Hi5 2.0 Interactive SDK User Manual

— Pico Neo3/ Pico4

Contents

Unity VR Basic environment configuration

It is recommended to use Unity 2019.x/2020.x/2021.x LTS version to create a new project, currently only supports Pico Neo3 and

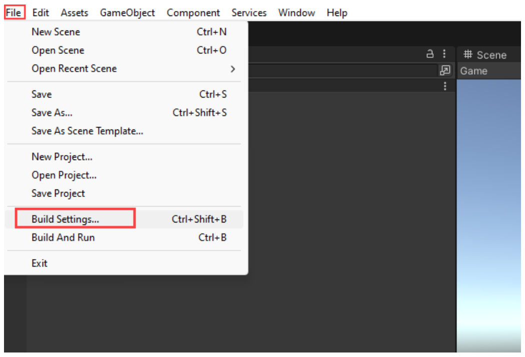
Pico4 does not support Pico Neo2, and the Unity 2022 version is being adapted.

Plug-in Download

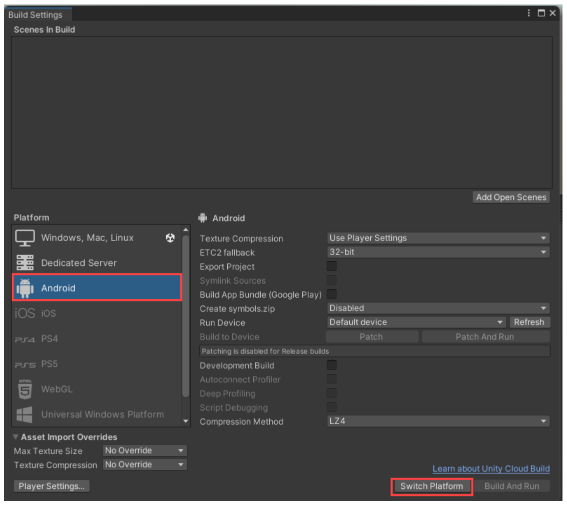
Go to Pico official website https://developer.pico-interactive.com/sdk to download the latest version of Unity XR SDK pico vr unity rapid development document https://developer.pico-interactive.com/document/doc

Plug-in installation

1. Unzip the SDK file Pico UnityXR SDK v2.0.5.zip
2. Create or open a Unity project, switch to the Android platform, and click File -> Build Settings



Select the Android platform in the Build Settings window, and then click the Switch Platform button.

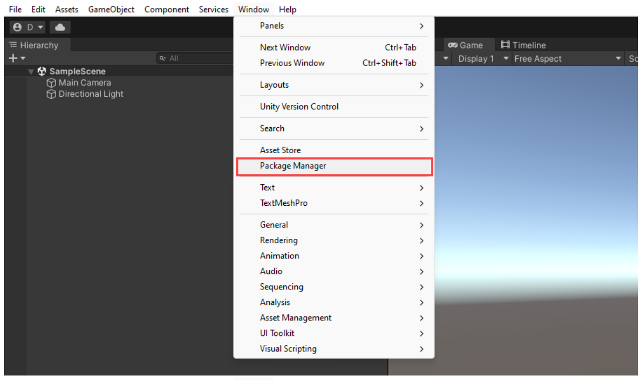


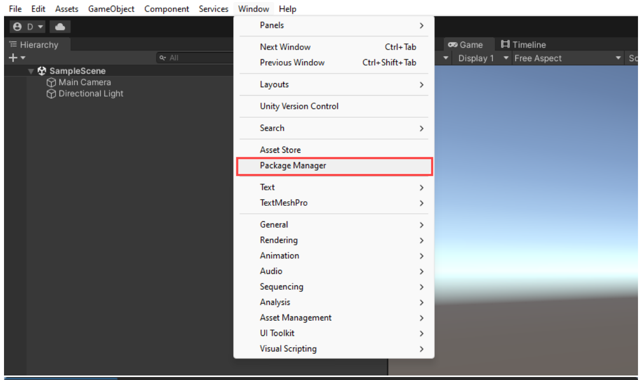
Android

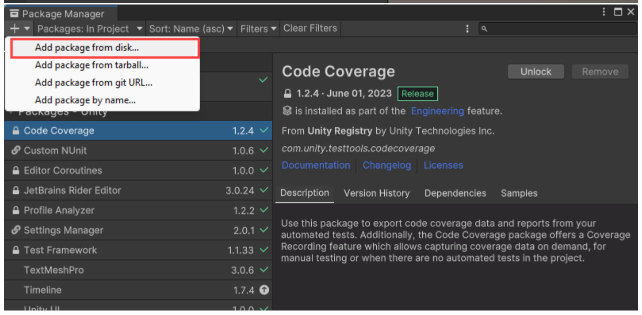
Texture Compression: Use Player Settings
ETC2 fallback: 32-bit
Export Project
Symlink Sources
Build App Bundle (Google Play)
Create symbols.zip: Disabled
Run Device: Default device — Refresh
Build to Device: Patch — Patch And Run
Patching is disabled for Release builds
Development Build
Autoconnect Profiler
Deep Profiling
Script Debugging
Compression Method: LZ4

Asset Import Overrides
Max Texture Size: No Override
Texture Compression: No Override

3. Click Windows -> Package Manager to open the Package Manager window and import the Pico Unity XR SDK, as shown in the figure:







Code Coverage

1.2.4 · June 01, 2023 Release

is installed as part of the Engineering feature.

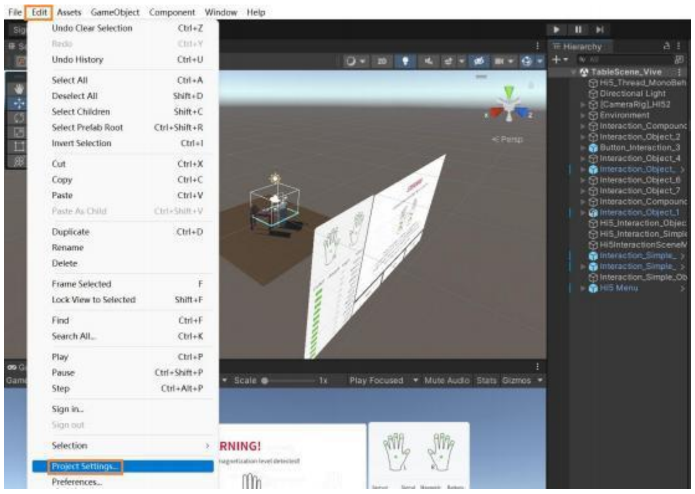
From Unity Registry by Unity Technologies Inc.

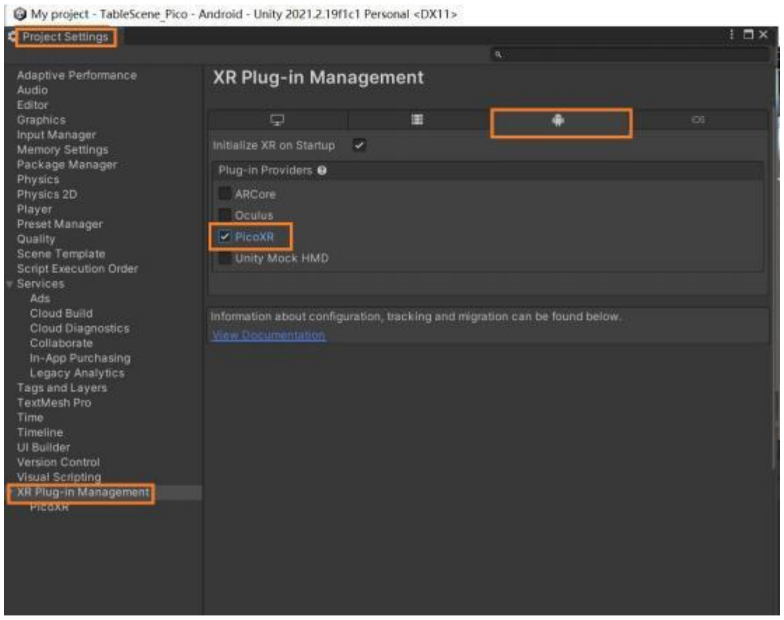
com.unity.testtools.codecoverage

Documentation Changelog Licenses

Use this package to export code coverage data and reports from your automated tests. Additionally, the Code Coverage package offers a Coverage Recording feature which allows capturing coverage data on demand, for manual testing or when there are no automated tests in the project.

4. After the import is successful, click Edit -> Project Settings, and apply the PicoXR plug-in, as shown in the figure:





XR Plug-in Management

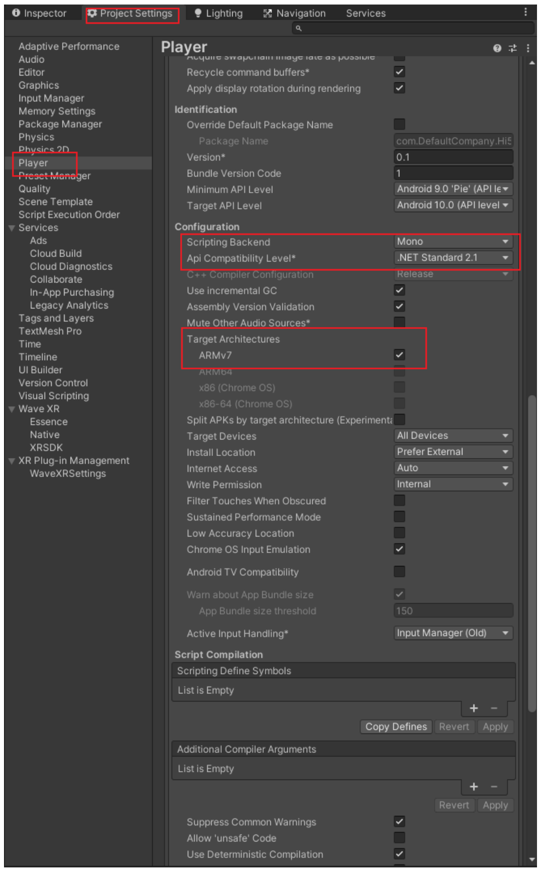
Initialize XR on Startup ✓

Plug-in Providers

- ARCore
- Oculus
- ✓ PicoXR
- Unity Mock HMD

Information about configuration, tracking and migration can be found below.
View Documentation

5. Setup configuration



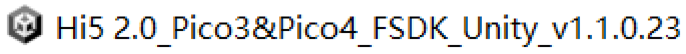
Player

Acquire swapchain image late as possible	
Recycle command buffers*	✓
Apply display rotation during rendering	✓
Identification	
Override Default Package Name	
Package Name	com.DefaultCompany.Hi5
Version*	0.1
Bundle Version Code	1
Minimum API Level	Android 9.0 'Pie' (API le
Target API Level	Android 10.0 (API level
Configuration	
Scripting Backend	Mono
Api Compatibility Level*	.NET Standard 2.1
C++ Compiler Configuration	Release
Use incremental GC	✓
Assembly Version Validation	✓
Mute Other Audio Sources*	
Target Architectures	
ARMv7	✓
ARM64	
x86 (Chrome OS)	
x86-64 (Chrome OS)	
Split APKs by target architecture (Experimenta	
Target Devices	All Devices
Install Location	Prefer External
Internet Access	Auto
Write Permission	Internal
Filter Touches When Obscured	
Sustained Performance Mode	
Low Accuracy Location	
Chrome OS Input Emulation	✓
Android TV Compatibility	
Warn about App Bundle size	✓
App Bundle size threshold	150
Active Input Handling*	Input Manager (Old)
Script Compilation	
Scripting Define Symbols	List is Empty
Additional Compiler Arguments	List is Empty
Suppress Common Warnings	✓
Allow 'unsafe' Code	
Use Deterministic Compilation	✓

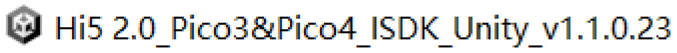
Hi5 2.0 Interactive SDK Installation

After the Unity VR environment is configured, install the Hi5-2 SDK first, and then install the interactive SDK.

1. First import the Hi5 2.0 basic SDK:

   
   Hi5 2.0_Pico3&Pico4_FSDK_Unity_v1.1.0.23

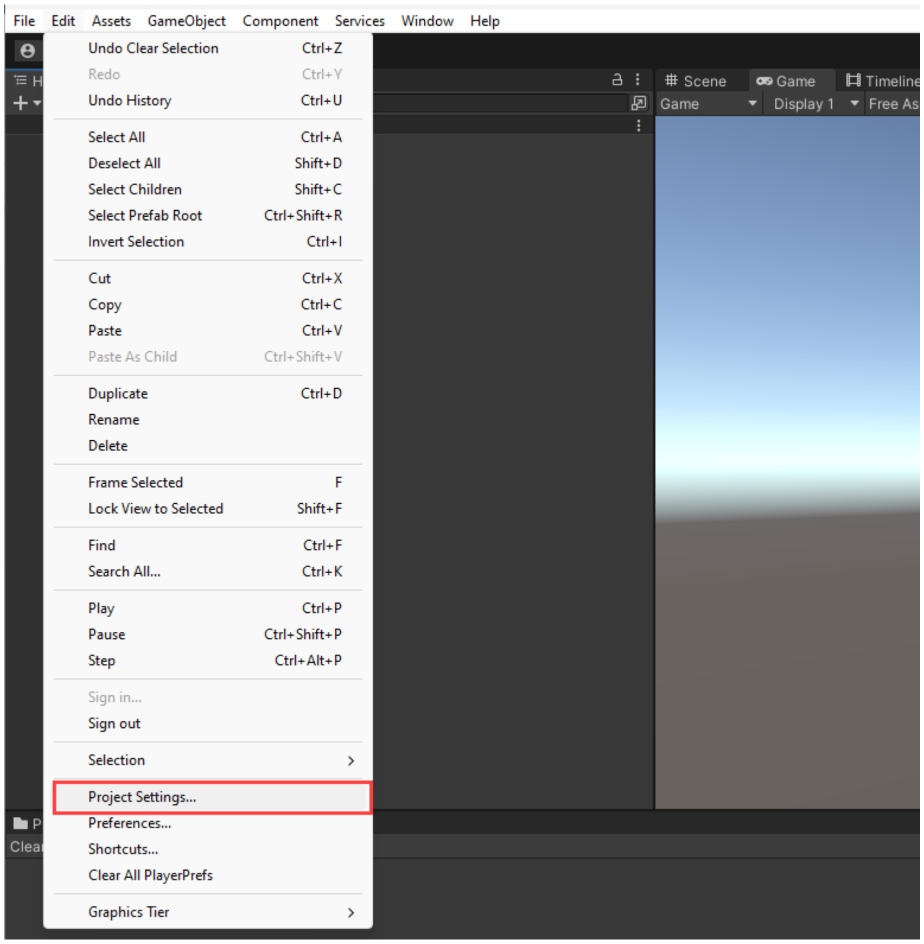
2. Then import the interactive SDK:

   
   Hi5 2.0_Pico3&Pico4_ISDK_Unity_v1.1.0.23

Hi5 2.0 Interactive SDK Application

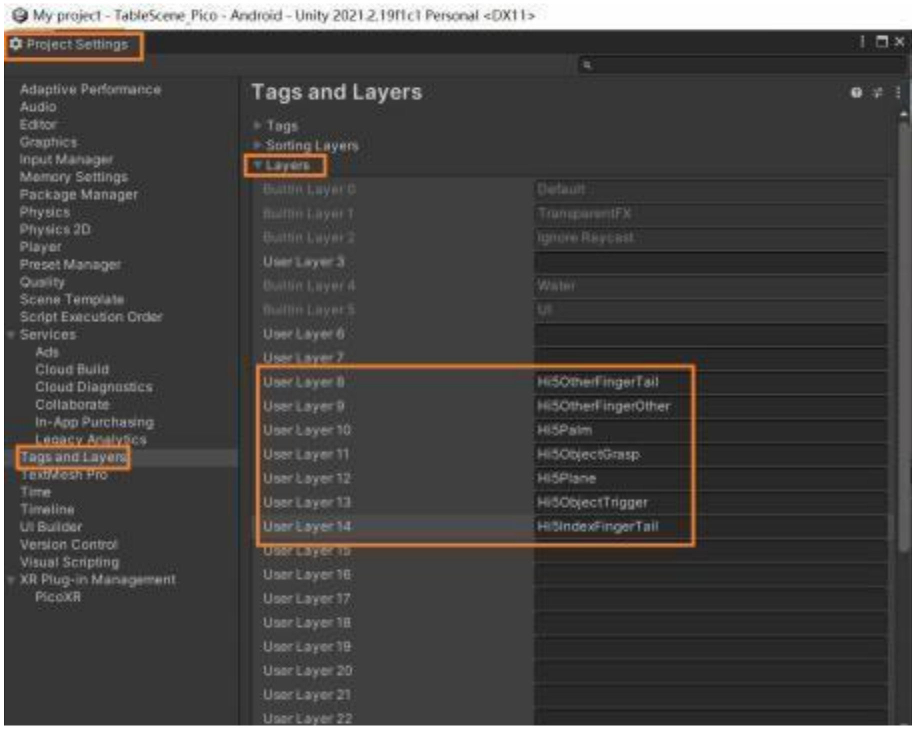
Project Settings

Click Edit -> Project Settings to open the project settings window, as shown in the figure:



Set Tags and Layers

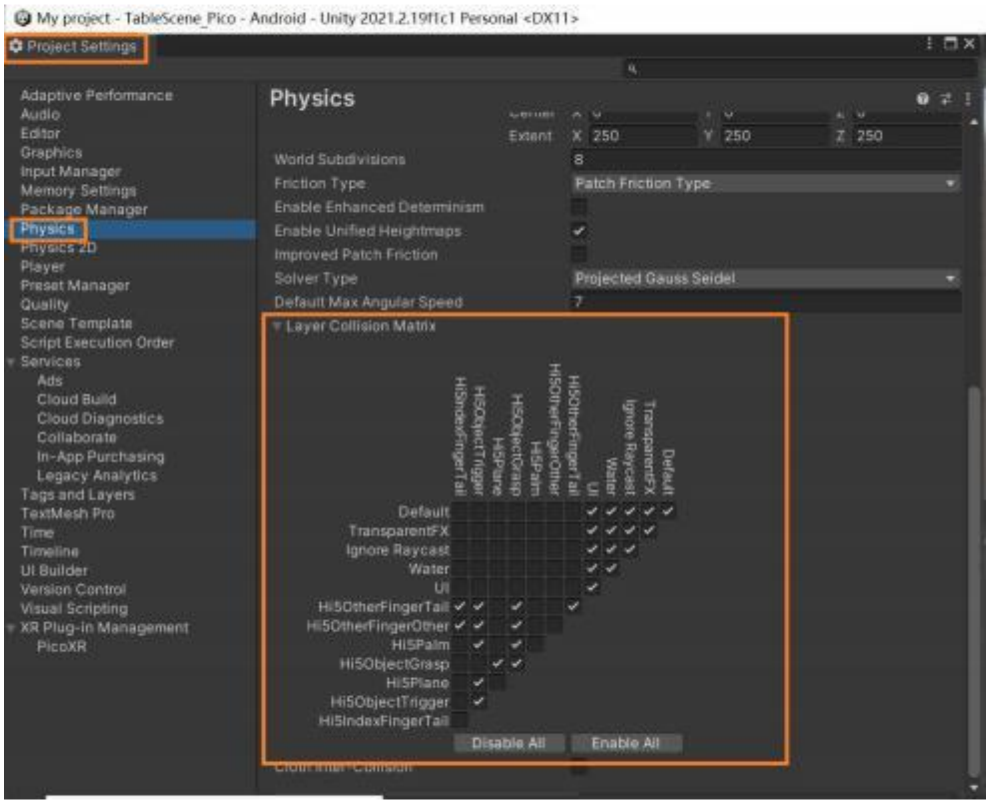
Layer 8	Hi5 OtherFingerTail
Layer 9	Hi5 OtherFingerOther
Layer 10	Hi5 Palm
Layer 11	Hi5 ObjectGrasp
Layer 12	Hi5 Plane
Layer 13	Hi5 ObjectTrigger
Layer 14	Hi5 IndexFingerTail



Builtin Layer 0	Default
Builtin Layer 1	TransparentFX
Builtin Layer 2	Ignore Raycast
User Layer 3	
Builtin Layer 4	Water
Builtin Layer 5	UI
User Layer 6	
User Layer 7	
User Layer 8	Hi5OtherFingerTail
User Layer 9	Hi5OtherFingerOther
User Layer 10	Hi5Palm
User Layer 11	Hi5ObjectGrasp
User Layer 12	Hi5Plane
User Layer 13	Hi5ObjectTrigger
User Layer 14	Hi5IndexFingerTail
User Layer 15	
User Layer 16	
User Layer 17	
User Layer 18	
User Layer 19	
User Layer 20	
User Layer 21	
User Layer 22	

Physics Settings

As shown below:



Extent X 250 Y 250 Z 250

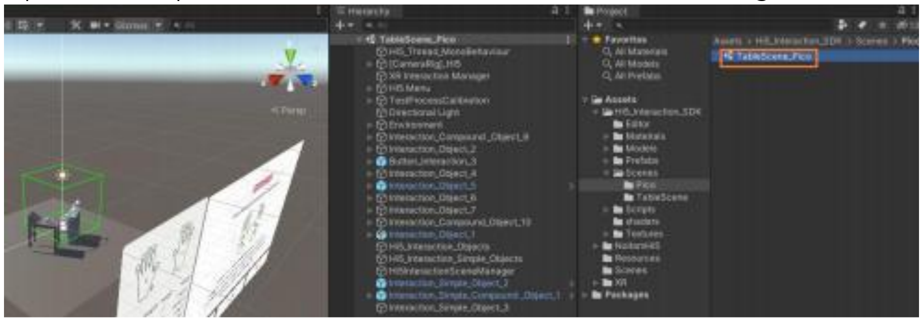
World Subdivisions	8
Friction Type	Patch Friction Type
Enable Enhanced Determinism	
Enable Unified Heightmaps	✓
Improved Patch Friction	
Solver Type	Projected Gauss Seidel
Default Max Angular Speed	7

Layer Collision Matrix

	Hi5IndexFingerTail	Hi5ObjectTrigger	Hi5Plane	Hi5ObjectGrasp	Hi5Palm	Hi5OtherFingerOther	Hi5OtherFingerTail	UI	Water	Ignore Raycast	TransparentFX	Default
Default								✓	✓	✓	✓	✓
TransparentFX								✓	✓	✓	✓	
Ignore Raycast								✓	✓	✓		
Water								✓	✓			
UI								✓				
Hi5OtherFingerTail	✓	✓		✓			✓					
Hi5OtherFingerOther	✓	✓		✓								
Hi5Palm		✓		✓								
Hi5ObjectGrasp			✓	✓								
Hi5Plane		✓										
Hi5ObjectTrigger		✓										
Hi5IndexFingerTail												

Scene Setup

Open the sample scene TableScene_Pico and refer to its settings, as shown in the figure:



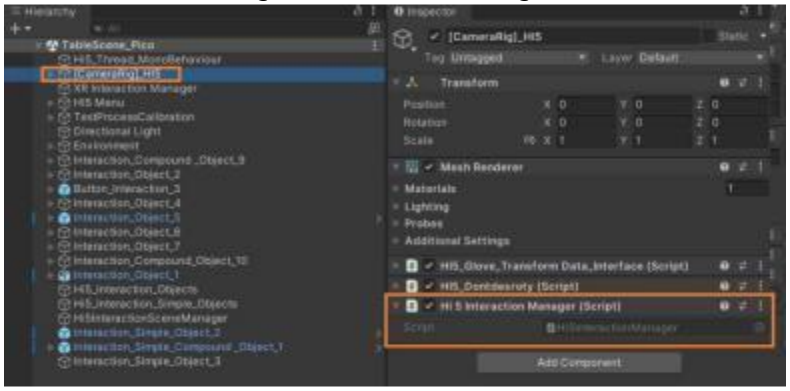
```
TableScene_Pico
  Hi5_Thread_MonoBehaviour
  [CameraRig]_Hi5
  XR Interaction Manager
  Hi5 Menu
  TestProcessCalibration
  Directional Light
  Environment
  Interaction_Compound_Object_9
  Interaction_Object_2
  Button_Interaction_3
  Interaction_Object_4
  Interaction_Object_5
  Interaction_Object_6
  Interaction_Object_7
  Interaction_Compound_Object_10
  Interaction_Object_1
  Hi5_Interaction_Objects
  Hi5_Interaction_Simple_Objects
  Hi5InteractionSceneManager
  Interaction_Simple_Object_2
  Interaction_Simple_Compound_Object_1
  Interaction_Simple_Object_3
```

Assets > Hi5_Interaction_SDK > Scenes > Pico

TableScene_Pico

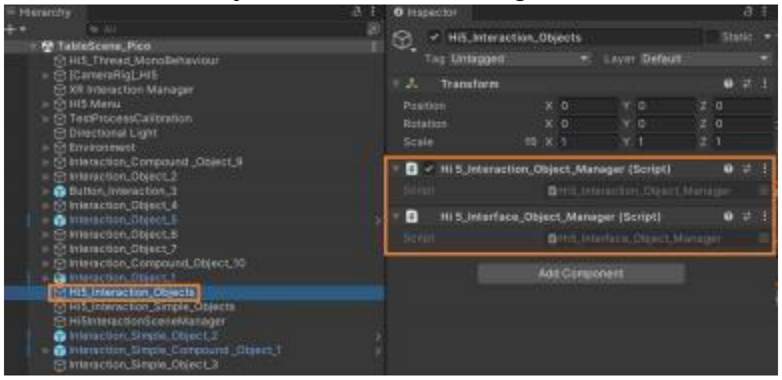
The scene must contain the following:

1. Hi5 Interaction Manager, as shown in the figure:



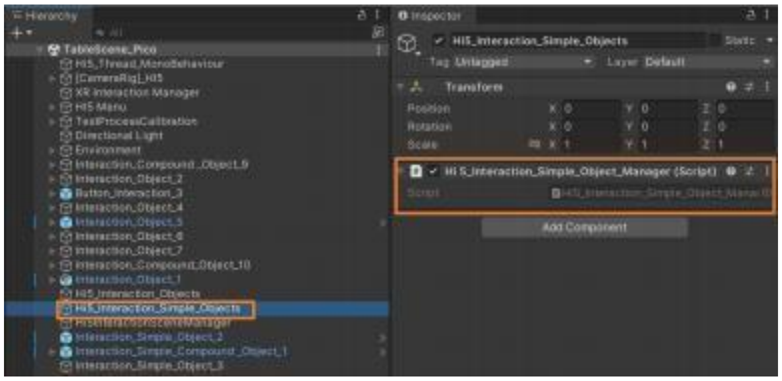
```
[CameraRig]_Hi5
Tag Untagged    Layer Default
Transform
Position  X 0  Y 0  Z 0
Rotation  X 0  Y 0  Z 0
Scale     X 1  Y 1  Z 1
Mesh Renderer
Hi5_Glove_Transform Data_Interface (Script)
Hi5_Dontdesroty (Script)
Hi 5 Interaction Manager (Script)
Script  Hi5InteractionManager
```

2. Hi5_Interaction_Objects, as shown in the figure:



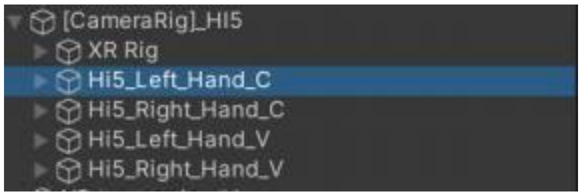
```
Hi5_Interaction_Objects
Tag Untagged    Layer Default
Transform
Position  X 0  Y 0  Z 0
Rotation  X 0  Y 0  Z 0
Scale     X 1  Y 1  Z 1
Hi 5_Interaction_Object_Manager (Script)
Script  Hi5_Interaction_Object_Manager
Hi 5_Interface_Object_Manager (Script)
Script  Hi5_Interface_Object_Manager
```

3. Hi5_Interaction_Simple_Objects, as shown in the figure:



```
Hierarchy
TableScene_Pico
  Hi5_Thread_MonoBehaviour
  [CameraRig]_Hi5
  XR Interaction Manager
  Hi5 Menu
  TestProcessCalibration
  Directional Light
  Environment
  Interaction_Compound_Object_9
  Interaction_Object_2
  Button_Interaction_3
  Interaction_Object_4
  Interaction_Object_5
  Interaction_Object_6
  Interaction_Object_7
  Interaction_Compound_Object_10
  Interaction_Object_1
  Hi5_Interaction_Objects
  Hi5_Interaction_Simple_Objects
  Hi5InteractionSceneManager
  Interaction_Simple_Object_2
  Interaction_Simple_Compound_Object_1
  Interaction_Simple_Object_3

Inspector
Hi5_Interaction_Simple_Objects          Static
Tag Untagged    Layer Default
Transform
Position  X 0  Y 0  Z 0
Rotation  X 0  Y 0  Z 0
Scale     X 1  Y 1  Z 1
Hi 5_Interaction_Simple_Object_Manager (Script)
Script  Hi5_Interaction_Simple_Object_Manag
Add Component
```

4. Hi5_Left_Hand_C， Hi5_Right_Hand_C， Hi5_Left_Hand_V， Hi5_Right_Hand_V，如图所示：



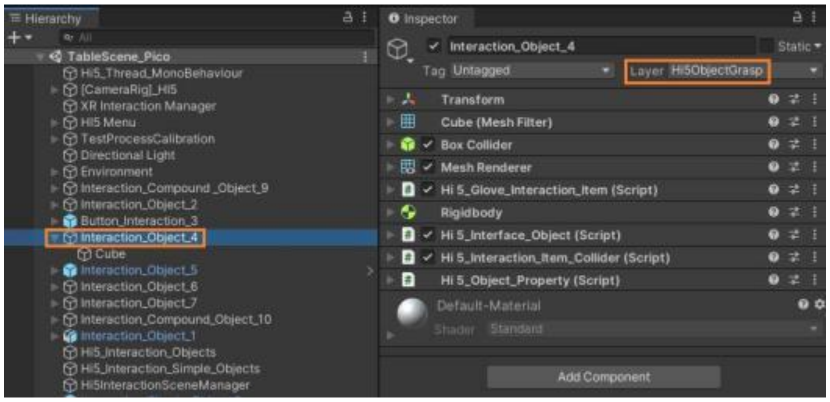
```
[CameraRig]_HI5
  XR Rig
  Hi5_Left_Hand_C
  Hi5_Right_Hand_C
  Hi5_Left_Hand_V
  Hi5_Right_Hand_V
```

Object Settings

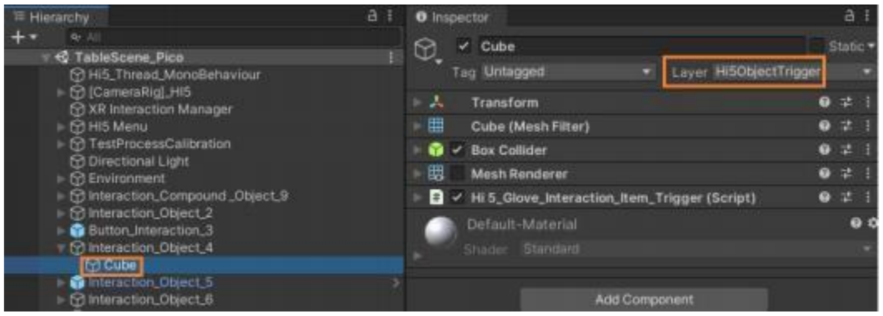
Common Interactive object Settings

Object settings are divided into parent object and child object settings. The parent object Layer should be set to Hi5ObjectGrasp, and the child object Layer should be set to Hi5ObjectTrigger, such as Interaction_Object_4 -> Cube.

The settings are shown in the figure:



```
Hierarchy
TableScene_Pico
  Hi5_Thread_MonoBehaviour
  [CameraRig]_HI5
  XR Interaction Manager
  HI5 Menu
  TestProcessCalibration
  Directional Light
  Environment
  Interaction_Compound_Object_9
  Interaction_Object_2
  Button_Interaction_3
  Interaction_Object_4
    Cube
  Interaction_Object_5
  Interaction_Object_6
  Interaction_Object_7
  Interaction_Compound_Object_10
  Interaction_Object_1
  HI5_Interaction_Objects
  Hi5_Interaction_Simple_Objects
  Hi5InteractionSceneManager

Inspector
Interaction_Object_4          Static
Tag Untagged    Layer Hi5ObjectGrasp
Transform
Cube (Mesh Filter)
Box Collider
Mesh Renderer
Hi 5_Glove_Interaction_Item (Script)
Rigidbody
Hi 5_Interface_Object (Script)
Hi 5_Interaction_Item_Collider (Script)
Hi 5_Object_Property (Script)
Default-Material
Shader  Standard
Add Component
```

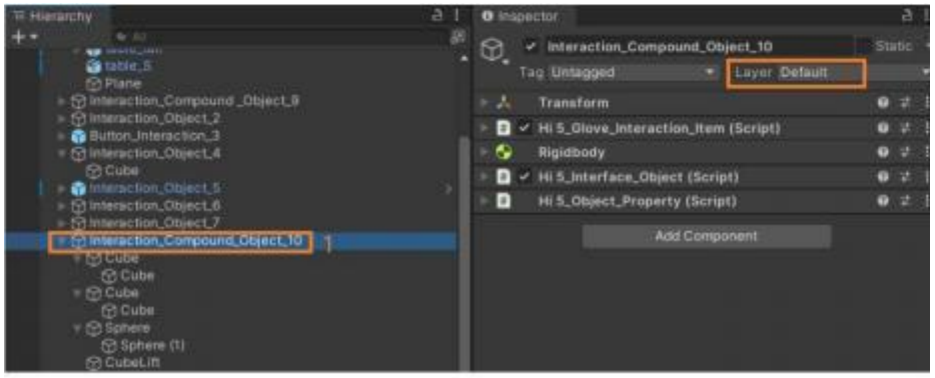


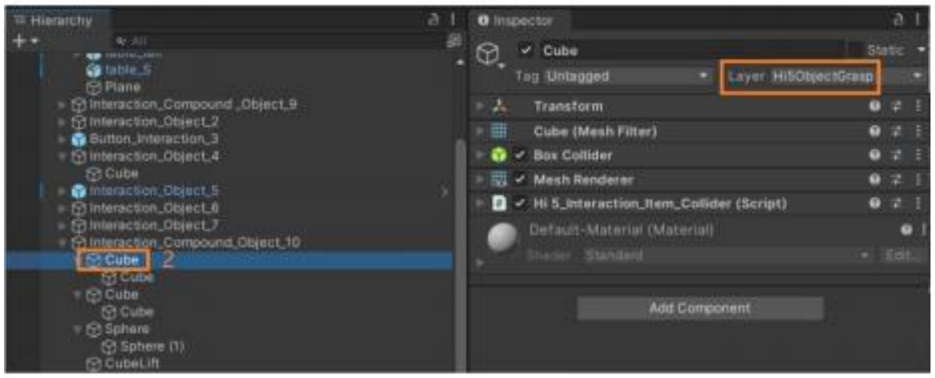
```
Hierarchy
TableScene_Pico
  Hi5_Thread_MonoBehaviour
  [CameraRig]_HI5
  XR Interaction Manager
  HI5 Menu
  TestProcessCalibration
  Directional Light
  Environment
  Interaction_Compound_Object_9
  Interaction_Object_2
  Button_Interaction_3
  Interaction_Object_4
    Cube
  Interaction_Object_5
  Interaction_Object_6

Inspector
Cube          Static
Tag Untagged    Layer Hi5ObjectTrigger
Transform
Cube (Mesh Filter)
Box Collider
Mesh Renderer
Hi 5_Glove_Interaction_Item_Trigger (Script)
Default-Material
Shader  Standard
Add Component
```

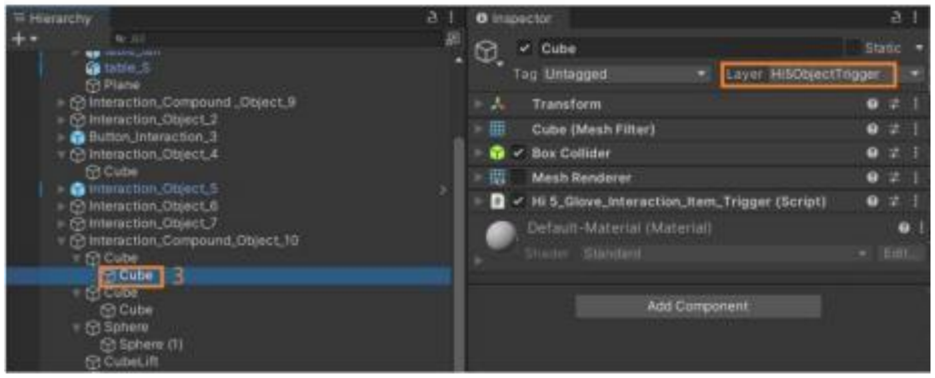
Combined Object Settings

The composite object is divided into three layers, the Layer of the outermost object in the composite object is set to Default, the Layer of the outer layer object in the composite object is set to Hi5ObjectGrasp, and the Layer of the inner layer object in the composite object is set to Hi5ObjectTrigger,

For example, Interaction_Compound_Object_10, the settings are as shown in the figure:


Interaction_Compound_Object_10 Static
Tag Untagged Layer Default

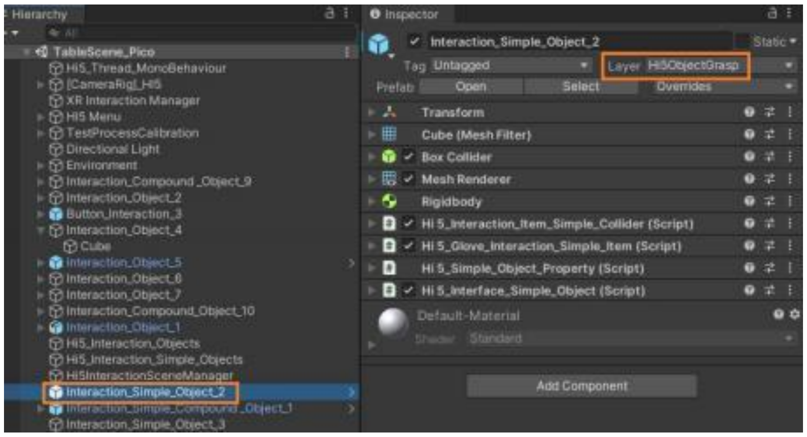

Cube Static
Tag Untagged Layer Hi5ObjectGrasp


Cube Static
Tag Untagged Layer Hi5ObjectTrigger

Simple Object Setup

Simple objects only have functions such as grasping, and do not generate movement by themselves. When grasped and released, they will stay in the original position, and their Layer

To set to Hi5ObjectGrasp , such as Interaction_Simple_Object_2 , set as shown:



Hierarchy

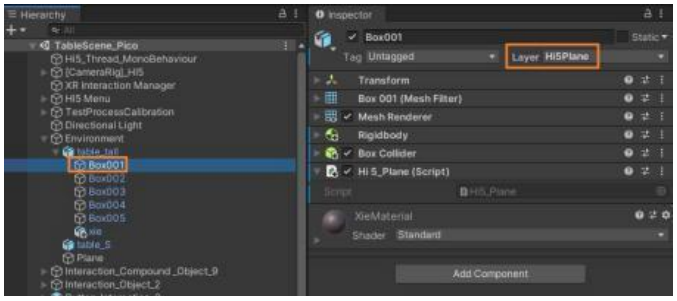
TableScene_Pico
Hi5_Thread_MonoBehaviour
[CameraRig]_Hi5
XR Interaction Manager
Hi5 Menu
TestProcessCalibration
Directional Light
Environment
Interaction_Compound_Object_9
Interaction_Object_2
Button_Interaction_3
Interaction_Object_4
Cube
Interaction_Object_5
Interaction_Object_6
Interaction_Object_7
Interaction_Compound_Object_10
Interaction_Object_1
Hi5_Interaction_Objects
Hi5_Interaction_Simple_Objects
Hi5InteractionSceneManager
Interaction_Simple_Object_2
Interaction_Simple_Compound_Object_1
Interaction_Simple_Object_3

Inspector

Interaction_Simple_Object_2
Tag Untagged Layer Hi5ObjectGrasp
Prefab Open Select Overrides
Transform
Cube (Mesh Filter)
Box Collider
Mesh Renderer
Rigidbody
Hi 5_Interaction_Item_Simple_Collider (Script)
Hi 5_Glove_Interaction_Simple_Item (Script)
Hi 5_Simple_Object_Property (Script)
Hi 5_Interface_Simple_Object (Script)
Default-Material
Shader Standard

Desktop Objects

The Layer of objects placed on the desktop should be set to Hi5_Plane, such as Box001, as shown in the figure:



Hierarchy

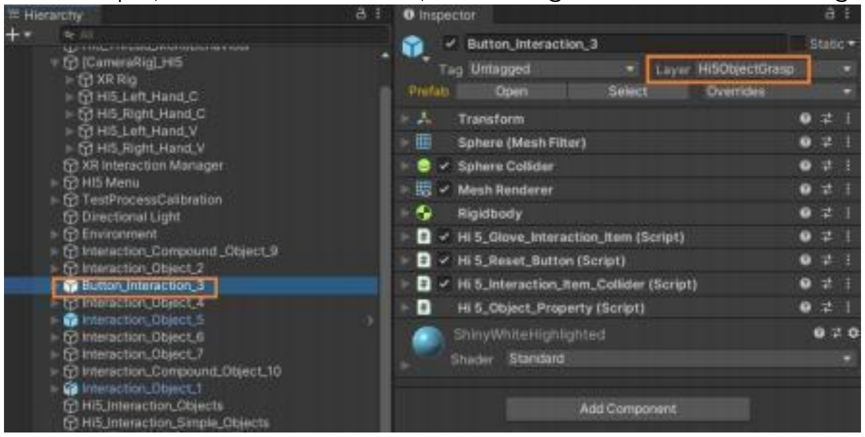
TableScene_Pico
Hi5_Thread_MonoBehaviour
[CameraRig]_Hi5
XR Interaction Manager
Hi5 Menu
TestProcessCalibration
Directional Light
Environment
table_tall
Box001
Box002
Box003
Box004
Box005
xie
table_S
Plane
Interaction_Compound_Object_9
Interaction_Object_2

Inspector

Box001
Tag Untagged Layer Hi5Plane
Transform
Box 001 (Mesh Filter)
Mesh Renderer
Rigidbody
Box Collider
Hi 5_Plane (Script)
Script Hi5_Plane
XieMaterial
Shader Standard

Button Settings

For example, Button_Interaction_3, the settings are as shown in the figure:



Hierarchy

[CameraRig]_Hi5
XR Rig
Hi5_Left_Hand_C
Hi5_Right_Hand_C
Hi5_Left_Hand_V
Hi5_Right_Hand_V
XR Interaction Manager
Hi5 Menu
TestProcessCalibration
Directional Light
Environment
Interaction_Compound_Object_9
Interaction_Object_2
Button_Interaction_3
Interaction_Object_4
Interaction_Object_5
Interaction_Object_6
Interaction_Object_7
Interaction_Compound_Object_10
Interaction_Object_1
Hi5_Interaction_Objects
Hi5_Interaction_Simple_Objects

Inspector

Button_Interaction_3
Tag Untagged Layer Hi5ObjectGrasp
Prefab Open Select Overrides
Transform
Sphere (Mesh Filter)
Sphere Collider
Mesh Renderer
Rigidbody
Hi 5_Glove_Interaction_Item (Script)
Hi 5_Reset_Button (Script)
Hi 5_Interaction_Item_Collider (Script)
Hi 5_Object_Property (Script)
ShinyWhiteHighlighted
Shader Standard

Related Interface

Hand Related Interface

Hand State

```
enum E_Interface_Hand_State
{
ERelease = -1,
EPinch = 2,
ELift = 4,
}
E_Interface_Hand_State GetHandState(out int interactionObjectId)
```

E_Interface_Hand_State Return to hand state， interactionObjectId Returns the interactive object Id index

Hand Gesture Recognition Status

```
enum Hi5_Glove_Gesture_Recognition_State
{
ENone = 0,
EOk,
EFist,
EIndexPoint,
EHandPlane
}
Hi5_Glove_Gesture_Recognition_State GetRecognitionState()
```

Hi5_Glove_Gesture_Recognition_State //Return the current state of the hand.

Hand event interface

```
public void MessageFun(string messageKey, object param1, object param2) {
    if
        (messageKey.CompareTo(Hi5_Glove_Interaction_Message.Hi5_MessageMessageKe
y.messageHandEvent) = = 0)
    {
        Hi5_Glove_Interaction_Hand_Event_Data data = param1 as
        Hi5_Glove_Interaction_Hand_Event_Data;
        switch (data.mEventType)
     {
            case EEventHandType.EClap:
                {
                    //Clap Event
                }
                break;
            case EEventHandType.EPoke:
                {
                    //Poke Event
                }
                break;
            case EEventHandType.EPinch:
                {
                    //Pinch Event
                }
                break;
            case EEventHandType.EThrow:
                {
                    //Throw Event
                }
                break;
            case EEventHandType.ELift:
                {
                    //Lifting Incident
                }
                break;
            case EEventHandType.ERelease:
                {
                    //Release Event
                }
                break;
        }
    }
}
```

Interactive Object Interface

Hi5_Interface_Object

Interactive Object State

```
enum E_Object_State {
  ENone = -1,
    EStatic = 1,
    EPinch = 3,
    EMove = 2,
    EClap = 4,
    EFlyLift = 5,
    EPoke = 6,
}
E_Object_State GetObjectItemState();
Get interactive object state
int GetObjectId();  return interactive object Id
```

Interactive object event

```
public void MessageFun(string messageKey, object param1, object param2) {
  if (messageKey.CompareTo(Hi5_Glove_Interaction_Message.Hi5_MessageMessageKe
y.messageObjectEvent) = = 0) {
    Hi5_Glove_Interaction_Object_Event_Data data = param1 as
Hi5_Glove_Interaction_Object_Event_Data;
    if (data.mObjectId = = ObjectItem.idObject) {
      switch (data.mEventType) {
      case EEventObjectType.EClap: {}
      break;
      case EEventObjectType.EPoke:
        break;
      case EEventObjectType.EPinch:
        break;
      case EEventObjectType.EMove:
        break;
      case EEventObjectType.ELift:
        break;
      case EEventObjectType.EStatic:
        if (mItem! = null) {
          mItem.ResetCorlor();
        }
        break;
      }
    }
  }
}
```

Button Interface

Hi5_Interface_Button

Hi5_Interface_Button

```
virtual public void MessageFun(string messageKey, object param1, object param2) {
  if (messageKey.CompareTo(Hi5_Glove_Interaction_Message.Hi5_MessageMessageKe
y.messageObjectEvent) = = 0) {
    Hi5_Glove_Interaction_Object_Event_Data data = param1 as
Hi5_Glove_Interaction_Object_Event_Data;
    if (data.mObjectId = = ObjectItem.idObject) {
      if (data.mEventType = = EEventObjectType.EClap) {} else if (data.mEventType = =
EEventObjectType.EPoke) {} else if (data.mEventType = = EEventObjectType.EStatic) {}
    }
  }
}
```