SUPER Character Controller

Documentation and Reference

Note:

This documentation is not complete and is subject to change.

Section I: Variables

Camera Variables:			
Name	Internal name	Type	Description
Player Camera	playerCamera	Camera Object	The camera attached to the player.
Camera Perspective Mode	cameraPerspective	Byte enum	The current perspective of the character.
Automatically Switch Perspective	automaticallySwitchPerspective	Bool	Should the Camera perspective mode automatically change based on the distance between the camera and the character's head?"
Perspective Switch Key	perspectiveSwitchingKey	Key/KeyCode	The keyboard key used to switch perspective modes. Set to none if you do not wish to allow perspective switching.
Mouse Input Inversion	mouseInputInversion	MouseInputInversionModes enum	Which axes of the mouse input should be inverted if any.
Mouse Sensitivity	Sensitivity	Float	Sensitivity of the mouse.
Camera Weight	rotationWeight	Float	How heavy should the camera feel?
Vertical Rotation Range	verticalRotationRange	Float	The vertical angle range (In degrees) that the camera is allowed to move in.
Lock and Hide mouse Cursor	lockAndHideMouse	Bool	Should the controller lock and hide the cursor?
Auto Generate Crosshair	autoGenerateCrosshair	Bool	Should the controller automatically generate a crosshair?
Crosshair Sprite	crosshairSprite	Sprite	The Sprite the controller will use when generating a crosshair.
Show Crosshair in 3rd person?	showCrosshairIn3rdPerson	Bool	Should the controller show the crosshair in 3rd person?
Draw Primitive UI	drawPrimitiveUI	Bool	Should the controller automatically generate and draw primitive stat UI?
Camera Input Methods	viewInputMethods	ViewInputModes Enum	The input method used to rotate the camera.
Eye Height	eyeHeight	Float	The Eye height of the player measured from the center of the character's capsule and upwards.
FOV Kick Amount	FOVKickAmount	Float	How much should the camera's FOV change based on the current movement speed?

FOV Sensitivity Multiplier	FOVSensitivityMultiplier	Foat	How much should the camera's FOV effect the mouse sensitivity? (Lower FOV = less sensitive)
Rotate Ungrounded Character to Camera Forward	rotateCharaterToCameraForward	Bool	Should the character get rotated towards the camera's forward facing direction when mid air?
Head Height	eyeHeight	Float	The Head height of the player measured from the center of the character's capsule and upwards.
Max Camera Distance	maxCameraDistance	Float	The farthest distance the camera is allowed to hover from the character's head.
Camera Zoom Sensitivity	cameraZoomSensitivity	Float	How sensitive should the mouse scroll wheel be when zooming the camera in and out?
Body Mesh Alignment Speed	bodyCatchupSpeed	Float	How quickly will the body align itself with the camera's relative direction.
Input Response Filtering	inputResponseFiltering	Float	How quickly will the internal input direction align itself the player's input.
Camera Obstruction Layers	cameraObstructionIgnore	Layer Mask	The Layers the camera will register as an obstruction and move in front of.

Movement Variables:			
Name	Internal name	Type	Description
Current Movement Speed	currentGroundMovementSpeed	GroundSpeedProfiles Enum	Displays the player's current movement speed.
Walking Speed	walkingSpeed	Float	How quickly can the player move while walking?
Can Sprint	canSprint	Bool	Is the player allowed to enter a sprint?
Toggle Sprint	toggleSprint	Bool	Should the spring key act as a toggle?
Sprint Key	sprintKey	Key/KeyCode	The Key used to enter a sprint.
Sprinting Speed	sprintingSpeed	Float	How quickly can the player move while sprinting?
Deceleration Factor	decelerationSpeed	Float	Behaves somewhat like a braking force
Can Crouch"	canCrouch	Bool	Is the player allowed to crouch?
Toggle Crouch	toggleCrouch	Bool	Should pressing the crouch button act as a toggle?

Crouch Key	crouchKey	Key/KeyCode	The Key used to start a crouch.
Crouching Speed	crouchingSpeed	Float	How quickly can the player move while crouching?
Crouching Height	crouchingHeight	Float	How small should the character's capsule collider be when crouching?
Current Stance	currentStance	Stances Stances	Displays the character's current stance
Stance TransitionSpeed	stanceTransisionSpeed	Float	How quickly should the character change stances?
What Is Ground	whatIsGround	LayerMask	What physics layers should be considered to be ground?
Hard Slope Limit	hardSlopeLimit	Float	At what slope angle should the player no longer be able to walk up?
Maximum Stair Rise	maxStairRise	Float	How tall can a single stair rise?
Step Up Speed	stepUpSpeed	Float	How quickly will the player climb a step?
Can Jump	canJump	Bool	Is the player allowed to jump?
Jump Key	jumpKey	Key/KeyCode	The Key used to jump.
Continuous Jumping	holdJump	Bool	Should the player be able to continue jumping without letting go of the Jump key.
Jump Power	jumpPower	Float	How much power should a jump have?
Air Control Factor	airControlFactor	Float	EXPERIMENTAL: How much control should the player have over their direction while in the air.
Jumping Depletes Stamina	jumpingDepletesStamina	Bool	Should jumping deplete stamina?
Jump Stamina Depletion Amount	s_JumpStaminaDepletion	Float	How much stamina should jumping use?
Enable Jump Enhancements	jumpEnhancements	Bool	Should extra math be used to enhance the jump curve?
On Decent Multiplier	decentMultiplier	Float	When the player begins to descend during a jump, what should gravity be multiplied by?
Tap Jump Multiplier	tapJumpMultiplier	Float	When the player lets go of space prematurely during a jump, what should gravity be multiplied by?
Can Slide	canSlide	Bool	Is the player allowed to slide?
Slide Key	slideKey	Key/KeyCode	The Key used to Slide while the character is sprinting.
Sliding Deceleration	slidingDeceleration	Float	How much deceleration should be applied while sliding?
Sliding Transition Speed	slidingTransitionSpeed	Float	How quickly should the character transition from

			the current stance to sliding?
Flat Slide Distance	maxFlatSlideDistance	Float	If the player starts sliding on a flat surface with no ground angle influence, How many units should the player slide forward?

Stamina Variables:			
Name	Internal name	Type	Description
Enable Stamina System	enableStaminaSystem	Bool	Should the controller enable it's stamina system?
Stamina	Stamina	Float	The maximum stamina level.
Minimum Stamina To Sprint	S_minimumStaminaToSprint	Float	The minimum stamina required to enter a sprint.
Depletion Speed	s_depletionSpeed	Foat	The speed at which stamina will depletes.
Regeneration Speed	s_regenerationSpeed	Float	The speed at which stamina will regenerate.

Footstep Variables:			
Name	Internal name	Type	Description
Enable Footstep System	enableFootstepSounds	Bool	Should the controller enable it's footstep audio systems?
Footstep Trigger Mode	footstepTriggeringMode	FootstepTriggeringMode Enum	How should a footstep SFX call be triggered? Calculated Timing: The controller will attempt to calculate the footstep cycle position based on Headbob cycle position, movement speed, and capsule size. This can sometimes be inaccurate depending on the selected perspective and base walk speed. (Not recommended if character animations are being used)\n\n- Called From Animations: The controller will not do it's own footstep cycle calculations/call for SFX. Instead the controller will rely on character Animations to call the 'CallFootstepClip()' function. This gives much more precise results. The controller will still calculate what footstep

			clips should be played.
Step Timing	stepTiming	Float	The time (measured in seconds) between each footstep.
footstepSoundSet	footstepSoundSet	List<GroundMaterialProfile>	
Trigger Mode	footstepSoundSet[i].profileTriggerType	MatProfileTypeEnum	Is this clip stack triggered by a Material or a Terrain Layer?
Materials	footstepSoundSet[i]._Materials	List<Materials>	The materials used to trigger this footstep stack.
Physic Materials	footstepSoundSet[i]._physicMaterials	List<PhysicMaterial>	The Physic Materials used to trigger this footstep stack.
Terrain Layers	footstepSoundSet[i]._Layers	List<TerrainLayer>	The Terrain Layers used to trigger this footstep stack.
Clip Stack	footstepSoundSet[i].footstepClips	List<AudioClips>	The Audio clips used in this stack.

Headbob Variables:			
Name	Internal name	Type	Description
Enable Headbobing	enableHeadbob	Bool	Should the controller enable it's headbobing systems?
Headbob Speed	headbobSpeed	Float	How fast does the headbob sway?
Headbob Power	headbobPower	Float	How far does the headbob sway?
Headbob Tilt	ZTilt	Float	How much does the headbob tilt at the sway extreme?

Survival Variables:			
Name	Internal name	Type	Description
Enable Survival Stats	enableSurvivalStats	Bool	Should the controller enable it's survival systems?
Stat Ticks Per-minute	statTickRate	Float	How many times per-minute should the stats do a tick update? Each tick depletes/regenerates the stats by their respective rates below.
defaultSurvivalStats	defaultSurvivalStats	SurvivalStats Class	The base/maximum values that “currentSurvivalStats” will regenerate to (See Section II: Internal Variables for more information on “the currentSurvivalStats variable.
Health Points	.defaultSurvivalStats.Health	Float	How much health does the controller start with?
Health is critically low?	currentSurvivalStats.hasLow Health	Bool	
Hunger Points	.defaultSurvivalStats.Hunger	Float	How much Hunger does the controller start with?"
Hunger Depletion Per Tick	hungerDepletionRate	Float	Hunger Depletion Per Tick","How much does hunger deplete per tick?
Player is Starving?	currentSurvivalStats.isStarvin g	Bool	
Hydration Points	defaultSurvivalStats.Hydratio n	Float	How much Hydration does the controller start with?
Hydration Depletion Per Tick	hydrationDepletionRate	Float	How much does hydration deplete per tick?
Player is Dehydrated?	currentSurvivalStats.isDehyd rated	Bool	

Interactable Variables:			
Name	Internal name	Type	Description
Interact Key	interactKey	Ky/KeyCode	The keyboard key used to Interact with objects that implement IInteract.
Range	interactRange	Float	How far out can an interactable be from the player's position?
Interactable Layers	interactableLayer	LayerMask	The Layers to check for interactables on.

Animation Trigger Variables:			
Name	Internal name	Type	Description
1st Person Animator	_1stPersonCharacterAnimator	Animator	The animator used on the 1st person character mesh (if any).
3rd Person Animator	_3rdPersonCharacterAnimator	Animator	The animator used on the 3rd person character mesh (if any).
Velocity (Float)	a_velocity	String	(Float) The name of the Velocity Parameter in the animator.
2D Velocity (Float)	a_2DVelocity	String	(Float) The name of the 2D Velocity Parameter in the animator.
Idle (Bool)	a_Idle	String	(Bool) The name of the Idle Parameter in the animator.
Sprinting (Bool)	a_Sprinting	String	(Bool) The name of the Sprinting Parameter in the animator.
Crouching (Bool)	a_Crouching	String	(Bool) The name of the Crouching Parameter in the animator.
Sliding (Bool)	a_Sliding	String	(Bool) The name of the Sliding Parameter in the animator.
Jumped (Bool)	a_Jumped	String	(Bool) The name of the Jumped Parameter in the animator.
Grounded (Bool)	a_Grounded	String	(Bool) The name of the Grounded Parameter in the animator.

Section II: Internal Variables

Camera Variables:		
Name	Type	Description
MouseXY	Vector2	Mouse Input Delta used to rotate the camera.
viewRotVelRef	Vector2	Velocity reference for rotation smoothing.
isInFirstPerson	Bool	
isInThirdPerson	Bool	
perspecTog	Bool	True on the frame perspectiveSwitchingKey was pushed down.
setInitialRot	Bool	Used to check if we've already applied the GameObject's initial rotation to the calculated rotation vectors.
initialRot	Vector3	The GameObject's Initial Rotation in EulerAngles.
crosshairImg	Image	
stamMeter	Image	
stamMeterBG	Image	
statsPanel	Image	
statsPanelBG	Image	
HealthMeter	Image	
HydrationMeter	Image	
HungerMeter	Image	
normalMeterSizeDelta	Vector2	
normalStamMeterSizeDelta	Vector2	
initialCameraFOV	Float	Stores the camera's FOV from the start of the game.
FOVKickVelRef	Float	Velocity reference for FOV Kick.
currentFOVMod	Float	The current camera sensitivity multiplier based on FOV.

mouseScrollWheel	Float	Input delta for the mouse scroll wheel.
maxCameraDistInternal	Float	The maximum distance the camera can zoom out due to obstructions or mouse wheel.
currentCameraZ	Float	The current Z position of the camera relative to the player.
cameraZRef	Float	Velocity reference for camera Z Position Smoothing.
headPos	Vector3	Stores the calculated rough position of the player's head.
headRot	Vector3	Stores the current rotation (in Euler Angles) of the theoretical head joint used to calculate the camera's position and rotation.
currentCameraPos	Vector3	Stores the position the camera should be at (in world space).
cameraPosVelRef	Vector3	Velocity reference for camera position smoothing.
quatHeadRot	Quaternion	Stores the current rotation (as Quaternion) of the theoretical head joint used to calculate the camera's position and rotation.
cameraObstCheck	Ray	The Ray variable used to check for obstructions between the camera and the headPos.
cameraObstResult	RaycastHit	The result of the obstruction check.

Movement Variables:		
Name	Type	Description
currentGroundInfo	GroundInfo Class	Stores the current information gathered about the ground underneath the player.
standingHeight	Float	The initial height of the capsule.
currentGroundSpeed	Float	The current movement speed the player is moving at while on the ground.
InputDir	Vector3	The direction the player is moving in relative to the camera's rotation if in 3rd person mode.
HeadRotDirForInput	Float	An interpolated version of headRot.y. Used for smoothing body mesh rotation..
MovInput	Vector2	The Raw input delta of WASD.

MovInput_Smoothed	Vector2	The Smoothed Input delta of WASD.
_2DVelocity	Vector2	A special calculation of the rigidbody's velocity. X and Y with extra steps.
_2DVelocityMag	Float	The magnitude of _2DVelocity.
speedToVelocityRatio	Float	The ratio of the GroundMovementSpeed and the rigidbody's actual velocity.
_ZeroFriction	PhysicMaterial	Stores an auto generated PhysicMaterial to help the player glide through the environment.
_MaxFriction	PhysicMaterial	Stores an auto generated PhysicMaterial to keep the player from sliding when not moving..
capsule	CapsuleCollider	Stores a reference to the capsule collider.
p_Rigidbody	Rigidbody	Stores a reference to the Rigidbody.
crouchInput_Momentary	Bool	Stores the crouch input key when held down.
crouchInput_FrameOf	Bool	Stores the crouch input key the frame it was pushed down.
sprintInput_Momentary	Bool	Stores the sprint input key when held down.
sprintInput_FrameOf	Bool	Stores the sprint input key the frame it was pushed down.
slideInput_Momentary	Bool	Stores the slide input key when held down.
slideInput_FrameOf	Bool	Stores the slide input key the frame it was pushed down.
jumpInput_Momentary	Bool	Stores the jump input key when held down.
jumpInput_FrameOf	Bool	Stores the jump input key the frame it was pushed down.
cachedDirPreSlide	Vector3	Stores the forward direction of the player just before entering a slide.
cachedPosPreSlide	Vector3	Stores the world position of the player just before entering a slide.

Stamina Variables:		
Name	Type	Description
staminaIsChanging	Bool	Is the player's stamina changing in value?
ignoreStamina	Bool	Is the player performing an action that calls to ignore stamina?

Footstep Variables:		
Name	Type	Description
shouldCalculateFootstepTriggers	Bool	Should the footstep system calculate footstep variables?
StepCycle	Float	The cycle position of the footstep cycle.
playerAudioSource	AudioSource	Stores a reference to the AudioSource.
currentClipSet	List<AudioSource>	The current set of audio clips to choose from when triggering a footstep.

Headbob Variables:		
Name	Type	Description
shouldCalculateHeadbob	Bool	Should the controller calculate positions for headbobbing?
headbobCameraPosition	Vector3	The position the camera should move to when headbobbing,
headbobCyclePosition	Float	The current position in the headbob cycle.
headbobWarmUp	Float	A smoothed float from 0 to 1 that headbobCameraPosition is multiplied by to give a ramp-up effect.

Survival Variables:		
Name	Type	Description
StatTickTimer	Float	A time float. (Time.time + statTickRate)
currentSurvivalStats	SurvivalStats	Stores the current survival stat values.

Interactable Variables:		
Name	Type	Description
interactInput	Bool	The Stores the interact input key the frame it was pushed down.

Section III: Classes

GroundInfo

The GroundInfo class is used to store info about the ground underneath the player's capsule collider.

GroundInfo Variables:		
Name	Type	Description
isInContactWithGround	Bool	Is the player in contact with the ground?
isGettingGroundInfo	Bool	Is the player close enough to the ground to gather information about it?
potentialStair	Bool	Is there potentially a stair being detected directly in front of the player?
groundAngle	Float	The average angle of the ground.
groundAngle_Raw	Float	The angle of the mesh triangle directly below the player.
playerGroundPosition	Float	The average Y position of the ground in world space.
groundRawYPosition	Float	The absolute Y position of the ground in world space.
groundAngleMultiplier	Float	A 0 to 1 float to act as a multiplier calculated using the groundAngle variable. Equation: `groundAngle/90`
groundAngleMultiplier_Inverse	Float	A 0 to 1 float to act as a multiplier calculated using the groundAngle variable. Equation: `((currentGroundInfo.groundAngle-90)*-1)/90`
groundAngleMultiplier_Inverse_persistent	Float	Equal to groundAngleMultiplier_Inverse but doesn't get cleared if isGettingGroundInfo is equal to false.
groundNormal_Averaged	Vector3	The average normal vector of the ground.
groundNormal_Raw	Vector3	The normal vector of the mesh triangle directly below the player.
groundInfluenceDirection	Vector3	Based on groundNormal_Averaged, a flat direction vector that influences the player's

		velocity in certain cases.
groundFromRay	RaycastHit	The hit result of a Raycast fired from the center-bottom of the capsule collider, downwards.
groundFromSweep	RaycastHit[]	The Hit results of a SphereCastAll() cast at the bottom of the capsule collider.
groundNormals_lowgrade	List<Vector3>	All the normals hit in groundFromSweep that have an angle under hardSlopeLimit.
groundNormals_highgrade	List<Vector3>	All the normals hit in groundFromSweep that have an angle over hardSlopeLimit.
groundTag	String	The tag of the ground GameObject.
currentMesh	Mesh	The mesh data attached to the collider from groundFromRay.
groundMaterial	Material	If currentMesh has ReadWriteEnabled checked,this is the material of the mesh face hit by groundFromRay. If currentMesh does not have ReadWriteEnabled, this is the first material in the mesh renderer's materials list.
currentTerrain	Terrain	The terrain component attached to the collider from groundFromRay.
groundLayer	TerrainLayer	The TerrainLayer of the terrain component attached to the collider from groundFromRay.
groundPhysicMaterial	PhysicMaterial	The PhysicMaterial of the collider from groundFromRay.
stairCheck_RiserCheck	RaycastHit	The Hit result of a check for a stair or step.
stairCheck_HeightCheck	RaycastHit	The Hit result of a check for a stair/step's height.

GroundMaterialProfile

The GroundMaterialProfile class is used to store a set of footstep audio clips as well as a set of Materials, PhysicMaterials, or TerrainLayers (Depending on the triggerType). If the Material/PhysicMaterial/TerrainLayer in currentGroundInfo matches that of one in a profile, then that profile is selected and it's footstep audio clips are used.

GroundMaterialProfile Variables:		
Name	Type	Description
profileTriggerType	MatProfileType Enum	Determines which material type will be compared to what's stored in currentGroundInfo.
_Materials	List<Material>	The Materials to compare.
_physicMaterials	List<PhysicMaterial>	The PhysicMaterials to compare.
_Layers	List<TerrainLayer>	The TerrainLayers to compare.
footstepClips	List<AudioClip>	The audio clips to use when this profile is selected.

SurvivalStats

The SurvivalStats class stores survival stats, current or maximum.

SurvivalStats Variables:		
Name	Type	Description
Health	Float	The Health variable SurvivalClass.
Hunger	Float	The Hunger variable of the SurvivalClass.
Hydration	Float	The Hydration variable of the SurvivalClass.
hasLowHealth	Bool	True when the Health variable in currentSurvivalStats is under one 10th of the Health variable in defaultSurvivalStats.
isStarving	Bool	True when the Hunger variable in currentSurvivalStats is under one 10th of the Hunger variable in defaultSurvivalStats.
isDehydrated	Bool	True when the Hydration variable in currentSurvivalStats is under one 8th of the Hydration variable in defaultSurvivalStats.

Section IV: Interfaces

This section assumes you have at least a basic understanding of C# Interfaces. Click here to learn more about C# Interfaces in unity.

IInteractable

This interface can be implemented to objects on the interactableLayer that you wish the player to be able to interact with. Should return true when the interaction operation was successful.

IInteractable Functions:	
Name	Returns
Interact	Bool

ICollectable

This interface can be implemented to objects with colliders set to IsTrigger that you want the player to collect.

IInteractable Functions:	
Name	Returns
Interact	Void

Section V: Enums

StatSelector
Selector Name (In order)
Health
Hunger
Hydration

MatProfileType
Selector Name (In order)
Material
terrainLayer
physicMaterial

FootstepTriggerMode
Selector Name (In order)
calculatedName
calledFromAnimation

PerspectiveModes
Selector Name (In order)
_1stPerson
_3rdPerson

ViewInputModes
Selector Name (In order)
Traditional
Retro

MouseInputInversionModes
Selector Name (In order)
None
X
Y
Both

GroundSpeedProfiles
Selector Name (In order)
Crouching
Walking
Sprinting
Sliding

Stances
Selector Name (In order)
Standing
Crouching

Section VI: Functions

Camera Functions:			
Name	Return Type	Parameters	Description
RotateView	Void	AbsoluteEulerAngles (Vector3) SmoothRotation (Bool)	Call to rotate the camera and subsequently the player to the supplied euler rotation in world space. If called with SmoothRotation = true, the character will rotate smoothly asif real mouse input was moving the camera.
ChangePerspective	Void	newPerspective (PerspectiveModes)	Call to change the camera perspective to the new supplied selector.

Stamina Functions:			
Name	Return Type	Parameters	Description
InstantStaminaReduction	Void	Reduction (Float)	Call to instantly reduce the player's stamina amount by this

Footstep Functions:			
Name	Return Type	Parameters	Description
CallFootstepClip	Void		Call to play a footstep clip from the list of clips from the selected GroundMaterialProfile.

Survival Stat Functions:			
Name	Return Type	Parameters	Description
TickStats	Void		Call to deplete stats at their respective rates. Also updates the StatTickTimer.
ImmediateStateChange	Void	Amount (Float) Stat (StatSelector)	Call to instantly change the supplied stat by the Amount.
LevelUpStat	Void	newMaxStatLevel (Float) Stat (StatSelector) Refill (Boo)	Call to change the max amount of the supplied stat to newMaxLevel. If called with Refill = true, the current respective stat level will be replenished to the new max.

Interaction Functions:			
Name	Return Type	Parameters	Description
TryInteract	Bool		**3rd person mode**: Call to check an OverlapBox (w,h,d = interactRange) in front of the player for objects that are both on the interactableLayer and implement the IInteractable interface. If more than one object that meets those requirements was found, call IInteractable.Interact() on the closest one to the player. Returns true if the object interacted with returns true from a successful operation. **1st person mode**: Call to do a SphereCast (from the camera, forward by interactRange) to check for an object that is both on the interactableLayer and implement the IInteractable interface. Returns true if the object interacted with returns true from a successful operation. Returns true if the object interacted with returns true from a successful operation.