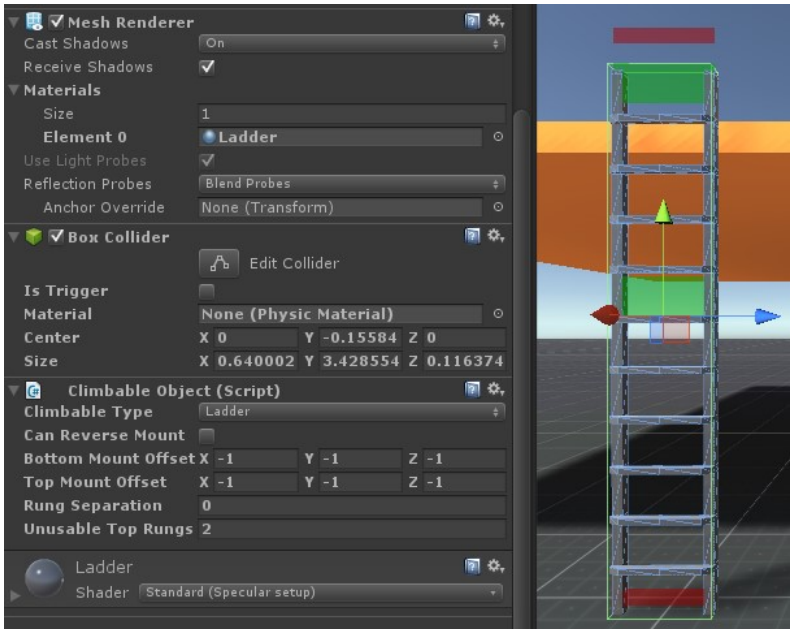
Function: ItemUsed
Int: 0

These parameters let the controller know that the character has used an item. The Int parameter indicates the type of item used. A value of 0 indicates a primary item, 1 indicates a secondary item, and 2 indicates a dual wield item.

Setup a Ladder

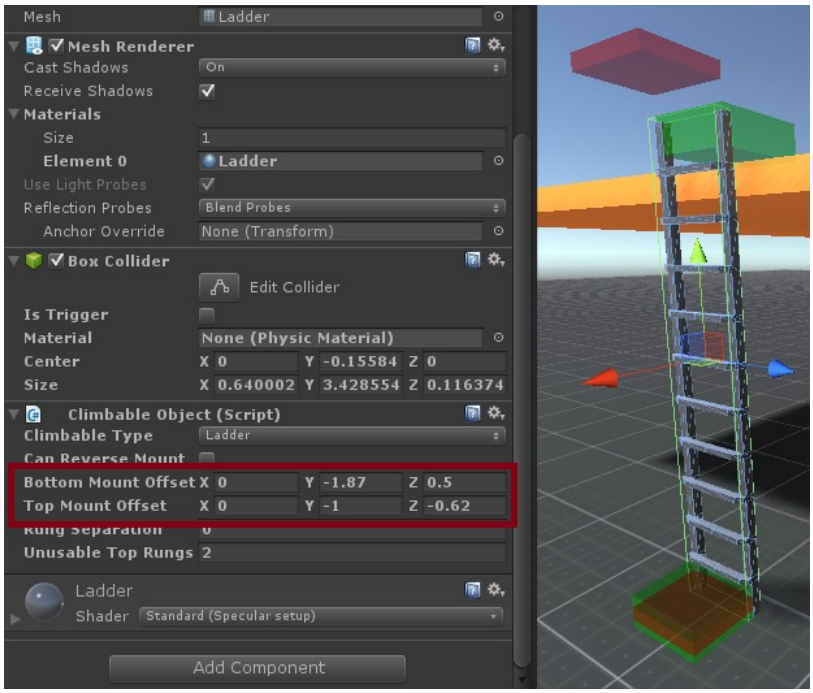
The character is able to climb ladders if the Climb ability has been added to the Rigidbody Character Controller. In order for the character to climb a ladder, the ladder object must have the Climbable Object component added. For this example we will start with a basic scene that just has tree objects: the floor, upper platform, and ladder.

The first step is to add the Climbable Object component to the ladder. This component tells the ability that the object can be climbed and specifies any parameters for the object. When a Climbable Object is selected there are editor gizmos to show the mounting and dismounting positions.

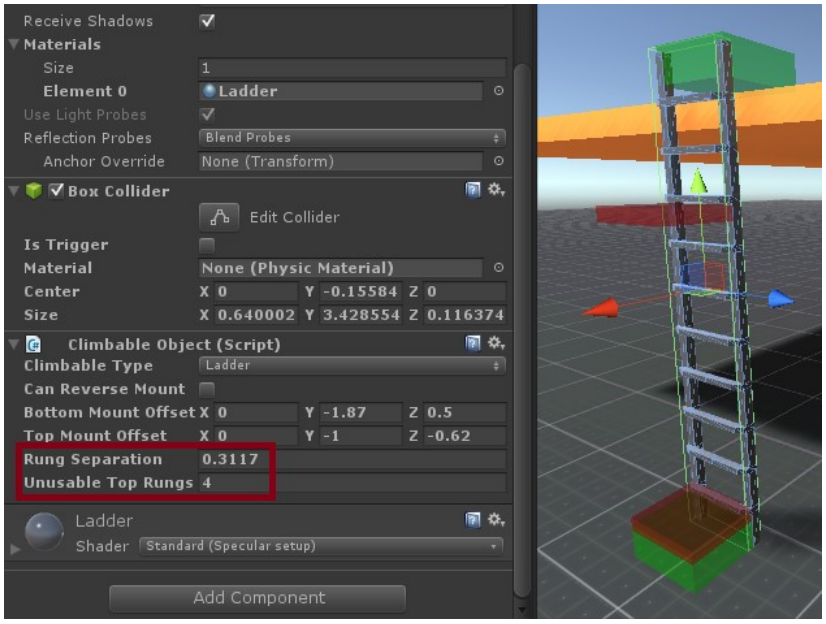


The green gizmos indicate mounting positions and the red gizmos indicate dismounting positions. When the character is on the ladder the blue gizmos will indicate the player position. The actual mounting or dismounting occurs at the center of the vertical space.

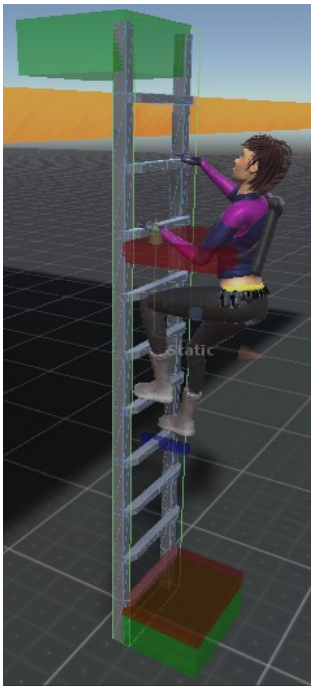
The first thing that needs to be modified is the mounting position so there is a green gizmo at the bottom of the ladder and a green gizmo at the top of the ladder. The mount offsets are in local space relative to the ladder Transform. A value of -1 for the mount/dismount offset indicates that the value is not used - the character's position for that axis will be used. The character should be centered on the ladder when mounting so an offset of 0 is specified for the x on both the top and bottom offset. The Bottom Mount Offset is too high so a value of -1.87 is specified to bring the mount position down. The Z offset specifies the distance away from the ladder that the character should start to play the mount animation. A value of 0.5 for the Bottom Mount Offset and a value of -0.62 is used for the Top Mount Offset. After each value change the gizmos will update to reflect their new position:



With the mount offsets set, it is now time to set the dismount position. The ladder is a unique Climbable Object because the dismount offset do not need to be explicitly set. This value can instead be computed based on the Run Separation and the Unusable Top Rungs. The Run Separation is the number of units in between ladder rungs. For this ladder the value is 0.3117. The Unusable Top Rungs specifies the number of rungs that should only be used if the character is dismounting. As soon as the character's position passes the top dismount gizmo the character will start to play the dismount animation. We used a value of 4 for this ladder. The dismount gizmos will update to reflect the changes:



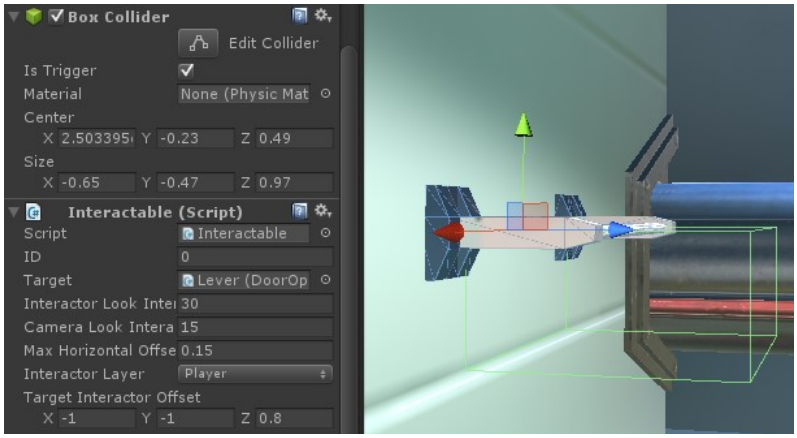
The Climbable Object is now setup to be climbed. The Climb ability still needs to be added to the character in order for the character to actually be able to climb the ladder. No special values need to be setup on this ability to allow the character to climb - just ensure the Climbable Layer specifies the same layer that the Climbable Object is in. Once this is complete your character will be able to mount and dismount on a ladder!



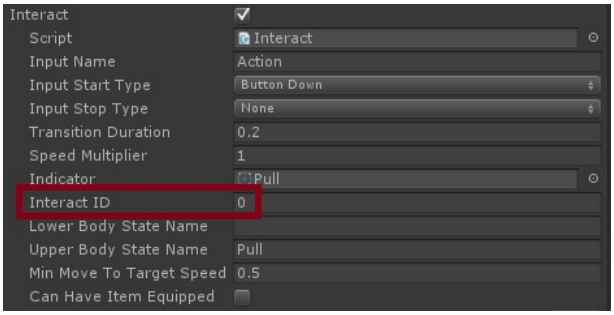
Setup an Interactable Object

The are two main components involved in setting up an interactable object. The object that can start the interaction (the Interactable), and the object that does the interaction (the Interactable Target). In the Third Person Shooter demo, the object that starts the interaction is the switch and the object that does the interaction is the moving platform.

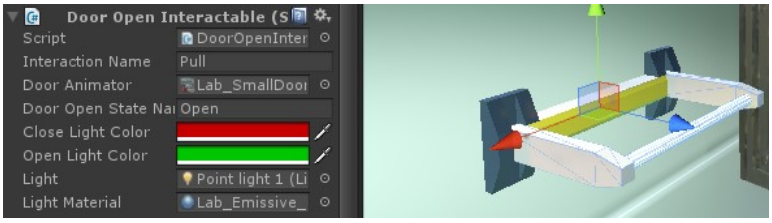
In this example we will use the adventure scene to open a door after interacting with another object. In this example the other object is a lever, but it could be anything. The first step is to add the Interactable component to the object that you want to use to start the interaction:



The Interactable component has various settings for determining if the character can interact with the object. It can be any MonoBehaviour as long as it implements to the IInteractable interface. In addition, it has a trigger collider which is used to ensure the character is near the Interactable object. The Interactable component has two especially important values: the ID and Target. The ID is used by the character controller to determine which Interact ability to use when an interaction takes place. Multiple Interact abilities can be placed on the character. This ID maps a particular Interact ability to a particular Interactable object. A value of -1 can be used if there are not going to be multiple types of interactions.



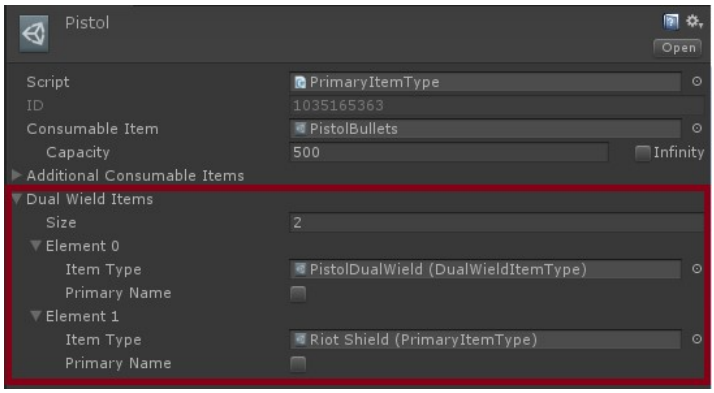
The second import value on the Interactable component is the Target. The Target is the object that does the actual interaction. As soon as all of the settings are satisfied (such as the character looking at the Interactable object and being in the correct layer), this Target object will actually perform the interaction. In our example, the Target object is the actual lever:



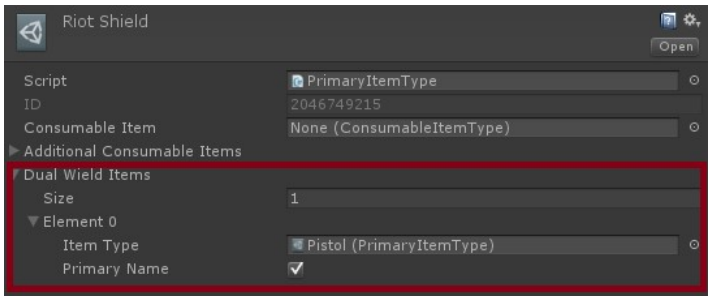
The Interactable Target can be any MonoBehaviour that implements the IInteractableTarget interface. The Door Open Interactable component is used in this example. This component will play an animation and toggle the light state when the Interactble component is interacted with.

Setup Dual Wield Items

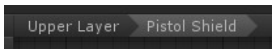
Extra setup is involved in order to specify that one item can be dual wielded with another item. The first step is to create your Item Type for each item. Once the Item Type has been created you'll need to specify the dual wielded item on each of the Item Types under the Dual Wield Items list. For example, if you look at the Pistol you'll see the following:



If we then click on the Riot Shield Item Type we'll see the following:



Just as the Pistol specifies the Riot Shield, the Riot Shield specifies the Pistol. The Primary Name toggle indicates which Item name should show up first within the Animator Controller. Since Primary Name is enabled for the Pistol, when the Pistol and Riot Shield are equipped the Animator Controller will look for the "Pistol Shield" substate.



Use with the NavMeshAgent

The Third Person Controller can work with the Unity NavMeshAgent to move according to the agent's velocity. This can work with or without root motion. The only setup required is that the NavMeshAgentBridge component must be added to your character. Since this character will be controlled by a NavMeshAgent the UnityInput component should be removed if it has been added.

Character

The character GameObject is any humanoid character that is controlled by a player or AI. The following components are used by the character:

Controller
Abilities

- Balance
- Climb
- Cover
- Damage Visualization
- Die
- Dive (Underwater Swimming)
- Dodge
- Fall
- Fly
- Generic
- Hang
- Height Change
- Interact
- Jump
- Ledge Strafe
- Move Object
- Quick Movement
- Restrict Rotation
- Ride
- Roll
- Short Climb
- Speed Change
- Swim
- Vault

Animator Monitor

- Animation Events

IK
Footsteps
Health
Respawner
Spawning

Controller

The RigidbodyCharacterController component controls all of the character's movement. At a high level there are two different types of movement: combat movement and adventure movement. With combat movement the camera is always behind the character's back and this allows the character to strafe and move backwards. With adventure movement the character can move in any direction and allows for a free camera movement. In the adventure case the character never strafes or moves backwards – they will always rotate to face in the direction that they are moving.

The controller uses a Rigidbody for allow for physics-based movement. The controller can optionally use root motion from the Animator in order to do the actual movement. It will also respond to external forces. An example of an external force includes if there is a nearby explosion and that explosion applies Rigidbody forces to the character.

The RigidbodyCharacterController provides basic movement functionality but the unique functionality comes through the Ability system. The ability system can give the character any functionality. Some of the included abilities include jumping, taking cover, or performing a roll. These abilities have the option of completely overriding the RigidbodyCharacterController behavior or they can work in addition to. For example, the Cover ability takes complete control of the RigidbodyCharacterController while the Spring ability just modifies a single Animator parameter to make the character move faster.

The character's controller can easily be setup using the Character Builder.

Movement Type
A popup specifying the movement type. Combat movement allows the character to move backwards and strafe. If the character has a camera following it then the character will always be facing in the same direction as the camera. Adventure movement always moves the character in the direction they are facing and the camera can be facing any direction. Top down movement moves rotates the character in the direction of the mouse and moves relative to the camera. RPG is a blend between Combat and Adventure movement types. Psuedo3D is used for 2.5D games. Point and Click moves the character according to the point clicked. The PointClickControllerHandler is required. Four Legged allows movement for the four legged generic characters.

Use Root Motion
Should root motion be used?

Root Motion Speed Multiplier
The multiplier of the root motion movement

Rotation Speed
The speed that the character can rotate

Aim Rotation Speed
The speed that the character can rotate while aiming

Torso Look Threshold
Do not rotate if the character minus look angle is less than the specified threshold

Local Coop Character
Is the character a local coop character?

Align To Ground
Should the character stay aligned to the ground rotation?

Align To Ground Rotation Speed
If aligning to ground, specifies the speed that the character can rotate to align to the ground

Ground Speed
The speed while on the ground and not using root motion

Air Speed
The speed while in the air

Ground Dampening
The amount of dampening force to apply while on the ground

Air Dampening
The amount of dampening force to apply while in the air

Ground Stickiness
Force which keeps the character sticking to the ground while stationary

Skin Width
The additional width of the character's collider

Moving Platform Skin Width
An extra width used to determine if the player is on the ground while on a moving platform

Movement Constraint
Optionally restrict the x or z position

Min X Position
If restricting the x axis, the minimum x position the character can occupy

Max X Position
If restricting the x axis, the maximum x position the character can occupy

Min Z Position

If restricting the y axis, the minimum y position the character can occupy

Max Z Position
If restricting the y axis, the maximum y position the character can occupy

Max Step Height
The maximum height that the character can step

Step Offset
The offset relative to the character's position that should be used for checking if a step exists

Step Speed
The vertical speed that the character moves when taking a step

Slope Limit
The maximum slope angle that the character can move on (in degrees)

Stop Movement Threshold
A -1 to 1 threshold for when the character should stop moving if another object collides with the character. A value of 1 indicates the object is directly in front of the character's move direction while a value of -1 indicates the object is directly behind the character's move direction

Always Aim
Should the character always aim?

Item Use Rotation Threshold
The character will rotate to face in the direction of the camera when using an item which requires aiming. If the character is not facing in the correct direction when trying to use an item, they will automatically rotate until an angle less than this value

Item Forcibly Use Duration
The duration that the character should forcibly use the item

Dual Wield Item Forcibly Use Duration
The duration that the character should forcibly use the dual wielded item

Capsule Collider
Optionally specify the CapsuleCollider if the current GameObject does not have one attached

Linked Colliders
Any other colliders that should also be affected by the friction material change

Grounded Idle Friction Material
The friction material to use while on the ground and idle

Grounded Movement Friction Material
The friction material to use while on the ground and moving

Step Friction Material
The friction material to use while stepping

Slope Friction Material
The friction material to use while on a slope

Air Friction Material
The friction material to use while in the air

Abilities

The ability system allows the character to add new functionality without touching the RigidbodyCharacterController code at all. The abilities can have complete control over the RigidbodyCharacterController or can work along the side of the RigidbodyCharacterController. For example, the Vault ability completely prevents the controller from updating when it is active. On the other end of the spectrum, the Speed Change (sprint) ability works with the controller and just modifies an Animator parameter when the character should be sprinting.

New abilities can be added by deriving your new class from the Ability class. This new ability will then automatically show up under the abilities drop down within the RigidbodyCharacterController component inspector. Abilities have a priority system in that the higher the ability is on the list, the higher priority it has. For example, lets say that the crouch ability has a higher priority than the jump ability. If this is the case then the jump ability would not be able to play while the crouch ability is active because the crouch ability will override any lower priority abilities.

The following API can be used by the abilities. Methods that return bool indicate if the RigidbodyCharacterController should stop execution of that method with its own functionality.

```
// Can this ability run at the same time as another ability?
public bool IsConcurrentAblity()

// Executed on every ability to allow the ability to update.
// The ability may need to update if it needs to do something when inactive or show a GUI icon when the ability can be started.
public void UpdateAbility()

// Can the ability be started?
```

```
public bool CanStartAbility()

// Can the inputted ability be started?
public bool CanStartAbility(Ability ability)

// Can the ability be stopped?
public bool CanStopAbility();

// The ability has been started.
public void AbilityStarted()

// Returns the destination state for the given layer.
public string GetDestinationState(int layer)

// Returns the duration of the state transition.
public float GetTransitionDuration()

// Can the ability replay animation states?
public bool CanReplayAnimationStates()

// The ability has stopped running.
public void AbilityStopped()

// Moves the character according to the input.
public bool Move(ref float horizontalMovement, ref float forwardMovement, Quaternion lookRotation)

// Perform checks to determine if the character is on the ground.
public bool CheckGround()

// Apply any external forces not caused by root motion, such as an explosion force.
public void CheckForExternalForces(float xPercent, float zPercent)

// Ensures the current movement is valid.
public bool CheckMovement()

// Apply any movement.
public bool UpdateMovement()

// Update the rotation forces.
public bool UpdateRotation()

// Update the Animator.
public bool UpdateAnimator()

// The Animator has changed positions or rotations.OnAnimatorMove method?
public bool AnimatorMove()

// Does the ability have complete control of the Animator states?
public bool HasAnimatorControl(int layer)

// Can the character have an item equipped while the ability is active?
public bool CanHaveItemEquipped()

// The character wants to interact with the item. Return false if there is a reason why the character shouldn't be able to.
public bool CanInteractItem()

// The character wants to use the item. Return false if there is a reason why the character shouldn't be able to.
public bool CanUseItem()

// Should the upper body IK be used?
public bool UseUpperBodyIK()
```

Abilities can be started and stopped by an input button or automatically. For example, the Crouch ability should only be started when the player taps the Crouch button. On the other hand, the Fall ability should be triggered when the character is in the air and has a negative y velocity.

Input Name
The button name that can start or stop the ability

Start Type
Specifies how the ability can be started from input

Stop Type
Specifies how the ability can be stopped from input

Transition Duration
The length of time it takes to transition to the ability

Speed Multiplier
The Animator multiplier of the state

Indicator
The sprite indicator used to specify that the ability can start or is active

Balance

When on a narrow object the Balance ability will slow the character's movements down and stretch the character's hands out to balance on the object.

Min Drop Height
Any drop more than this value can be a balance object

Side Padding
Extra padding applied to the left and right side of the character when determining if over a balance object

Stumble Magnitude
Start stumbing if the horizontal input value is greater than this value

Climb

The Climb ability allows the character to climb up vertical or horizontal objects. This includes ladders, vines, or pipes. The Climb ability works closely with the ClimbableObject component in order to successfully climb over the object.

Most of the Climb setup is defined on the ClimbableObject rather then the Climb ability. The StartClimbMaxAngle and StartClimbMaxDistance values specify the angle and the distance away from the ClimableObject that the character can start to climb. The SearchRadius is used to determine how large of a raycast should be performed to find the ClimbableObject, specified by the ClimbableLayer. As soon as the Climb ability is activated the character will move to the mounting position at a minimum normalized speed of Min Move To Target Speed.

Climbable Layer
The layers that can be climbed

Start Climb Max Angle
Start climbing when the angle between the character and the climbable object is less than this amount

Start Climb Max Distance
Start climbing when the distance between the character and the climbable object is less than this amount

Min Move To Target Speed
The normalized speed to move to the start climbing position

Search Radius
The radius of the SphereCast to search for a climbable object

Cover

The cover ability allows the character to take cover behind other objects. The cover system is a runtime cover system and pre-defined cover points do not need to be setup ahead of time. Instead, the cover system uses layers to determine if an object can be used for cover. The ability can specify what layers can be used for cover by the CoverLayer LayerMask. When the character initially decides to take cover they will move towards the cover point.

Once arrived at the cover point the character will rotate to face in the opposite direction of the cover. It does this using a raycast at the center of the character's body. As the character strafes while in cover a raycast will be used to keep the character rotated in the opposite direction of the cover.

When the character reaches an edge they will no longer be able to strafe. If the character starts to aim they will pop out of cover ready to fire. As soon as the character is no longer aiming they will move back into cover.

Take Cover Distance
The maximum amount of distance that they can take cover from

Cover Layer
The layers which the character can take cover on

Min Move To Target Speed
The normalized speed that the character moves towards the cover point

Take Cover Rotation Speed
The speed that the character can rotate while taking cover

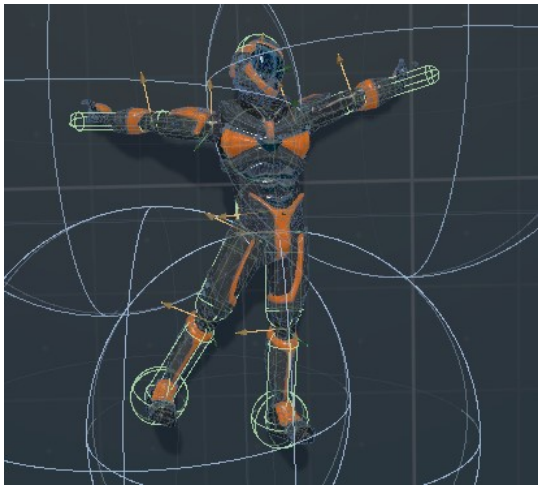
Cover Offset
The offset between the cover point and the point that the character should take cover at

Cover Angle Threshold
Can move and continue to take cover behind objects as long as the new cover has a normal angle difference less than this amount

Damage Visualization

The Damage Visualization ability allows the character to react when getting hit by an object (bullet, rocket, basetball bat, etc). This ability will automatically start when the character is damaged. It uses the Animator Controller's additive layer to play its animations.

Die



The Die ability will play a death animation or enable the ragdoll when the character dies. If the ragdoll is enabled then it will let Unity's physics engine react to the damage. The ragdoll can be created using Unity's Ragdoll Wizard. When the character is alive the ragdoll colliders will be disabled and the Rigidbodies will be kinematic. When the character dies the ragdoll colliders will be enabled and the Rigidbodies will be able to freely move. The Die ability will disable the ragdoll again as soon as the character either spawns or the ragdoll Transforms have settled according to a SettledThreshold.

Ragdoll Death
Should the character use a ragdoll upon death?

Settled Threshold
The ragdoll's rigidbodies will be set to kinematic as soon as the transforms have moved a total difference less than this amount between two frames

Settled Frame Count
The number of frames that the rigidbodies have to be settled before they are set to kinematic

Disable Colliders
Should the ragdoll colliders be disabled? Set to false if the collider should be used for hit detection

Dive (Underwater Swimming)

The Dive ability allows the character to swim while below water. The Dive ability will only start when the Swim ability is active or in the case of a completely underwater scene will start when requested if there is no Swim ability. The Dive ability will stop when the character reaches the surface of the water.

Dive Speed
The speed the character will move underwater at

Min Dive Depth
The minimum water depth that the dive ability can start

Recurrence Delay
Prevent the character from diving again too quickly after stopping the ability

Collider Height Adjustment
The height adjustment of the collider

Dodge

The Dodge ability allows the character to quickly move to the left, right, or back.

Require Aim
Does the Dodge ability require the character to be aiming?

Start On Double Press
Should the ability start on a double press?

Fall

The Fall ability allows the character to play a falling animation when the character has a negative y velocity and is not on the ground. The Fall ability is activated automatically and cannot start with an input button.

Fly

The Fly ability allows the character to fly based on look direction.

Fly Speed
The speed that the character can fly

Recurrence Delay
Prevent the character from flying too quickly after stopping flight

Generic

The Generic ability is a generic ability implementation. There are no transitions and the ability will end after the state is complete or is ended through an event.This ability is great if you want to play an animation that does not affect movement.

The ability lists for the "OnGenericAbilityStop" and "OnGenericAbilityStopID" events. The ID event is used if your character has multiple generic abilities and you want to stop a specific ability.

Lower Body State Name
The name of the lower body state. An empty value indicates the layer is not used

Upper Body State Name
The name of the upper body state. An empty value indicates the layer is not used

Stop On State Complete
Should the ability be stopped after the animation state has finished?

Stop On State Complete Layer
If Stop on State Complete is enabled, which layer should be used to determine if the state is complete?

ID
The unique ID of the ability. Used if stopping the ability with an event. -1 indicates no use

Can Have Item Equipped
Can the item be equipped?

Use Lower Body IK
Should IK be used on the lower body layer?

Use Upper Body IK
Should IK be used on the upper body layer?

Hang

The Hang ability allows the character to hang and shimmy from a tall object.

StartHangDistance
The character can start to hang if within the specified distance

HangOffset
The difference between the top of the hang object and the top of the character

HangLayer
The layer of the objects that the character can hang on

ShimmyOffset
Strafe offset to apply when checking for cover while shimmying

AngleThreshold
Can move and continue to take hang on objects as long as the new hang object has a normal angle difference less than this amount

RotationSpeed
The speed that the character can rotate while hanging

MinHangDuration

The character can hang for at least as long as the specified duration before another ability can play

Height Change

The HeightChange ability allows the character to toggle between height changes. This includes a crouching or crawling state. The Height Change ability is has the option of being a concurrent ability so it can be run while other abilities are active. When the ability is active the character's capsule collider will change heights to match the height of the character. This value is specified from the Float Curve Data Animator parameter. This value can be adjusted by changing the animation curve on the Height Change animations.

Start State
The name of the state when the HeightChange ability starts. Can be blank

Idle State
The name of the state when the character is idle

Moving State
The name of the state when the character is moving

Stop State
The name of the state when the HeightChange ability stops. Can be blank

Concurrent Ability
Is the ability a concurrent ability?

Can Have Item Equipped
Can the item be equipped while the ability is active?

Can Use Upper Body IK
Can the upper body IK be used?

Interact

The Interact ability allows the character to interact with another object. The object that the character interacts with must implement the IInteractable interface. The Interact ability will show a GUI icon when an interaction can take place.

Interact Target ID
The ID of the IInteractTarget object that the character can interact with. -1 indicates any

Lower Body State Name
The name of the lower body interact state. Can be empty

Upper Body State Name
The name of the upper body interact state. Can be empty

Min Move To Target Speed
The normalized speed that the character moves towards the target interact position

Can Have Item Equipped
Can the item be equipped while interacting?

Jump

The Jump ability allows the character to jump into the air. Jump is only active when the character has a positive y velocity. When the character has a negative y velocity the Fall ability starts.

Force
The amount of force that should be applied when the character jumps

Double Jump Force
The force to apply for a double jump. 0 indicates that a double jump is not possible

Recurrence Delay
Prevent the character from jumping too quickly after jumping

Movement Cycle Normalized Length
The normalized length of one movement cycle

Movement Cycle Leg Offset
Determines the correct leg to jump off of

Uniform Acceleration.
Should uniform acceleration be used on a jump?

Ledge Strafe

The LedgeStrafe ability allows the character to place their back against the wall and strafe left or right. During this time the character is not able to use their item. This ability is ideal for strafing along a high cliff and the character doesn't want to fall.

The character searches for a ledge to be able to strafe on by the StrafeLayer. In order for the ability to start the character must be a maximum of StartStrafeDistance away from the object. As soon as the ability is activated the character will move to the strafing point at a minimum normalized speed of Min Move To Target Speed and have a offset of StrafeOffset. The character will then continue to be able to strafe along the ledge as long as the ledge angle is less then StrafeAngleThreshold. The StrafeRotationSpeed value specifies how quickly the character can rotate while strafing.

Start Strafe Distance
The maximum amount of distance that the character can start to strafe from

Strafe Layer
The layers that can be used to strafe on

Min Move To Target Speed
The normalized speed to move to the strafe point

Strafe OFfset
The offset between the strafe point and the point that the character should strafe

Strafe Angle Threshold
Can move and continue to strafe behind objects as long as the new strafe object has a normal angle difference less than this amount

Strafe Rotation Speed
The speed that the character can rotate while strafing

Move Object

The MoveObject ability allows the character to move objects. These objects must have the MoveableObject component attached and use the layer specified by the PushableLayer. The character will be able to push the object in the direction that they are facing. In order to push in a different direction the character must change to another side of the object.

In order to start pushing, the character must be have an angle less then the StartMoveMaxLookAngle and a distance less then StartMoveMaxDistance. When the Push ability is activated the character will move to the move position at a minimum normalized speed of Min Move To Target Speed. This move position is specified by the ArmLength value to give a small offset from the character's position. The character will then move the object with a force of MoveForce.

Moveable Layer
The layers that can be moved

Start Move Max Look Angle
Start moving when the angle between the character and the moveable object is less than this amount

Start Move Max Distance
Start moving when the distance between the character and the moveable object is less than this amount

Min Move To Target Speed
The normalized speed that the character moves towards the move point

Arm Length
The length of the character's arms

Move Force
The amount of force to move with

Allow Horizontal Movement
Can the object be moved in the horizontal direction?

Allow Forward Movement
Can the object be moved in the forward direction?

Quick Movement

The Quick Movement ability allows the character to play a quick stop or quick turn animation.

Can Quick Turn
Can the character quick turn?

Quick Turn Speed
Perform a quick stop if the character's speed is over this value

Quick Turn Wait
Check for a quick turn after the specified number of seconds. This gives the character some time to actually start making the turn

Quick Turn Angle
Quick turn can be activated if the character makes a turn greater than the specified angle?

Movement Cycle Normalized Length
The normalized length of one movement cycle

Movement Cycle Leg Offset

Determines the correct leg to quick turn from

Can Quick Stop
Can the character quick stop?

Quick Stop Speed
Perform a quick stop if the character's speed is over this value

Restrict Rotation

The Restrict Rotation ability will restrict the character to a specified rotation interval.

Restriction
The amount of degrees that the character can rotate between

Start Offset
Any offset that should be applied to the initial look rotation

End Offset
Any offset that should be applied to the final, restricted rotation

Ride

The Ride ability allows the character to ride a RideableObject. The RideableObject must be on a different Third Person Controller character.

Mount Distance
The distance away from the RideableObject that the character can start to mount

Max Mount Angle
The maximum angle that the character can mount onto the RideableObject

Rideable Layer
The layers that the character can ride on

Min Move To Target Speed
The normalized speed to move to the start climbing position

Roll

The Roll ability allows the character to roll. The character can only roll when moving in a relative positive z velocity.

Roll Recurrence Delay
Prevent the character from rolling too quickly after rolling

Short Climb

The Short Climb ability allows the character to climb over short objects.

Move To Climb Distance
The maximum amount of distance that the character can start moving towards the climb position

Climb Layer
The layers which the character can climb from

Max Climb Height
The maximum height of the object that the character can climb from

Min Move To Target Speed
The normalized speed that the character moves towards the climb point

Start Climb Offset
The depth offset to start the climb animation. If -1 the character will start climbing from the current position

Horizontal Match Target Offset
The horizontal offset between the climb point and the point that the character places their hands

Vertical Match Target Offset
The vertical offset between the climb point and the point that the character places their hands

Start Match Target
The normalized starting value of the character pushing off the climb object

Stop Match Target
The normalized ending value of the character pushing off the climb object

Speed Change

The SpeedChange ability allows the character to move at a slower or faster rate. This ability is used to add a run or a sprint to the character. Optionally a stamina can be used to prevent character from sprinting too long.

If your character uses root motion the SpeedChange ability will not directly multiply the speed by the Speed Change Multiplier. It will instead multiply the Forward and Horizontal Input parameters belonging to the Animator Controller. This allows the movement blend tree to change the speed by playing a slower or faster movement animation.

Speed Change Multiplier
The speed multiplier when the ability is active

Can Aim
Can the ability be active while the character is aiming?

Use Stamina
Should the character have stamina while in a different speed?

Max Stamina
The amount of stamina the character has

Stamina Decrease Rate
The rate at which the stamina decreases while in a different speed

Stamina Increase Rate
The rate at which the stamina increases while not in a different speed

Swim

The Swim ability allows the character to swim while above water. The Swim ability activates as soon as the character enters the water even though they may not be swimming yet. It will allow normal character movement until the water reaches a predefined depth.

Water Resistance
The amount of resistance to apply while moving

Rotation Speed
The speed that the character can rotate

Swim Depth
The water depth to start swimming at

Swim Camera Offset
The vertical camera offset while swimming

Transition Grace Period
The amount of time that has to elapse before the character can transition between starting and stopping swimming again

Left Hand Splash Particle
Reference to the splash ParticleSystem on the left hand (optional)

Right Hand Splash Particle
Reference to the splash ParticleSystem on the right hand (optional)

Left Foot Splash Particle
Reference to the splash ParticleSystem on the left foot (optional)

Right Foot Splash Particle
Reference to the splash ParticleSystem on the right foot (optional)

Vault

The Vault ability allows the character to vault over other objects. The character can vault over any object specified by the VaultLayer. This object can have a maximum height of MaxVaultHeight and depth of MaxVaultDepth. In addition, this object can be no further away from the character than the distance specified by MoveToVaultDistnace.

When the character decides to vault, the character will move up to the VaultOffset at a normalized speed of MoveToVaultSpeed. The actual vaulting animation will then start. This animation uses Target Matching to ensure the characters hands and feet are placed at the top of the vaulting object. This prevents the characters limbs from clipping with the object or being too high up in the air. The MatchTargetOffset value specifies the offset between the characters hands and the top of the vaulting object. This value is used if the targeting matching doesn't completely align the hands to the vaulting object. StartMatchTarget and StopMatchTarget specify when the character has their hands on the vaulting object and target matching should be active.

Move To Vault Distance
The maximum amount of distance that the character can start moving towards the vault position

Vault Layer
The layers which the character can take vault from

Max Vault Height
The maximum height of the object that the character can vault from

Max Vault Depth
The maximum depth of the object that the character can vault from

Min Move To Target Speed
The normalized speed that the character moves towards the vault point

Vault Offset
The offset between the vault point and the point that the character should start to vault at

Match Target Offset
The offset between the vault point and the point that the character places their hands

Start Match Target
The normalized starting value of the character pushing off the vaulting object

Stop Match Target
The normalized ending value of the character pushing off the vaulting object

Animator Monitor

Unity's Animator Controller has a reputation of quickly becoming a spaghetti mess of transitions. With normal Animator Controller designs, you have a transition from one state to every other possible state that the Animator can play next. In addition, the number of necessary parameters grows in order to be able to trigger the transitions. The Third Person Controller takes a different approach to this controller and transitions only need to be specified when they are absolutely necessary.

The AnimatorMonitor component manages these transitions and will manually transition to new states when requested. This transition occurs using Animator.Crossfade so no explicit transitions are needed within the Animator Controller. This crossfade transition is generally used when transitioning between groups of animations. For example, the crossfade transition is used when transitioning from an ability back to the normal idle animation. The crossfade transition is not used when transition within a group of animations. For example, explicit transitions are used while within the Cover ability's substate. Explicit transitions are used in this case because not many transitions are needed and it allows for a more familiar design process.

When using the crossfade transitions, there are three different locations in which the destination state and transition duration are specified. If transitioning to an animation specific to an item, the item animation state is used. If transitioning to an Ability, the destination state and transition duration is specified within the ability. If no item or ability animation needs to play then the AnimatorMonitor will play the default animation as specified in the parameters below.

With most Animator Controller designs the transition takes place because a parameter with a specific name is triggered. For example, the character may jump when the Jump bool parameter is true. This results in many, many different parameters if your character can perform many different types of animations. The Third Person Controller framework uses a generic set of parameters that can handle an infinite amount of animations.

In addition to managing the transitions, the AnimatorMonitor component is the central point for animation event callbacks. The AnimatorMonitor will be called when an animation event occurs and the AnimatorMonitor will convert the animation event into an event understood by the rest of the framework using and EventHandler.

Debug State Changes
Should state changes be sent to the debug console?

Horizontal Input Damp Time
The horizontal input dampening time

Vertical Input Damp Time
The vertical input dampening time

Base State
The default base state

Upper Body State
The default upper body state

Left Arm State
The default left arm state

Right Arm State
The default right arm state

Left Hand State
The default left hand state

Right Hand State
The default right hand state

Additive State
The default additive state

Animation Events

When the AnimatorMonitor component receives an animation event it will convert that animation event into an EventHandler. In most cases the ExecuteEvent or ExecuteEventCheckUpperState animation events can be used. Both of these events take a single string parameter that is used to specify the EventHandler event name. The other events are used when a string cannot be specified. The following animation events are called from the included animations:

ExecuteEvent
Executes an event on the EventHandler

ExecuteEventCheckUpperState
Executes an event on the EventHandler and determine the upper body state

FootDown
The Animator has placed a foot on the ground so a footstep should play

StartAim
The Animator has moved the arms into the aim position

ItemUsed
An item has been used

AlignWithCover
The Animator has moved the character into/out of position to take cover

PopFromCover
The Animator has popped from cover or returned from a pop

IK

The CharacterIK component will rotate and position the character's limbs to face in the correct direction and stand on uneven surfaces. CharacterIK uses Unity's IK solution which requires Unity 5 or Unity 4 pro.

The CharacterIK component will rotate the upper body to look in the direction that the camera is facing. The body, head, and eyes can be influenced differently depending on how much weight each body part should have in looking at the target. CharacterIK will also position the character's feet to match the direction of the surface below them.

Besides positioning limbs, the CharacterIK component also positions of the character's hips. This is used to lower the hip position when the character is standing on uneven ground. As an example, imagine that the character is standing on a set of stairs. The stairs has two sets of colliders: one collider which covers each step, and another collider is a plane at the same slope as the stairs. When the character is standing on top of the stairs, the character's collider is going to be resting on the plane collider while the IK system will be trying to ensure the feet are resting on the stairs collider. In some cases the plane collider may be relatively far above the stair collider so the hip needs to be moved down to allow the character's foot to hit the stair collider.

Debug Draw Look Ray
Draw a debug line to see the direction that the character is facing

LayerMask
The layers that the IK should be checking against

Hips Adjustment Speed
The speed at which the hips adjusts vertically

Look Ahead Distance
The distance to look ahead

Look At Offset
An offset to apply to the look at position

Look At Aim Body Weight

(0-1) determines how much the body is involved in the look at while aiming

Look At Body Weight
(0-1) determines how much the body is involved in the look at

Look At Head Weight
(0-1) determines how much the head is involved in the look at

Look At Eyes Weight
(0-1) determines how much the eyes are involved in the look at

Look At Clamp Weight
(0-1) 0.0 means the character is completely unrestrained in motion, 1.0 means the character motion completely clamped (look at becomes impossible)

Look AT IK Adjustment Speed
The speed at which the look at position should adjust between using IK and not using IK

Hand IK Weight
(0-1) determines how much the hands look at the target

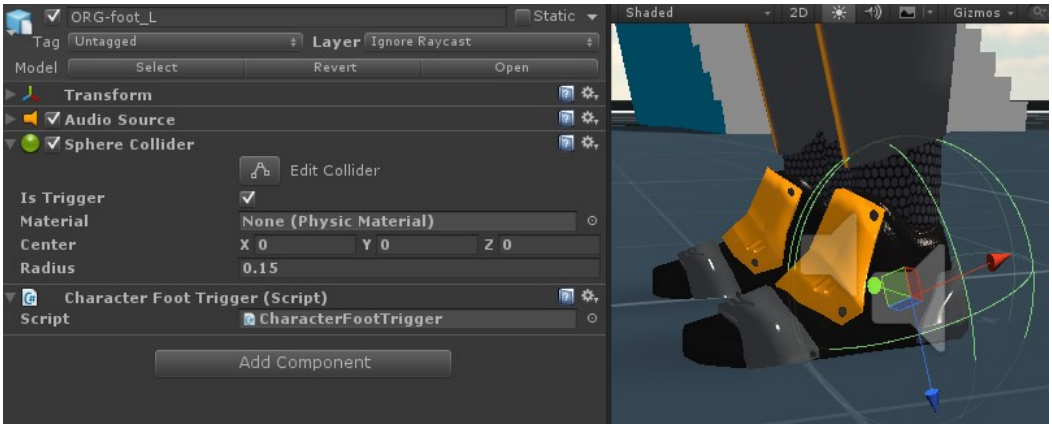
Hand IK Adjustment Speed
The speed at which the hand position/rotation should adjust between using IK and not using IK

Foot Position Adjustment Speed
The speed at which the foot position should adjust between using IK and not using IK

Foot Rotation Adjustment Speed
The speed at which the foot rotation should adjust between using IK and not using IK

Foot Weight Adjustment Speed
The speed at which the foot weight should adjust

Footsteps



The CharacterFootsteps component will use triggers to play a footstep when the character moves. The AudioSource, SphereCollder, and CharacterFootTrigger components must be added to the foot GameObjects to allow the sound to be played from the correct location. The CharacterFootsteps components allows for a per foot sound.

When the SphereCollider trigger intersects with the ground the OnTriggerEnter method will fire within the CharacterFootstepTrigger component. This will tell the CharacterFootsteps component that contact has been made and this component will then play the sounds from the AudioSource.

Left Foot
A reference to the left foot

Right Foot
A reference to the right foot

Per Foot Sounds
Should a unique sound play for each foot?

Footsteps
A list of clips to play when the foot hits the ground

Health

The Character Health component extends on the Health component by allowing the character to take fall damage. The amount of damage is specified by a curve. The Character Health component listens for the OnControllerLand event and will apply a fall damage if the fall height is greater than MinFallDamageHeight. If the fall is greater than DeathHeight then the character will immediately die. The MinFallDamage and MaxFallDamage is used by the DamageCurve to determine how much damage to apply to the character if the fall height is between MinFallDamageHeight and DeathHeight.

Use Fall Damage
Should fall damage be applied?

Min Fall Damage Height
The minimum height that the character has to fall in order for any damage to be applied

Death Height
A fall greater than this value is an instant death

Min Fall Damage
The amount of damage to apply when the player falls by the minimum fall damage height

Max Fall Damage
The amount of damage to apply when the player falls just less than the death height

Damage Curve
A curve specifying the amount of damage to apply if the character falls between the min and max fall damage values

Respawner

The Character Respawner component extends the Respawner by allowing the character to spawn in a location determined by the SpawnSelection.

Spawning

The SpawnSelection component will randomly select a new spawn location out of the SpawnLocations array. SpawnLocations is an array of Transforms and is placed ahead of time while editing the scene. When placing the spawn Transforms, both the position and the rotation of that Transform matter. The object spawned will be facing in the same direction as the spawn Transform. The Character Respawner component will use the Spawn Selection component in order to determine which location to respawn the character at when the character dies.

Spawn Locations
The locations that the object can spawn

Items

The Item component is the base class of anything that can be picked up. Items can be used by subscribing to the IUsableItem interface and reloaded by subscribing to the IReloadableItem interface. The Item class is an abstract class and there is no limit to what is considered an item: weapons, baseballs, chainsaws, frying pans. Items don't have to be used only for offense either, for example a health pack or power up can also be considered an item.

If the Item can be used it will work with the Inventory to determine how much it can be used. The Inventory identifies the Item by the ItemType. The ItemType should be created before the actual item is created. Every item that the character has a chance of using should be placed on the character while in edit mode. When the game starts the Inventory will search the character for any Items and deactivate any items that the character does not start out with. When the character picks up a new Item it will activate the Item and appear as if the character just picked up the Item.

Items can quickly be created with the Item Builder.

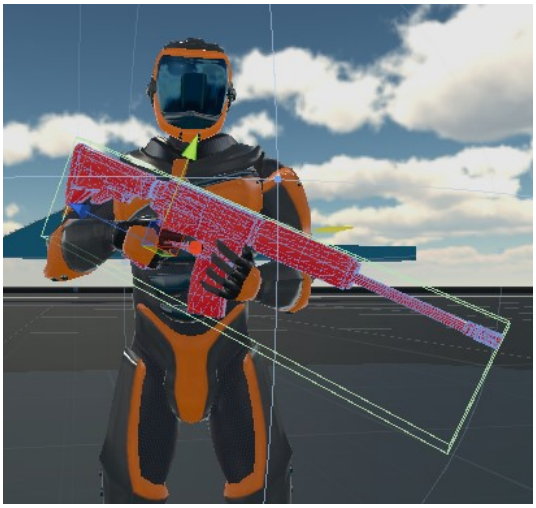
Shootable Weapon
Magic Item
Melee Weapon
Static Item

Throwable Item
Attachments

- Flashlight
- Laser Sight

Character Item Animations
Item Extensions

Shootable Weapon



The ShootableWeapon component inherits from the Weapon component and allows the weapon to be shot. The ShootableWeapon doesn't have to be used with just bullets, it can be used with anything that is shot. This includes rockets, bow and arrows, pumpkins, etc. ShootableWeapons have many parameters and can keep firing until the trigger is released or are out of ammo. The ShootableWeapon works with the Inventory to determine how much ammo it has.

When the ShootableWeapon is fired it can either fire a projectile or do a hitscan fire (a raycast). If a hitscan fire is used then the weapon will use the HitscanDamageAmount and HitscanImpactForce to determine how much to damage the object and how much force to apply. Hitscans can also spawn decals, dust, sparks, and an impact sound. If the ShootableWeapon fires a Projectile then the projectile applies the damage and force.

If the ShootableWeapon is fired continuously and Overheat is enabled then the ShootableWeapon will overheat for a duration of CooldownDuration. During this time the ShootableWeapon cannot be fired.

In addition, when the weapon is fired it can optionally spawn a Shell, MuzzleFlash, Smoke, and make a sound. When the weapon is out of ammo it will AutoReload if the option is enabled.

ShootableWeapon Items can optionally add the flashlight or laser sight attachments.

Fire Point
The point at which to do the actual firing

Fire Mode
The mode in which the weapon fires multiple shots. Options include SemiAuto, FullAuto, and Burst

Fire Rate
The number of shots per second

Burst Rate
If using the Burst FireMode, specifies the number of bursts the weapon can fire

Fire Range
The distance in which the bullet can hit. This is only used for weapons that do not have a projectile

Clip Size
The number of rounds in the clip

Fire Count
The number of rounds to fire in a single shot

Fire Type
Specifies how the weapon should be fired

Fire On Used Event
Should the weapon wait to fire until the used event?

Wait For End Use Event
Should the weapon wait for the OnAnimatorItemEndUse to return to a non-use state?

Use Scope
Does the weapon use a scope UI?

Auto Reload
Should the weapon reload automatically once it is out of ammo?

Recoil Amount
The amount of recoil to apply when the weapon is fired

Spread
The random spread of the bullets once they are fired

Regenerate Rate
The speed at which to regenerate the ammo

Regenerate Amount
The amount of ammo to add each regenerative tick. RegenerativeRate must be greater than 0

Idle Animation State Name
The name of the state to play when idle. The Animator component must exist on the item GameObject

Fire Animation State Name
The name of the state to play when firing. The Animator component must exist on the item GameObject

Reload Animation State Name
The name of the state to play when reloading. The Animator component must exist on the item GameObject

Shell
Optionally specify a shell that should be spawned when the weapon is fired

Shell Location
If Shell is specified, the location is the position and rotation that the shell spawns at

Shell Force
If Shell is specified, the force is the amount of force applied to the shell when it spawns

Shell Torque
If Shell is specified, the force is the amount of torque applied to the shell when it spawns

Muzzle Flash
Optionally specify a muzzle flash that should appear when the weapon is fired

Muzzle Flash Location
If Muzzle Flash is specified, the location is the position and rotation that the muzzle flash spawns at

Smoke
Optionally specify any smoke that should appear when the weapon is fired

Smoke Location
If Smoke is specified, the location is the position and rotation that the smoke spawns at

Particles
Optionally specify a sound that should play when the weapon is fired

Fire Sound
Optionally specify any particles that should play when the weapon is fired

Fire Sound Delay
If Fire Sound is specified, play the sound after the specified delay

Empty Fire Sound
Optionally specify a sound that should play when the weapon is fired and out of ammo

Reload Sound
Optionally specify a sound that should randomly play when the weapon is reloaded

Projectile
Optionally specify a projectile that the weapon should use

Projectile Always Visible
Should the projectile always be visible? This only applies to weapons that have a projectile

Projectile Rest Location
If a projectile and always visible is enabled, the location is the position and rotation that the rest projectile spawns at

Projectile Rest Parent
If a projectile and always visible is enabled, the parent is the GameObject that should be the parent of the projectile

Hitscan Impact Layers

A LayerMask of the layers that can be hit when fired at. This only applies to weapons that do not have a projectile

Hitscan Damage Event
Optionally specify an event to send when the hitscan fire hits a target

Hitscan Damage Amount
The amount of damage done to the object hit. This only applies to weapons that do not have a projectile

Hitsscan Impact Force
How much force is applied to the object hit. This only applies to weapons that do not have a projectile

Default Hitscan Decal
Optionally specify a decal that should be applied to the object hit. This only applies to weapons that do not have a projectile and only used if no per-object sound is setup in the ObjectManager

Default Hitscan Dust
Optionally specify any dust that should appear on top of the object hit. This only applies to weapons that do not have a projectile and only used if no per-object sound is setup in the ObjectManager

Default Hitscan Spark
Optionally specify any sparks that should appear on top of the object hit. This only applies to weapons that do not have a projectile and only used if no per-object sound is setup in the ObjectManager

Default Hitscan Impact Sound
Optionally specify an impact sound that should play at the point of the object hit. This only applies to weapons that do not have a projectile and only used if no per-object sound is setup in the ObjectManager

Tracer
Optionally specify a tracer that should should appear when the hitscan weapon is fired

Tracer Location
If Tracer is specified, the location is the position and rotation that the tracer spawns at

Overheat
Should the weapon overheat after firing too many shots?

Overheat Shot Count
The number of shots it takes for the weapon to overheat

Cooldown Duration
The time it takes for the weapon to cooldown after overheating

Flashlight
Optionally specify a flashlight that should shine in the direction of the target

Activate Flashlight On Aim
If the flashlight GameObject is specified, should the flashlight automatically activate when aim or should it manually be toggled?

Laser Sight
Optionally specify a laser sight that should point at the target

Activate Laser Sight On Aim
If the laser sight GameObject is specified, should the laser sight automatically activate when aim or should it manually be toggled?

Disable Crosshairs When Laser Sight Active
If the laser sight GameObject is specified, should the crosshairs be disabled when the laser sight is active?

Magic Item

The MagicItem component inherits from the Item component and allows the item to cast a magic spell when used. The MagicItem implements the IUesableItem interface and registers for the used callback so it knows when to cast the spell.

By default the spell will only apply a damage, but you can receive a callback to apply any game specific events. The spell can be casted continuously until the use event has stopped or once when the used event is fired. In addition, the shape of the cast can be linear or spherical.

Can Use In Air
Can the item be used in the air?

Cast Mode
Specifies how often the magic is casted

Cast Shape
Specifies the shape of the cast

Cast Rate
The number of casts per second

Cast Point
The point at which to do the actual cast

Cast Distance
The distance of the cast. Only used if the CastShape is linear

Cast Radius
The radius of the cast

Cast Amount
The amount of ConsumableItem to use for each item use

Target Layer
The layers that the cast can hit

Wait For End Use Event
Should the magic wait for the OnAnimatorItemEndUse to return to a non-use state?

Can Stop Before Use
Can the magic be stopped before the used method is called?

Continuous Min Use Duration
Minimum amount of time that the continuous item can be used

Regenerate Rate
The speed at which to regenerate the ammo

Regenerate Amount
The amount of ammo to add each regenerative tick. RegenerativeRate must be greater than 0

Cast Particles
Optionally specify any particles that should play when the magic is casted

Cast Sound

Optionally specify a sound that should randomly play when the magic is casted

Cast Sound Delay
If Cast Sound is specified, play the sound after the specified delay

Damage Event
Optionally specify an event to send to the object hit by the cast

Damage Amount
The amount of damage done to the object hit

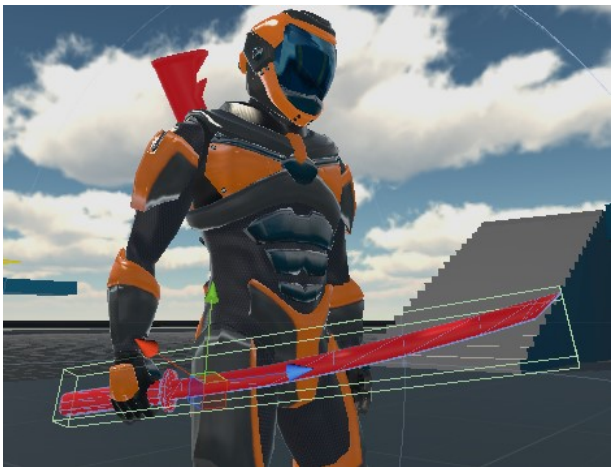
Normalize Damage
If the cast hits multiple objects should the damage amount be distributed evenly across all objects?

Impact Force
How much force is applied to the object hit

Default Impact Sound
Optionally specify a default impact sound that should play at the point of the object hit. This is only used if no per-object sound is setup in the ObjectManager

Default Spark
Optionally specify any default sparks that should appear on top of the object hit. This is only used if no per-object spark is setup in the ObjectManager

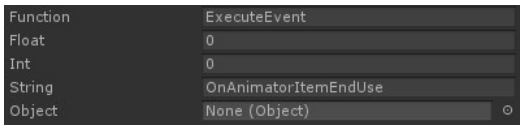
Melee Weapon



The MeleeWeapon component inherits from the Weapon component and allows the weapon to apply damage after playing a melee attack animation. A melee weapon can be anything that uses an object within the character's hand to attack. The MeleeWeapon implements the IUesableItem interface and registers for the used callback so it knows when to apply the melee damage and force.

A melee attack will use a hitbox in order to determine if an object has been hit. This hitbox is a collider that is placed on the MeleeWeapon. Multiple hitbox components can be specified. If the MeleeWeapon hits a fixed object an optional recoil animation can play which will knock the character back.

While attacking the MeleeWeapon uses the OnAnimatorItemEndUse animation event to be notified that the attack is complete. As you are replacing animations ensure this event has been added to your attack animation.



During a combo the melee weapon can be interrupted if Can Interrupt Attack is enabled. The OnAnimatorItemAllowInterruption event must be added at the location when the animation can start to be interrupted.

Attack Rate
The number of melee attacks per second

Attack Layer
The layers that the melee attack can hit

Attack Hitboxes
Any other hitboxes that should be used when determining if the melee weapon hit a target

Can Interrupt Attack
Can the attack be interrupted to move onto the next attack? The OnAnimatorItemAllowInterruption event must be added to the attack animation

Attack Sound
Optionally specify a sound that should play when the weapon is attacked

Attack Sound Delay
If Attack Sound is specified, play the sound after the specified delay

Damage Event
Optionally specify an event to send to the object hit on damage

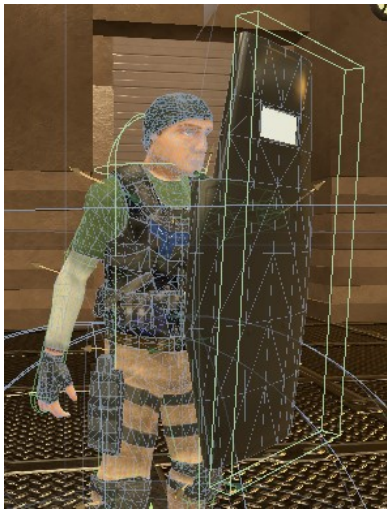
Damage Amount
The amount of damage done to the object hit

Impact Force
How much force is applied to the object hit

Default Dust
Optionally specify any dust that should appear on at the location of the object hit. This is only used if no per-object dust is setup in the ObjectManager

Default Impact Sound
Optionally specify an impact sound that should play at the point of the object hit. This is only used if no per-object dust is setup in the ObjectManager

Static Item



Any Item that doesn't do anything besides exist. Examples include a shield or book.

Throwable Item

The ThrowableItem component gives the character the ability to thrown an item. Any item can be thrown such as grenades, baseballs, water balloons, etc. The GameObject that the ThrowableItem component attaches to is not the actual object that is thrown – the ThrownObject variable specifies this instead. The ThrowableItem component works with the Inventory to determine how many items can be thrown.

The ThrowableItem component implements to the IUseableItem interface and will wait until the Used method is called before actually letting go of the object. The Used method is called when an animation event is fired at the throw point of the throw animation. It is at this point that the ThrowableItem will spawn the ThrownObject. This ThrownObject must implement the IThrownObject interface so a force can be applied to the object.

Can Use In Air
Can the item be used in the air?

Thrown Object
The object that can be thrown. Must have a component that implements IThrownObject

Throw Rate
The number of objects that can be thrown per second

Throw Force
The force applied to the object thrown

Throw Torque
The torque applied to the object thrown

Spread
A random spread to allow some inconsistency in each throw

Attachments

Attachments extend the functionality of an Item. The following attachments are available:

Flashlight
Laser Sight

Flashlight

The flashlight is an optional attachment that can be added to the ShootableWeapon component. The flashlight can be triggered manually through the ItemHandler or automatically turn on when the character aims.

Laser Sight

The laser sight is an optional attachment that can be added to the ShootableWeapon component. The laser sight can be triggered manually through the ItemHandler or automatically turn on when the character aims.

Scroll Speed
The speed at which the laser texture scrolls

Max Length
The maximum length of the laser

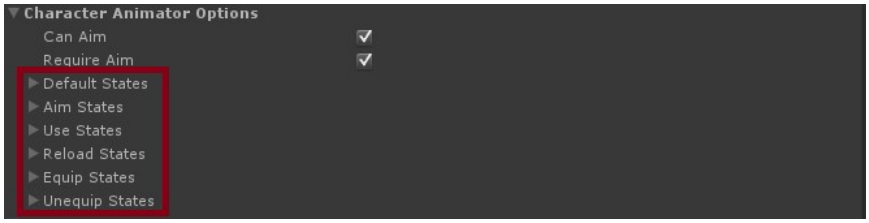
Min Width
The minimum width of the laser

Max Width
The maximum width of the laser

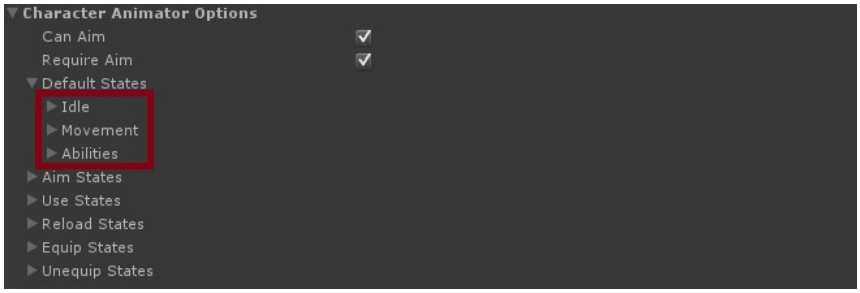
Pulse Speed
The speed at which the laser changes width

Character Item Animations

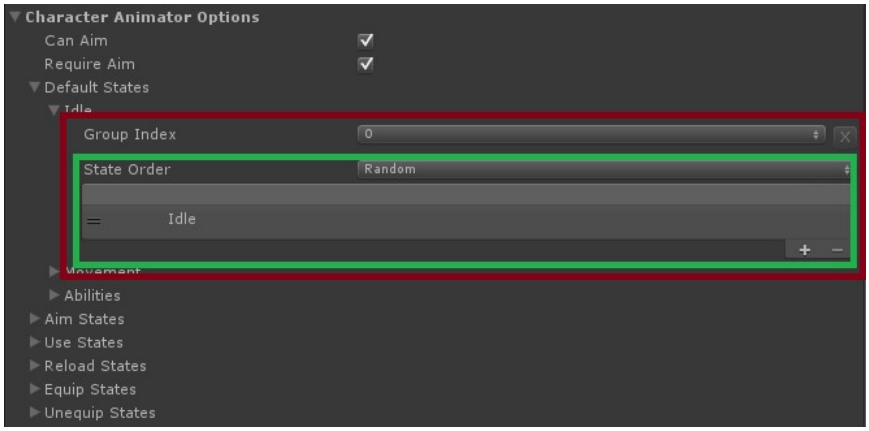
When an item is equipped it has the option of overriding any character animations to play an item-specific animation. For example, if attacking with a sword then the character should play a sword attack animation. The item animation system will allow you to play an item animation for aiming, using, reloading, equipping, reloading, moving and idle. It is also flexible enough in that you can play a unique animation per ability. This for example lets you play a specific attack animation while crouching (using the Height Change ability). The item animation system also allows for multiple states per category which allows you to have multiple variants of an animation. The state order can be determined randomly, sequentially, or through a combo system where the states will be ordered sequentially until a timeout value in which case it'll reset back to the beginning. Due to the power of the item animation system the editor interface can look daunting at first, but you'll be adding new states in no time once you are familiar with the interface.



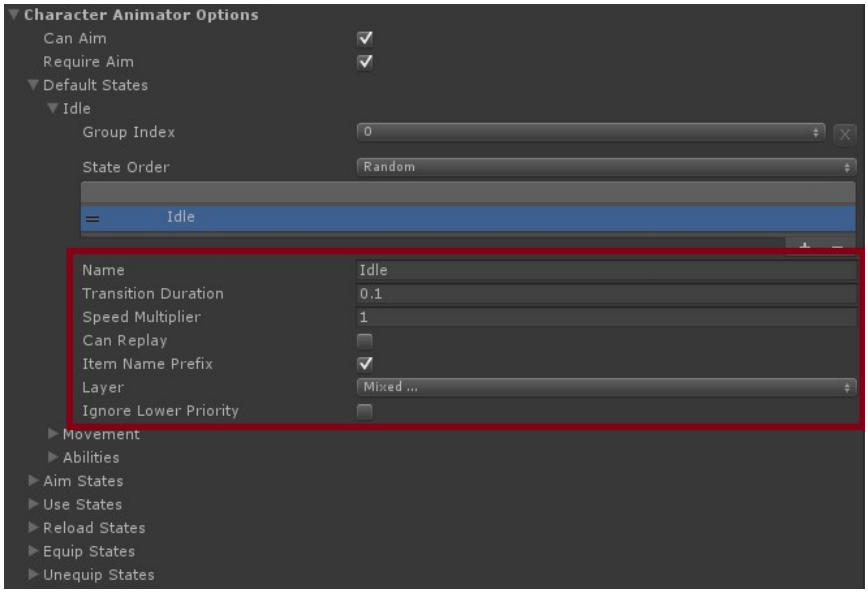
If you click on the GameObject for any Item you'll see a foldout for the Character Animator Options. Once this foldout is expanded you'll see six more foldouts: Default, Aim, Use, Reload, Equip, and Unequip. These six foldouts are called Item Collections. Item Collections represent the highest level of the item animation system.



Directly underneath the Item Collection folders are the Item Set foldouts. Item Sets represent the idle, moving, and ability animation states for each Item Collection.



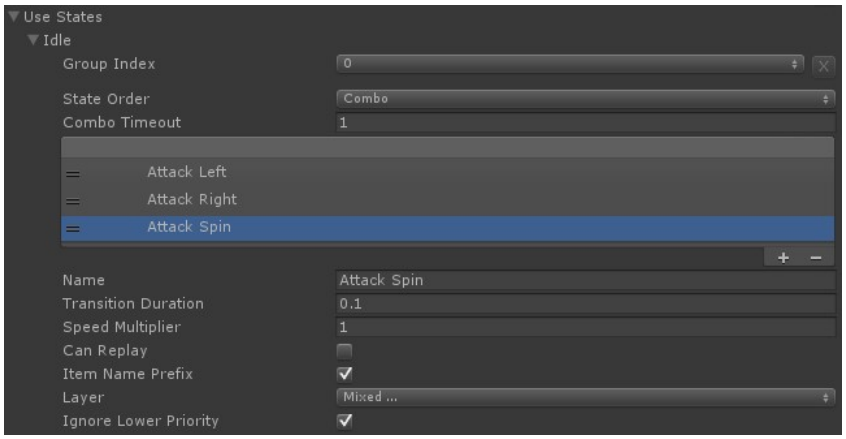
Moving one more level lower we have the Item Group and Item State inspector. The Item Group is in red and the Item State is in green in the image above. Item Groups contain the individual states that the item animations can transition to. Item States represent the actual state that is within the Animator Controller.



If you click on an Item State within the ReordableList you'll have the options for that particular state.

One of the best ways to explain this system is give an example of a potential use case. Lets say that we have a sword and we want to play three combo attack animations. When the character is idle the animations should include the base layer, however it should not include the base layer when the character is moving. In addition, two other animations should play randomly when the Height Change ability is active.

Since these animations should play when the item is being used we are going to be adding all of these animations to the Use State collection. We are going to start by adding the animations to the Idle Set and use the first group.



We specified a State Order of combo so it'll play the Attack Left, Attack Right, and Attack Spin animations sequentially. If the player does not continue to attack within the Combo Timeout duration (1 in this example) then it'll go back to the first state, Attack Left. As an example, lets say that the player attacks at time 10. The first animation that will be played is the Attack Left animation. The player then attacks again at time 10.5 so the next animation within the combo is Attack Right. The player then waits until time 11.75 so the Attack Left animation is played again instead of Attack Spin. In order for Attack Spin to play the player would have had to attack before time 11.5.

The following settings are used for the selected state:

Name: Attack Spin

Specifies the name of the state that the animator should transition to. This name must exist within the Animator Controller

Transition Duration: 0.1

Specifies the duration of the transition to the indicated state from the previous state

Speed Multiplier: 1

Specifies the Animator Controller speed multiplier. This is only applied to the base layer

Can Replay: False

Can the same state name replay multiple times in a row? Note that this is independent of the animations looping value and is only used to determine if the Animator Controller can call the same state twice in a row

Item Name Prefix: True

Should the name of the item be appended before the state name? This is useful for when organizing the item states within substates

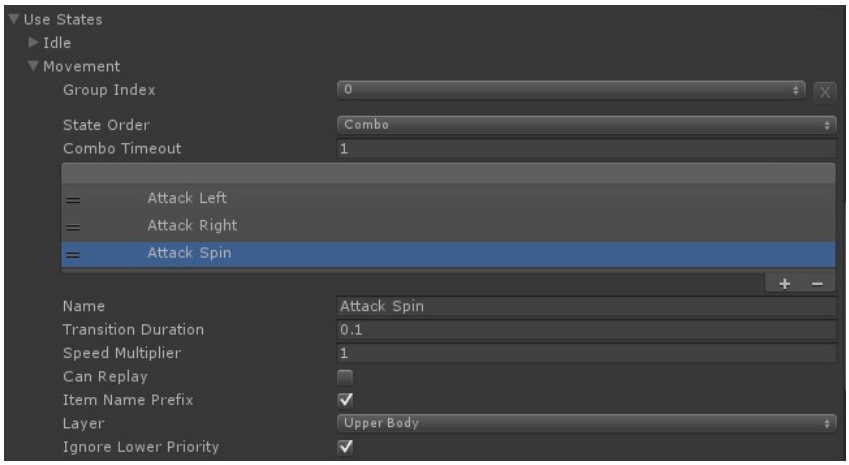
Layer: Base, Upper Body

Which Animator Controller layers are affected by this state? For any layers not specified the default idle animation will play

Ignore Lower Priority: True

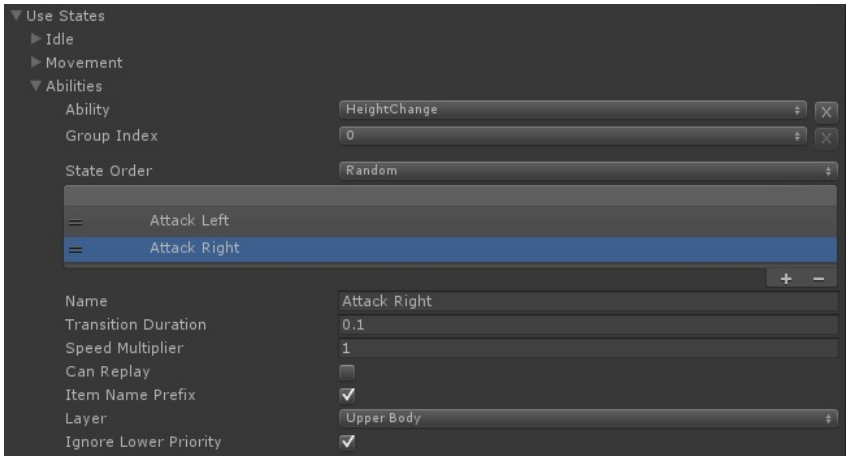
When the Animator Controller decides on which item animation to play it will first search the high priority animations (aim, use, reload, equip, unequip), the ability animations, and finally the low priority animations (idle and movement). If Ignore Lower Priority is enabled then any layers which have a higher index than the last played state layer will ignore the low priority item animations (idle and movement). The default animation will then play (as specified within the Animator Monitor component)

With the Idle Set complete we can now setup the Movement Set.

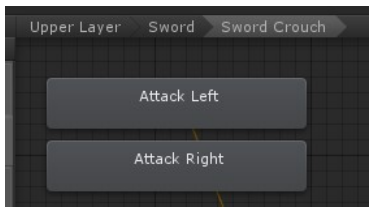


As you can see, the Movement Set is very similar to the Idle Set except it only uses the Upper Body layer. This is done to allow free range of motion while the character is attacking. Alternatively a specific base layer animation could have been specified to go along with the moving use states but it's not necessary in this case.

The last requirement for this use case is to play two other animations when the Height Change ability is active. This can be setup very similarly as the Idle and Movement animations.



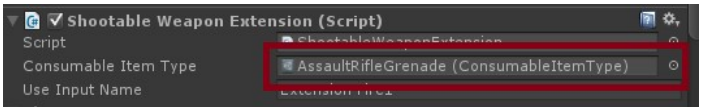
We first selected Height Change from the popup because we want a unique set of states to play when the character is crouching. Instead of a Combo State Order we specified Random so it'll randomly choose out of all of the states. The Attack Right state is setup similar to how the Movement states were setup because we only want to use the Upper Body.



You may notice that we specified a State Name of "Attack Right" versus something unique to the Height Change ability like "Crouch Attack Right". You do not need to specify "Crouch" because the Animator Monitor will automatically place all of the ability states within a substate. In order to add this state you'll need to create a new state in the "Upper Layer.Sword.Sword Crouch.Attack Right" state. The "Sword Crouch" substate is the additional substate added. We have to use "Sword Crouch" versus just "Crouch" because Unity doesn't allow duplicate nested substate names even if the duplicate names are in different parent substates.

Item Extensions

Item extensions allow items to be used in more than one context. For example, an assault rifle primarily fires bullets, but you may also want it to shoot a grenade or melee. The ShootableWeaponExtension or MeleeWeaponExtension component can be added to any existing Item GameObject. This extension component will work with the main Item component to add the extension functionality. The available fields for the ShootableWeaponExtension and MeleeWeaponExtension are similar to their main counterpart.



When adding a new item extension the key difference is that instead of specifying a PrimaryItemType, you instead specify a ConsumableItemType.

Inventory

The Inventory component manages all of the Items. It allows Items to be used, reloaded, dropped, etc. It also communicates with the Animator to trigger animations when switching between items. The Inventory uses an ItemType to map an Inventory Item to a particular Item that is held by the character. When the Inventory is initialized it will search through the components on the character for any component that has a type of Item. When it finds an Item it will add that Item's ItemType to the inventory. The character doesn't actually have the Item yet - the Item still needs to be picked up by the character. It is only then that the Item can actually be used. The Inventory has a DefaultLoadout which will load the specified Items when the Inventory is first initialized.

The number of Items in the Inventory can be obtained from the GetItemCount method. This method takes two parameters - the first being the ItemType and the second being if the calling function is interested in the loaded or unloaded count. PrimaryItems have two different counts: one for the number of ConsumableItems that are loaded and one for the number of ConsumableItems that are not loaded yet. As an example, the ShootableWeapon uses these two different values for the number of bullets that have been loaded in the weapon and the number of ConsumableItems that have yet to be loaded. When the ShootableWeapon is reloaded it will take the unloaded ConsumableItems and add it to the loaded ConsumableItems.

The GUI interfaces with the Inventory to show the status such as number of bullets remaining or the number of SecondaryItems left. It does this using the SharedProperty class.

Item Type

An Item is the base class of any object that can be picked up by the character. The ItemBaseType maps an Item to an object type that the Inventory can use to update properties on that Item such as if the Item is equipped or how many bullets are left.

Item types are .asset files which can be created using the Item Type Builder. The ItemType is extended by the following classes:

Primary
Secondary
Consumable
Dual Wield

Primary

The PrimaryItemType extends the ItemType and is any item type that can be equipped by the character. This includes a standard weapon such as a pistol or shotgun but it can also include throwable items (such as grenade) or melee weapons (such as a knife). The PrimaryItemType uses the ConsumableItemType to determine how many resources it has left. When an Item is used (such as a weapon being fired), the PrimaryItem count in the Inventory doesn't get decremented. Instead, it is the number of ConsumableItems the PrimaryItem has left.

The PrimaryItemType can also specify any additional ConsumableItems. This allows multiple ConsumableItems to use the same PrimaryItemType. PrimaryItemType items may also be dual wielded with other items.

Consumable Item
The consumable item that can be used by the primary item

Additional Consumable Items
Any other consumable items that can be used by the primary item

Dual Wield Items
The items that can dual wield with the current item

Secondary

The SecondaryeItemType extends the ItemType and is any item type that does not need to be equipped. This includes grenades, health packs, power ups, etc. SecondaryeItemTypes can be assigned to the same Items that the PrimaryItemTypes are assigned to, it's just that these Items will never be equipped. SecondaryeItemTypes specify a capacity since they do not use ConsumableItemTypes when being used.

Capacity
The maximum number of secondary items the inventory can hold

Consumable

The ConsumableItemType extends the ItemType and is any item type that can be consumed by the PrimaryItemType. These item types cannot be equipped or used

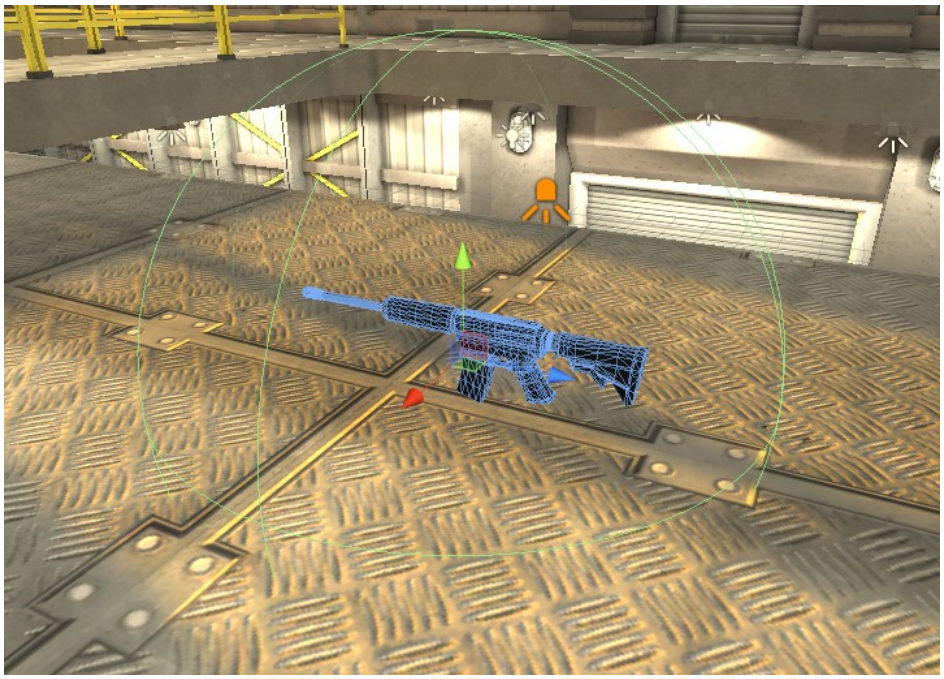
independently. Examples include bullet, flame from a flame thrower, number of melee attacks, etc.

Dual Wield

A dual wield item is any item that can be equipped in conjunction with another primary item of the same type. Examples include dual pistols. If a pistol and a shield can be equipped at the same time, they each will have their own primary type. The shield does not need to use the dual wield item type because two shields are not equipped.

Primary Item
The PrimaryItem that this ItemType can be equipped with

Item Pickup



The ItemPickup component will allow your character to pickup an Item within the scene. In order for the character to pickup an Item, that Item must first be added to the character. Once that Item has been added, the character will then pickup the item when the character enters the ItemPickup's trigger. The ItemPickup component uses the Item Type in order to know which Item to add. Multiple ItemTypes can be specified within a single ItemPickup component.

Item List
Allows an object with the Invetory component to pickup items when that object enters the trigger

Objects

The following components are considered small objects that don't belong in any other category:

Climbable Object
Destructable

- Grenade
- Projectile

Moveable Object
Rideable Object
Shell
Muzzle Flash
Explosion
Moving Platform

Climbable Object

The ClibmableObject component is added to any object in which the character can climb. This includes ladders, vines, or pipes. Even though each type of ClimbableObject has its own traits they all can use the same object. The character can only move up and down vertically while on the ladder. The vines allows the character to move up, down, left, or right as long as the character is not near an edge. When the character is climbing the pipe they must follow the pipe's path. The pipe can move vertically or horizontally.

Climbable Type
The type of object that this component has been added to

Can Reverse Mount

Used by all: can the character mount and face the opposite side of the ClimbableObject?

Bottom Mount Offset
Used by all: the offset that the character should move to when starting to climb from the bottom. A value of -1 means no movement on that axis

Top Mount Offset
Used by ladders and vines: the offset that the character should move to when starting to climb from the top. A value of -1 means no movement on that axis

Rung Separation
Used by ladders: the separation between ladder rungs

Unusable Top Rungs
Used by ladders: the number of rungs that are unusable by the characters feet

Horizontal Padding
Used by vines: the padding from the left and right sides of the box collider that prevent the character from moving too far horizontally

Top Dismount Offset
Used by vines: the offset from the top of the box collider that the character should start dismounting from

Bottom Dismount Offset
Used by vines and pipes: the offset from the bottom of the object that the character should start dismounting from

Mount Positions
Used by pipes: the transforms of the positions that the character can start climbing from

Horizontal Transition Offset
Used by pipes: the horizontal offset from the object position to transition from a vertical to horizontal pipe

Vertical Transition Offset
Used by pipes: the vertical offset from the object position to transition from a horizontal to vertical pipe

Extra Forward Distance
Used by pipes: the amount of extra transition distance of the forward movement compared to the backward movement

Destructable

The Destructable component is an abstract class which acts as the base class for any object that immediately destroys itself and applies a damage. The Projectile and Grenade components are inherited from the Destructable class. When the object is destroyed it can spawn an explosion, decal, or dust prefab.

Damage Amount
The amount of damage done to the object hit. Will not be used if an explosion is specified

Impact Force
How much force is applied to the object hit. Will not be used if an explosion is specified

Damage Event
Optionally specify an event to send when the object is hit. Will not be used if an explosion is specified

Explosion
Optionally specify an explosion prefab

Decal
Optionally specify a decal when the destructable activates

Dust
Optionally specify dust when the destructable activates

Grenade

The Grenade component extends the Destructable component to allow an object to be destroyed after the specified Lifespan. When this Lifespan has elapsed the parent Destruction method will be called to do the actual destruction. To start this timer the Initialize method must be called and this method has two parameters: force and torque. These parameters will apply a relative force and torque to the Rigidbody when the Grenade is initialized.

Lifespan
The length of time the Grenade should exist before it destroys itself

Projectile

The Projectile component extends the Destructable component to allow an object to move using a Rigidbody. The Projectile will keep moving at the specified Speed until it collides with another collider or the Lifespan duration has been reached. When one of these events do happen the Projectile will call the parent Destruction method to do the actual destruction.

Speed
How quickly the Projectile should move

Lifespan
The length of time the Projectile should exist before it activates if no collision occurs

Moveable Object

The MoveableObject component is added to any object which can be moved by the character. The MoveableObject requires a Rigidbody and when the object is not being pushed the Rigidbody is kinematic.

Dampening
The amount of dampening force to apply while moving

Rideable Object

The RideableObject represents any Third Person Controller character object that can be ridden by another character. When the character is mounted on the object it will take control of the input.

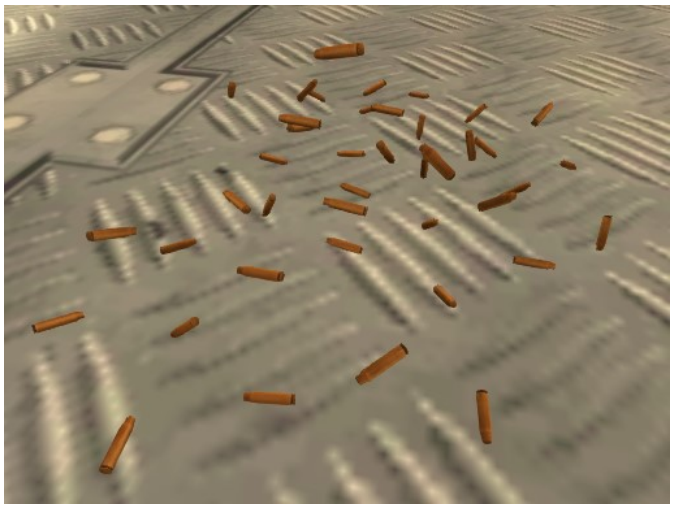
Right Mount

A reference to the Transform where the character can mount on the right side

Left Mount
A reference to the Transform where the character can mount on the left side

Mount Parent
A reference to the Transform where the character should mount to

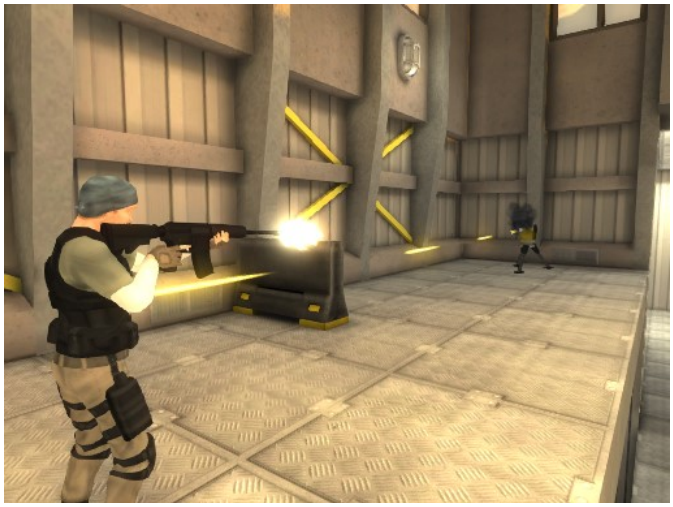
Shell



The Shell component is added to an object which will fly out of a weapon to help indicate that a bullet has been fired. Because the shell is so small Unity's physics engine doesn't work too well with it so the shell's Rigidbody will be set to kinematic after it has landed on the floor. The shell will stay on the floor for the Lifespan duration and then placed back in the ObjectPool.

Lifespan
The length of time that the shell should exist for

Muzzle Flash

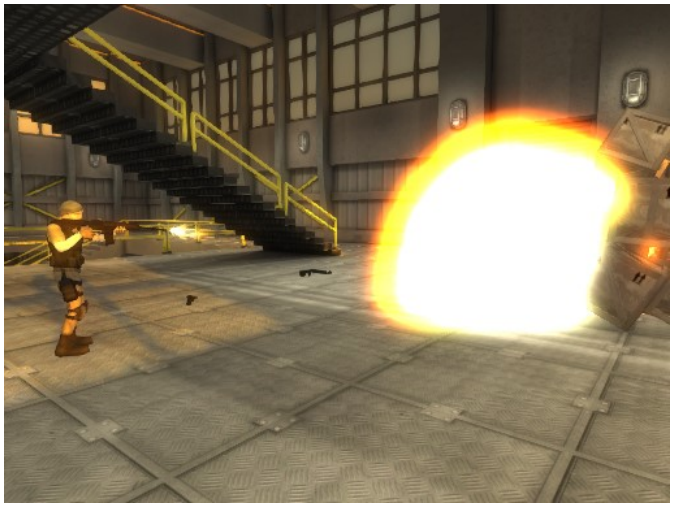


The MuzzleFlash component will slowly fade the Renderer when the component is enabled. The renderer must have the "_TintColor" color defined to be able to apply the fade. A light may optionally be added to the object and that light will be faded at the same rate as the Renderer.

Start Alpha
The alpha value to initialize the muzzle flash material to

Fade Speed
The larger the value the quicker the muzzle flash will fade

Explosion



The Explosion component will apply a force and damage any object that is within the specified Radius. A sound can be played as well to indicate that an explosion took place. The Explosion object will be placed back in the ObjectPool after the Lifespan duration has elapsed. An explosion can occur either when enabled or triggered manually with the Explode method.

Explode On Enable
Should the explosion explode when the object is enabled?

Lifespan
The duration of the explosion

Radius
How far out the explosion affects other objects

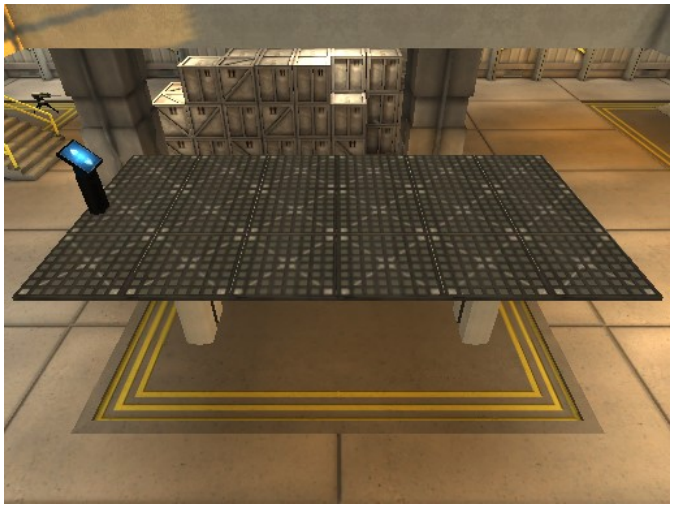
Impact Force
The amount of force the explosion applies to other Rigidbody objects

Damage Event
Optionally specify an event to send to the object hit on damage

Damage Amount
The amount of damage the explosion applies to other objects with the Health component

Sound
Sound to play during the explosion

Moving Platform



The MovingPlatform component will smoothly move an object between any number of waypoints. In addition to position changes, the platform can change rotations as defined by the RotationSpeed. As soon as the platform arrives at a waypoint it will either smoothly come to a stop or continue on to the next waypoint. The MovingPlatform component implements the IInteractableTarget interface and will start moving when Interact is called.

The RigidbodyCharacterController component can smoothly ride on top of MovingPlatforms. In order for it to do this it must know that it is on top of a MovingPlatform and this is specified by the MovingPlatform layer.

Move When Enabled
Should the platform start moving when the object is enabled?

Move Dampening
The amount of dampening to make the movement smooth

Rotation Speed
The speed at which the platform rotates

Stop At Waypoint
Should the platform stop moving when it arrives at a waypoint?

Can Interact While Moving
Can the direction be changed while the platform is moving?

Waypoints
An array of Transforms which the moving platform will move towards. When the ending waypoint is reached it will loop back to the start

Start Waypoint Index
The starting waypoint index to move towards

Traits

Traits are components which add small functionality to an object. The following traits are included:

Health

- Health Pickup

Interactable
Particle Remover
Respawner

Health

The Health component allows any object to take damage inflicted by another object. This component can be added to any object to give that object health – whether that be a character or an inanimate object such as a barrel. The health component does not require any other components to work.

The Health component has two types of health – standard health that does not regenerate and health that does regenerate (called a shield). Both types of health are not required. For example, an object can only use its shield if it has a MaxHealth value set to zero.

When the health and shield values reach zero the object is considered dead. When the object dies it will spawn any objects in the SpawnedObjectsOnDeath array and deactivate if DeactivateOnDeath is enabled. In addition, the OnDeath and OnDeathDetails events are executed which notifies interested objects that the object has died.

An object can take damage by calling the Damage method. This method takes three parameters: an amount, position, and force. The amount specifies the amount of damage to take. If the object has both health and a shield then the amount will be subtracted from the shield first. The position and force parameters specify where the damage occurred and how much force was applied. This information is used by the GUI for the hit indicators and the ragdoll if the object died and has a ragdoll attached.

Health can be added by collecting the Health Pickup.

Invincible
Is the object invincible? If true no damage will be taken

Max Health
The maximum amount of health, can be 0

Max Shield
The maximum amount of shield, can be 0

Shield Regenerative Initial Wait
If using a shield, the amount of time to initially wait before the shield regenerates

Shield Regenerative Amount
If using a shield, the amount to regenerate every interval

Shield Regenerative Wait
If using a shield, the amount of time to wait before regenerating a small amount of shield

Damage Multipliers
The list of colliders that should apply a multiplier when damaged

Spawned Objects On Death
Any object that should spawn when the object dies

Destroyed Objects On Death
Any object that should be destroyed when the object dies

Deactivate On Death

Should the object be deactivated on death?

Deactivate On Death Delay
If DeactivateOnDeath is enabled, specify a delay for the object to be deactivated

Death Layer
The layer that the GameObject should switch to upon death

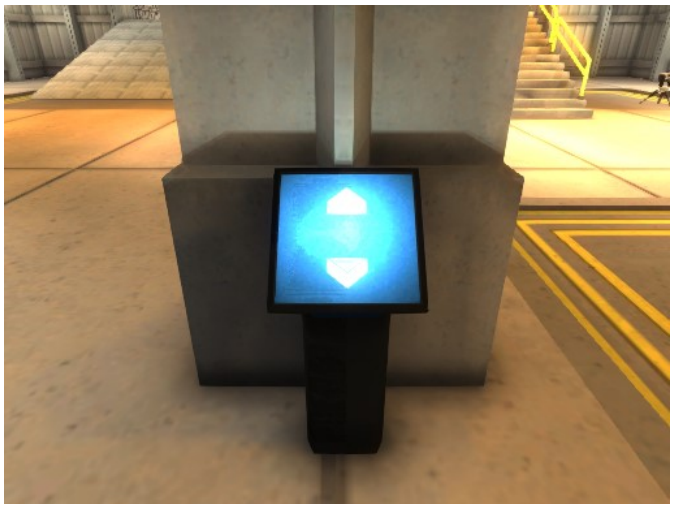
Time Invincible After Spwan
The amount of time that the object is invincible after respawning

Health Pickup

The HealthPickup component allows the character to pickup health. When the character enters the health pickup trigger, the HealthPickup will immediately increase the object's health by the specified amount. This object must have the Health component attached.

Heal Amount
The amount of health to add

Interactable



The Interactable component allows the object to be interacted with. Examples of use include switches or buttons. In order for an interaction to occur, the character that will be interacting with the Interactable object must be within the Interactable's trigger and be looking at the Interactable object.

The Interactable object specifies which object it can interact with. This object, which implements the IInteractableTarget interface, can be any object that performs an action. Examples include a moving platform, opening door, or turning on a light.

When the Interactable object is interacted with it will register itself for the OnAnimatorInteracted event. This event is executed by the AnimatorMonitor when the interact animation fires the Interacted animation event. It is only when this event is executed that the Interactable will tell the IInteractableTarget to perform its action. At any point during this time the IInteractableTarget may become unavailable for any reason so immediately before the action is performed the Interactable object asks the IInteractableTarget if it can still be interacted with.

Target
The object perform the interaction on. This object must implement the IInteractableTarget interface

Interactor Look Interact Threshold
The amount that the interactor must be looking at the Interactable in order to interact. -1 is completely looking at the target, 1 is looking in the opposite direction

Camera Look Interact Threshold

The amount that the camera must be looking at the Interactable in order to interact. -1 is completely looking at the target, 1 is looking in the opposite direction

Max Horizontal Offset
The maximum x offset that the character can be standing away from the Interactable in order to interact

Interactor Layer
The layer of objects that can perform the interaction

Particle Remover

The ParticleRemover component attaches to an object which has a ParticleSystem and will place the object back in the ObjectPool when the ParticleSystem is done playing.

Respawner

The Respawner component will spawn the object again after it has been disabled. It will spawn the object after the RespawnTime duration has elapsed. When the object spawns again it will have same position and rotation as it did when the object was first enabled. When the object is spawned again it will execute the OnRespawn event.

Respawn Time
Waits the specified amount of time before respawning

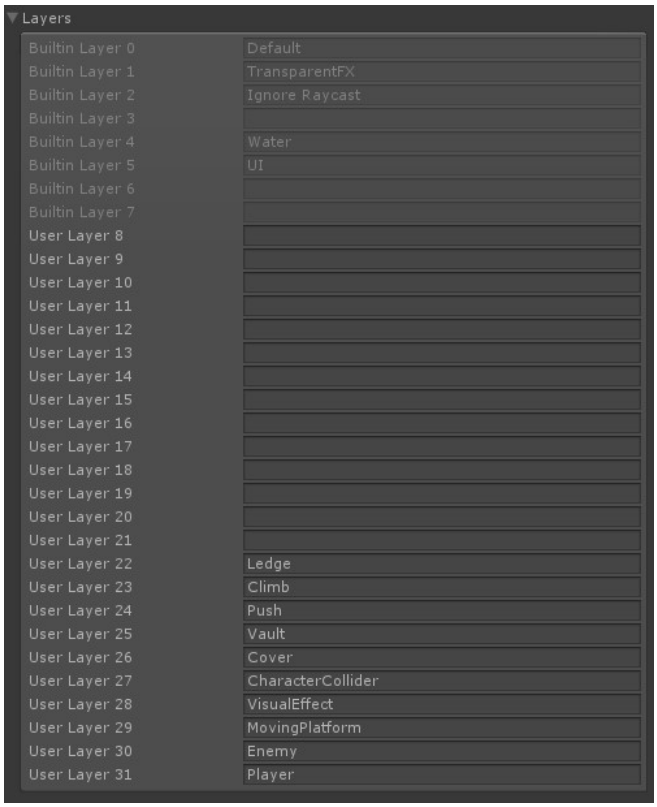
Layers

The Third Person Controller is not in the "Complete Projects" category of the Asset Store and therefore does not import any project settings. Custom layers are however necessary for certain features to work properly such as the moving platforms or cover. The LayerManager class allows this to happen by defining the layers without the layers having to exist in Unity's TagManager.

The following custom layers are setup:

Ledge – Layer 22
Climb – Layer 23
Push – Layer 24
Vault - Layer 25
Cover – Layer 26
CharacterCollider– Layer 27
VisualEffect - Layer 28
MovingPlatform – Layer 29
Enemy – Layer 30
Player – Layer 31

These layers should be setup manually in the TagManager for them to be visible on the object which belongs in that layer.



Input

Unity's InputManager is used for getting input from the player. Keyboard and mouse, controller, and mobile input is supported. The UnityInput component is used as a common base class for both standalone and mobile input. To easily allow integration with other input implementations, the UnityInput class is derived from the PlayerInput class. The PlayerInput class is used by all of the calling components in order to determine if the specified input is activated.

Note: When the Third Person Controller is first downloaded from the Asset Store it does not include a custom InputManager file which contains the correct inputs for a third person controller. The InputController can be updated by opening the Third Person Controller Start Window and selecting Update Input. The InputManager will then add any missing inputs.

Standalone

Standalone input is used by any platform that is not a mobile platform. This includes the PC, Mac, and consoles. In most cases the InputManager maps the controller and keyboard to the same name. The only time this does not occur is for the controller's trigger controls. The triggers are considered an axis whereas with a keyboard and mouse they are regular buttons. In this case the StandaloneInput class first tries to get the controller input and if that fails it will then try to get the input from the keyboard.

Note: When the Third Person Controller is first downloaded from the Asset Store it does not include a custom InputManager file which contains the correct inputs for a third person controller. The InputController can be updated by opening the Third Person Controller Start Window and selecting Update Input. The InputManager will then add any missing inputs.

Mobile

MobileInput does not use the InputManager and instead completely relies on touch input. This touch input can be retrieved with the VirtualButton component. The VirtualButton accepts both presses and swipes. Presses are similar to button presses on the keyboard and swipes are similar to axis input on the keyboard. All of the VirtualButtons should be placed under a common GameObject which contains the VirtualButtonManager. This VirtualButtonManager component will enable or disable the VirtualButtons according to the PlayerInput settings. No extra work is required to get mobile controls to work – the same PlayerInput class can be used to get both standalone and mobile input and most components do not even need to know that the game is running on a mobile device.

Note: for MobileInput to work correctly, make sure you first import the source code.

Component Communication

The components within the Third Person Controller are designed to be very modular. Don't want an object to have health? No problem, don't add the Health component. Or what if you don't want an object to respawn after it gets destroyed? Just don't add the Respawner component.

This modularity is achieved through events, schedules, and property/method sharing. In the case where one component requires another component, such as the CameraController requiring a CameraHandler, the two classes are as loosely coupled as possible. For this camera example, the CameraController is aware of the CameraHandler but the CameraHandler does not know about the CameraController.

Events
Shared Property and Method
Scheduler
Object Pool

Events

The EventHandler classes adds a generic event system to the framework. This event system allows objects to register, unregister, and execute events on particular objects. Multiple objects can subscribe to the same event. The Third Person Controller uses events extensively to allow components to communicate without directly knowing about each other. The following definition is used to listen for an event:

```
EventHandler.RegisterEvent(object obj, string name, Action handler)
```

This function is overloaded to allow events with multiple parameters. Unregistering from an event is very similar as it is to register for an event:

```
EventHandler.UnregisterEvent(object obj, string name, Action handler)
```

An event can then be executed with:

```
EventHandler.ExecuteEvent(object obj, string name)
```

As an example, the "OnRespawn" event is executed when the Respawner component spawns the object again. A component can listen for this event by first registering:

```
EventHandler.RegisterEvent(gameObject, "OnRespawn", RespawnFunction);
```

Where RespawnFunction is the function that should execute when the “OnRespawn” event is executed. This function might look like:

```
private void RespawnFunction()
{
   // Respawn logic
}
```

The GameObject can then unsubscribe itself from the event with the following:

```
EventHandler.UnregisterEvent(gameObject, "OnRespawn", RespawnFunction);
```

The OnRespawn event will be called by the Respawner class by calling ExecuteEvent:

```
EventHandler.ExecuteEvent(gameObject, "OnRespawn");
```

Every object which is subscribed to the "OnRespawn" event of that particular GameObject.

Shared Property and Method

In some cases a component may want to get/set a value or execute a function on a separate component without directly knowing about that separate component. As an example, when a weapon is fired it sets a recoil amount so the recoil can be portrayed on the GUI by expanding or moving the crosshairs. Since the framework works with both player-controlled characters and AI-controlled characters, there isn’t always guaranteed to be a GUI for every weapon fired. Furthermore, every game is different so a GUI that displays the recoil may not even be necessary. Instead of requiring the Weapon component to have knowledge that the GUI component exists, a SharedProperty can be used instead. SharedMethod is similar to SharedProperty except it works on methods instead of properties.

The first step to setup a SharedProperty is to first define the variable that holds the property value. From the recoil example it would be a simple float:

```
private float m_RecoilAmount = 0;
```

The property for this variable then needs to be have a special formatting in order for other components to know that this property exists. This special formatting means that the property needs to have “SharedProperty_” appended before the name of the property:

```
private float SharedProperty_RecoilAmount { get { return m_RecoilAmount; } set { m_ RecoilAmount = value; } }
```

After the "SharedProperty_" is the name of the variable that the property gets or sets. Do not include the "m_" as that will be ignored. SharedProperties will not work if this formatting is not applied. For example, the following will property name will NOT work:

```
SharedProperty_Recoil
```

This property name will not work because the property doesn’t have the full variable name, RecoilAmount.

After the property has been created the component needs to register itself with the SharedManager so other components can find it. This should be done within the Awake method:

```
private void Awake()
{
    SharedManager.Register(this);
}
```

This is all that is required to have the property be recognized. In order for another component to find this property it first needs to have a variable which will be used to store the reference to the property:

```
private SharedProperty m_RecoilAmount = null;
```

Take note that this variable has the same name as the variable that the SharedProperty modifies. This is also necessary as it maps a particular variable to the SharedProperty. The component then needs to initialize the SharedProperty with the correct property reference. This should be done within the Start method:

```
private void Start()
{
    SharedManager.InitializeSharedFields(guiGameObject, this);
}
```

The first parameter is the object that the original SharedProperty has been added to. In this example the object is the GameObject that the GUI has been added to. This is all that is required in order to get the components to share properties without directly knowing about each other!

The RecoilAmount SharedProperty can then be used by calling Get and Set:

```
float amount = m_RecoilAmount.Get();
m_RecoilAmount.Set(amount);
```

SharedMethod works in a very similar way as SharedProperty does except it doesn’t require as much setup because no values are being stored. The first step is to create the method:

```
public Vector3 SharedMethod_TargetLookPosition()
{
    // Implementation
}
```

Notice that this method has a very similar format as SharedProperty: it must start with "SharedMethod_" and the name of the method ("TargetLookPosition") is used to map the variable to the method. The component which contains this method still must register itself within Awake:

```
Public void Awake()
{
    SharedManager.Register(this);
}
```

In order for another component to find this method it needs to have a variable which will be used to store the reference to the method:

private SharedMethod TargetLookPosition = null;

Notice that the name of this variable matches the name of the method after the “SharedMethod_” prefix. This component then needs to initialize the SharedMethod with the correct reference:

```
private void Start()
{
    SharedManager.InitializeSharedFields(targetGameObject, this);
}
```

The same parameters are used with SharedMethod as SharedProperty. The first parameter is the object that the SharedMethod method exists on. Once this is setup the component is able to execute methods without having direct knowledge on what object it is executing these methods on! As an example, this SharedMethod can then be used by calling invoke:

```
TargetLookPosition.Invoke();
```

Scheduler

While not directly related to communicating with other components, the Scheduler allows the delayed execution of methods. When a new event is scheduled, a ScheduledEvent object is created and can then be stored which then allows the event to be cancelled. The following definition is used to schedule an event:

```
ScheduledEvent Schedule(float delay, Action handler)
```

Where delay is the amount of time that should elapse before handler is executed. The scheduler can also accept parameters:

```
ScheduledEvent Schedule(float delay, Action handler, object arg)
```

This ScheduledEvent can later be cancelled with:

```
Cancel(ScheduledEvent scheduledEvent)
```

As an example, the Explode method will be called after 1.5 seconds:

```
Scheduler.Schedule(1.5f, Explode);
```

Object Pool

It is a relatively expensive operation to instantiate and destroy objects. To avoid many instantiations and destructions an ObjectPool is used which will reuse an already-created object. The ObjectPool class can pool both GameObjects and regular objects derived from System.object.

If you are wanting to create a new object, ObjectPool.Instantiate should be used instead of Instantiate. This function will create a new GameObject if one doesn't already exist within the pool. Similarly, to destroy an object, ObjectPool.Destroy should be used instead of Destroy. This will place the GameObject back in the pool.

In a similar way that GameObjects can be pooled, regular System.object objects can be pooled as well. To get a new object, ObjectPool.Get< T >() should be used. T specifies the type of object to get. For example, if you have a class named CustomClass you can get the pooled object with ObjectPool.Get< CustomClass >(). To return an object back to the pool ObjectPool.Return(obj) can be used.

Interfaces

The following interfaces can be subscribed to:

IInteractable
IInteractableTarget
IReloadableItem
IUseableItem
IThrownObject
IFlashlightUsable
ILaserSightUsable

IInteractable

IInteractable provides an interface for objects that perform the interaction on an IInteractableTarget. Examples of objects that may implement the IInteractable interface are switches or buttons. The Interacable component implements this interface.

IInteractableTarget

IInteractableTarget provides an interface for objects that can be interacted with. Examples of objects that may implement the IInteractableTarget are platforms, doors, or lights. The MovingPlatform component implements this interface.

IReloadableItem

IReloadableItem provides an interface for an Item that can be reloaded. Weapon components implement this interface.

IUseableItem

IUseableItem provides an interface for an Item that can be used. Examples of being used include being fired, swung, or thrown. The Weapon and ThrowableItem components implement this interface. This interface provides the methods which allow the handler to try to use the Item, determine if the Item is in use, and try to stop the in-use Item.

The implementer can register to receive a callback to know when to actually be used. An example of use for this is when the Grenade is being thrown. The Grenade shouldn't be thrown immediately because it should wait for the hand's animations to get to an appropriate release point. When the hands reach this release point an animation event will be triggered which will then callback to the IUseableItem.

IThrownObject

IThrownObject provides an interface for an object that can be thrown. The Grenade component implements this interface.

IFlashlightUsable

IFlashlightUsable provides an interface for Items that can add a flashlight attachment. The ShootableWeapon component implements this interface.

ILaserSightUsable

ILaserSightUsable provides an interface for Items that can add a laser sight attachment. The ShootableWeapon component implements this interface.

Integrations

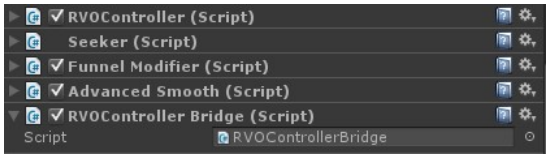
The following topics explain in depth how the Third Person Controller integration is setup. All of these integrations can be downloaded from the Integrations page.

A* Pathfinding Project
Adventure Creator
Apex Path
Dialogue System
Edy's Vehicle Physics
Final IK
InControl
Input
Inventory Pro
ORK
plyGame
PuppetMaster
UMA 2

A* Pathfinding Project

This integration is available on the Integrations page.

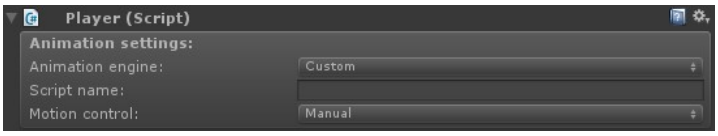
The A* Pathfinding Project integration allows your character to move according to the A* Pathfinding Project RVOController. After you have imported the package the integration can be setup by adding the RVOControllerBridge component to your character already setup to work with the RVOController.



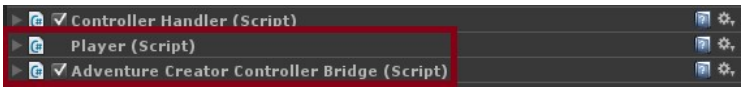
Adventure Creator

The Adventure Creator integration enables the Third Person Controller character controller to be used with the Adventure Creator framework. The following steps are required to have your character work with Adventure Creator:

1. Create your character like normal through the Character Builder.
2. Add the Adventure Creator Player component.
3. Set the Player Animation Engine to Custom and Motion Control to Manual.



4. Add the Adventure Creator Controller Bridge component. This can be found on the Integrations page.



5. Set the Player within the Character settings section of the Adventure Creator Settings Manager.

With this setup Adventure Creator will take control of the character when it needs to (such as during cutscenes). For all other times the Third Person Controller will have control.

If you are trying the Adventure Creator sample scene you should do the following:

1. Import Adventure Creator.
2. Import the Third Person Controller.
3. Import the Adventure Creator integration assets.
4. Import the Adventure Creator sample scene.
5. Open Third Person Controller/Third Party/Adventure Creator/Sample/scene.unity.
6. Click on Third Person Controller/Third Party/Adventure Creator/Samples/Adventure Creator Sample_ManagerPackage.asset so it opens in the Unity inspector.
7. Click "Assign Managers" within the inspector.
8. Play.

Apex Path

This integration is available on the Integrations page.

The Apex Path integration allows your character to move according to a path generated by Apex Path. After you have imported the integration package the only setup required is to add the MovableUnitControllerBridge component to your Apex Path character.

Dialogue System

This integration is available on the Integrations page.

The Dialogue System for Unity integration was developed by Pixel Crushers. Please see this page for its documentation.

Edy's Vehicle Physics

This integration is available on the Integrations page.

The Edy's Vehicle Physics integration allows the Third Person Controller character to enter and exit an Edy's Vehicle Physics Vehicle Controller. Note that this integration does not contain an enter and exit animation because the vehicles in Edy's Vehicle Physics have no interiors.

After importing the integration package the integration can be setup in two steps:

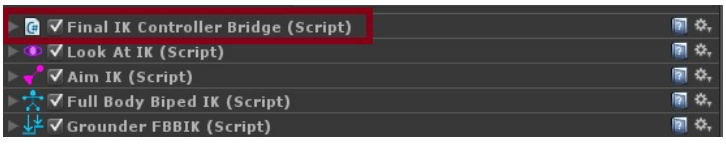
1. Add the Vehicle Disabler component to the vehicle. This will disable Edy's Vehicle Physics from giving the player control over the vehicle.
2. Add the Drive Edy Vehicle ability to the character.

Final IK

This integration is available on the Integrations page.

The Final IK integration allows your character use Final IK for its lower and upper body IK instead of Unity's IK system. The integration with Final IK is quick to setup:

1. Ensure the Character IK component is removed from the character. Note that this component may not have been added if you did not have "Add IK" selected within the Character Builder.
2. Add the Final IK Controller Bridge to your character.
3. Add your Final IK components. In the sample scene we added the Look At IK, Aim IK, Full Body Biped IK, and Grounded FBBIK.



InControl

This integration is available on the Integrations page.

The InControl integration allows you to use InControl instead of Unity's standard Input Manager. To use InControl the first step is similar to the other input integrations where you first remove the UnityInput component and add the InControlInput component.

InControl requires an extra step because it has no visual editor for adding key bindings. A new class needs to be created which implements the IBindings interface. This interface is included with the InControl integration files. IBindings requires you to implement two methods: CreateBindings and GetInputControl. CreateBindings should create the PlayerAction bindings, and GetInputControl should return the PlayerAction for the specified input name. The InControl documentation has more information on this topic.

Input

This integration is available on the Integrations page.

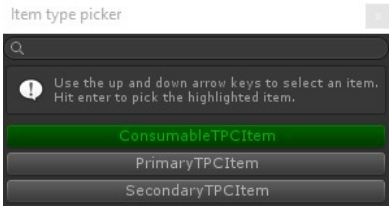
The Third Person Controller is integrated with Rewired, Control Freak, InControl, and Easy Touch for alternate input implementations. In order to use one of these integrations, the corresponding Input component should be used instead of UnityInput. Ensure the UnityInput component has been removed after adding a third party input integration. For example, if you want to use Rewired, the RewiredInput component should be added and the UnityInput component removed. The Third Person Controller will always use this input implementation instead of Unity's InputManager.

Inventory Pro

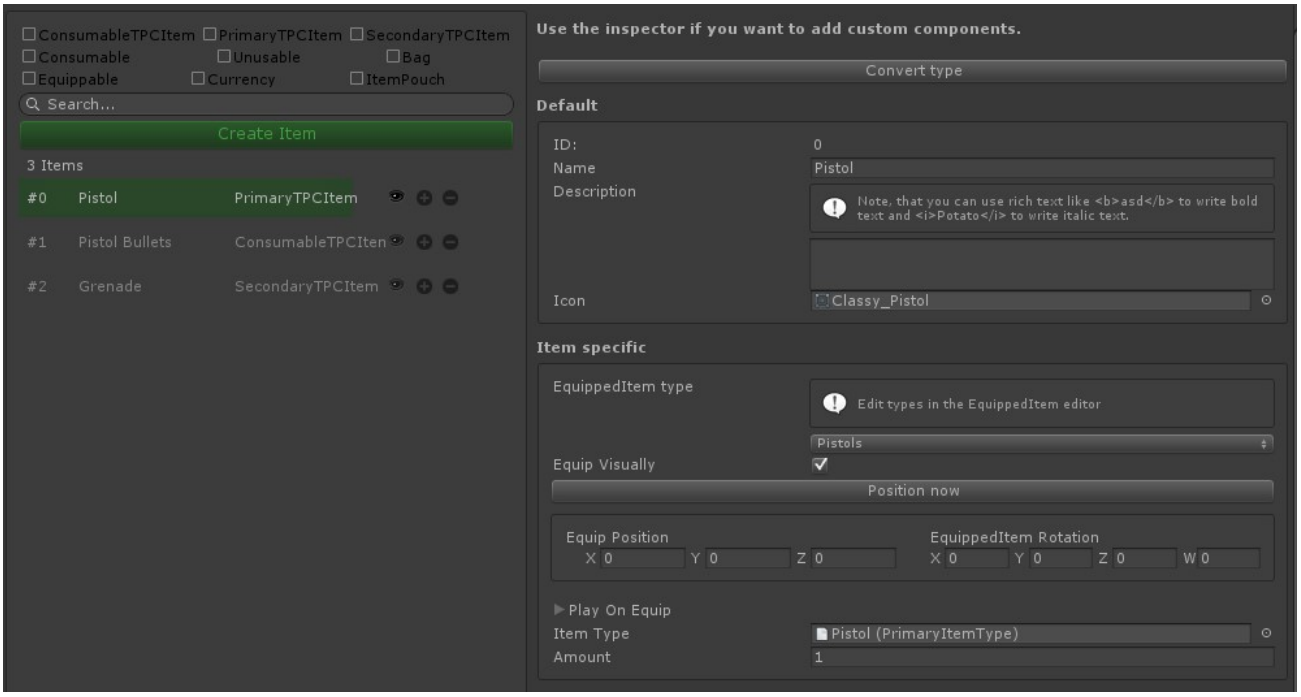
This integration is available on the Integrations page.

The Inventory Pro integration allows your character to use Inventory Pro along with the Third Person Controller inventory. This integration works by receiving callbacks from Inventory Pro when an event occurs (such as looting a treasure chest or purchasing an item from a vendor). The Third Person Controller inventory will notify Inventory Pro when an event causes an inventory change on its end (such as using an item). This document assumes that you are familiar with how Inventory Pro works.

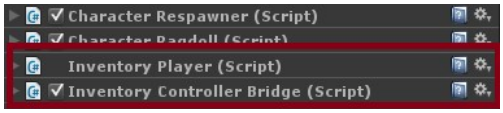
After downloading the Inventory Pro integration files you'll have the option of selecting three new Inventory Pro ItemTypes: PrimaryTPCItem, ConsumableTPCItem, and SecondaryTPCItem. These three types map to the Third Person Controller PrimaryItemType, ConsumableItemType, and SecondaryItemType. DualWieldItemTypes are not necessary as you can equip multiple PrimaryItemTypes.



These ItemTypes can be selected from the Inventory Pro Item Editor.



These item types can be used as normal Inventory Pro items - with Object Triggers, Lootable Object, etc. Your Third Person Controller character also needs to be setup to work with Inventory Pro. The first step is to add Inventory Pro's Inventory Player component, along with the Inventory Controller Bridge component included with the integration files.



Once these components have been added you can use the Third Person Controller with Inventory Pro!

ORK

The ORK integration enables the Third Person Controller character and camera to be used with the ORK framework. The following steps are required to setup your character to be used with ORK:

1. Create your character like normal through the Character Builder.
2. Add the ORKCharacterControllerBridge component to your character. This can be found on the integrations page.
3. Following the ORK documentation, open the Base/Control -> Game Controls editor within the ORK Framework window.
4. Set the Player Control Type to None.
5. Add a new Custom Control with the following values. The other fields can keep their defaults.
    - Blocked By: Player
    - Placed On: Player
    - Behaviour Name: ORKCharacterControllerBridge
6. Save your settings within the ORK Framework

After completing these steps the Third Person Controller can now be used by ORK. ORK will automatically take control of the character when it needs to (such as during interactions).

The Third Person Controller camera can also be used with ORK. It is setup in a similar way as the character:

1. Add the ORKCameraControllerBridge component to your camera. This can be found on the integrations page.
2. Following the ORK documentation, open the Base/Control -> Game Controls editor within the ORK Framework window.
3. Set the CameraControl Type to None.
4. Add a new Custom Control with the following values. The other fields can keep their defaults.
    - Blocked By: Camera
    - Placed On: Camera
    - Behaviour Name: ORKCameraControllerBridge
5. Save your settings within the ORK Framework

The ORK sample project can be downloaded from the integrations page. Perform the following steps to get this sample working:

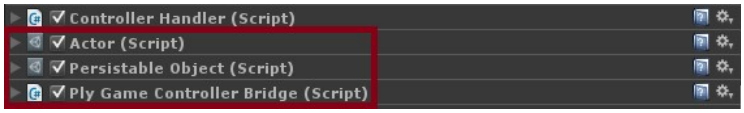
1. Import ORK
2. Import the Third Person Controller.
3. Import the ORK Game Tutorials from the ORK website.
4. Update the Input Manager from the Third Person Controller Start Window.
5. Import the Third Person Controller ORK sample and integration packages.
6. Add the "0 Main Menu" and "1 Town" scenes to your Unity build settings.
7. Open the scene found in Tutorial Resources/Scenes/0 Main Menu. This scene has been updated with the Third Person Controller integration.
8. Play.

plyGame

This integration is available on the Integrations page.

The plyGame integration enables the Third Person Controller character and camera controller to be used with the plyGame framework. The following steps are required to have your character work with plyGame:

1. Create your character like normal through the Character Builder.
2. Add the plyGame Actor and Persistable Object component.
3. Add the plyGame Game Controller Bridge component. This can be found on the Integrations page.



No other steps are required. With this setup plyGame will be aware of the Third Person Controller character controller. The camera can be setup similarly:

1. Add the Third Person Controller Camera Controller component.
2. Add the plyGame Camera Bridge component
3. Add the plyGame Game Controller Bridge component. This can be found on the Integrations page.

If you are trying the plyGame sample scene you should do the following:

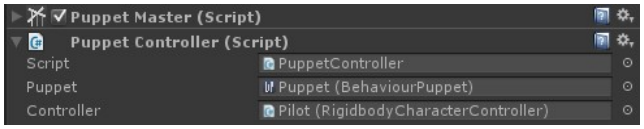
1. Import plyGame.
2. Import the Third Person Controller.
3. Import the plyGame integration assets.
4. Add the scene located at Third Person Controller/Third Party/plyGame/System/00-bootstrap.unity to the Unity build menu.
5. Open the scene at Third Person Controller/Integrations/plyGame/scene.unity
6. Play.

PuppetMaster

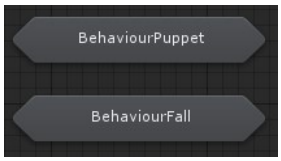
This integration is available on the Integrations page.

The PuppetMaster integration adds advanced ragdoll physics to your character. PuppetMaster sits on top of the Third Person Controller and will notify the Third Person Controller when it goes into full ragdoll mode. Two steps are required in order to allow PuppetMaster to work with the Third Person Controller.

The first step is to add the PuppetController integration component to the same GameObject that has the PuppetMaster component. This will be a separate GameObject from the character. Make sure you assign the two fields - Puppet and Controller.



The second step is to add the BehaviourPuppet and BehaviourFall states to the base layer of your characters animator controller. You can copy these states from an existing PuppetMaster controller.

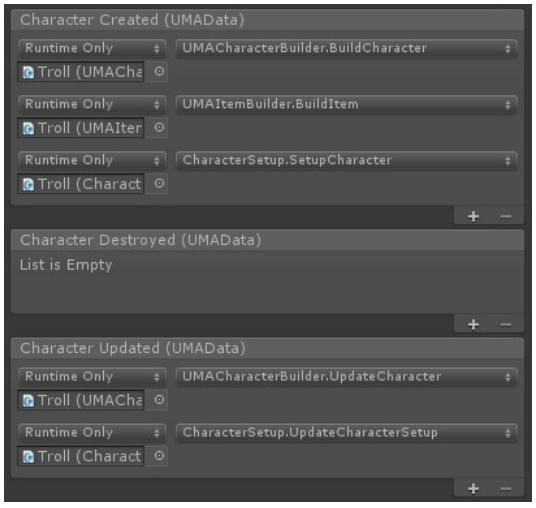


The PuppetMaster developer made a Third Person Controller integration video and that can be found here. Note that this video is using an older version of the Third Person Controller so setup is much easier now.

UMA 2

This integration is available on the Integrations page.

The UMA 2 integration allows your UMA created character to be used as a Third Person Controller character. There are two different components included in this integration. The first component adds all of the Third Person Controller components after UMA has created the character. These components are the same components that the Character Builder adds. The second component is game specific and is included in the UMA sample scene download. This component will add the Fall and Jump ability, along with attaching the camera. Both of these components use Unity Events to be notified after the UMA character has been created:



This screenshot was taken on the UMA Dynamic Avatar component. When the character is created UMACharacterBuilder.BuildCharacter will be called. This adds of the standard Third Person Controller components. The second event, UMAItemBuilder.BuildItem, will add the specified items to the character. The last event, CharacterSetup.SetupCharacter, is game specific and in this case will add the Fall and Jump ability along with attaching the camera to the character.

When the character is updated UMACharacterBuilder.UpdateBuilder is called and this will do any Third Person Controller updates, such as resizing the character's CapsuleCollider. The final callback, CharacterSetup.UpdateCharacterSetup, is game specific and will reinitialize the abilities.

Support

We are here to help! If you have any questions/problems/suggestions please don't hesitate to ask. You can email us at support@opsive.com or post on the forum. For email support please include your Third Person Controller invoice number.