Level： No.：

Skyworth Standalone VR SDK（Unity）

DevelopDoc

Drafted by ________Date ___________

Checked by ________Date ___________

Approved by ________Date ___________

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1 Introduction

1.1 SDK Introduction

SDK supports hardware devices: Skyworth standalone VR headset S8000.

SDK mainly provides: 3DOF handle interactive support, multi-functional interactive support, binocular stereo rendering and other functions.

1.2 Development Environment

Unity：Currently supports Unity 2017.1.0~2017.4.6, recommend to use Unity2017. 3.1f1 version

Android SDK：API Level 19 and above

JDK： Jdk1.7.0_01 and above

1.3 SDK Constrcution

For the convenience of developers, SDK is provided in the form of UnityPackage. After import SDK, developers can see the following directories:

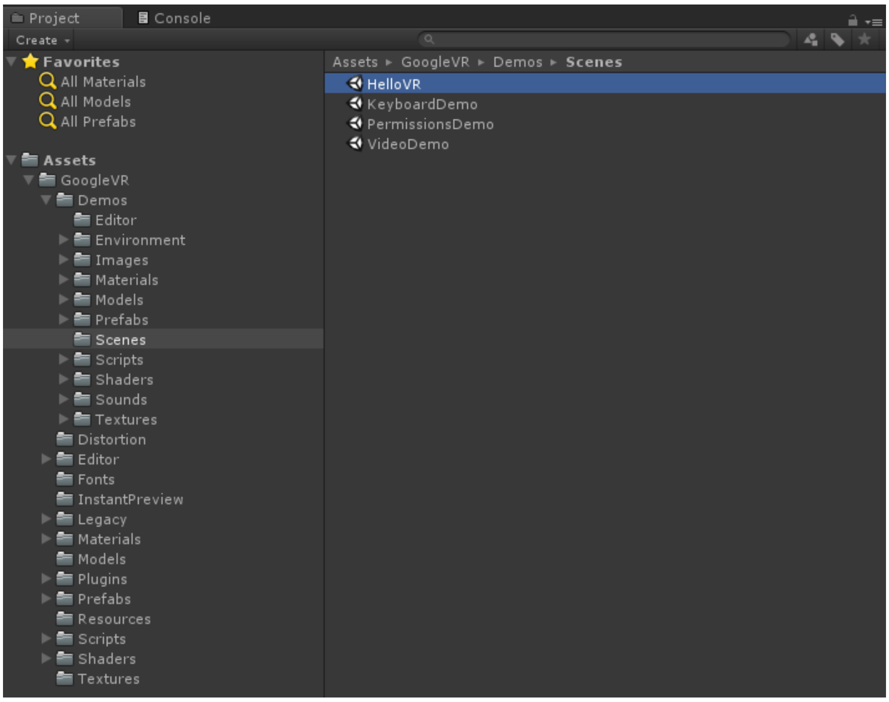
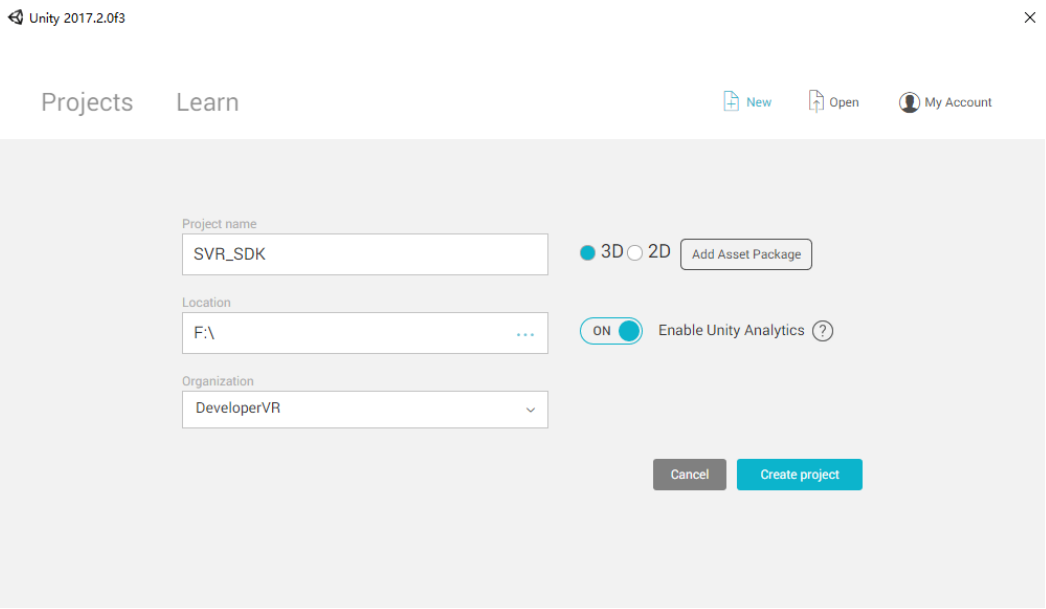


Figure 1.1 SDK structure

2 SDK Instructions

2.1 Create a new project

Open Unity, create a new project as follows:



Project name: SVR_SDK

Location: F:\

Organization: DeveloperVR

● 3D ○ 2D

ON Enable Unity Analytics

Figure 2.1 Create new project

2.2 Import SDK

Select menu Assets->Import Package->Custom Package…as follows：

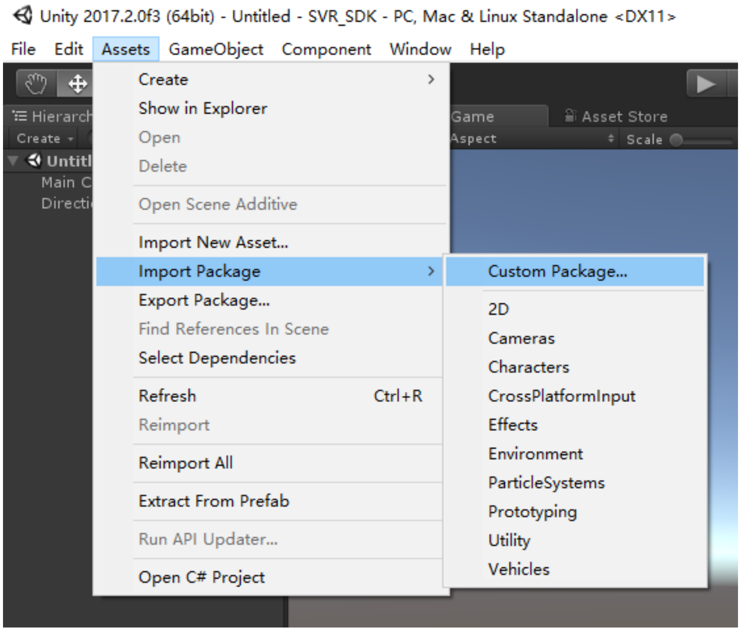
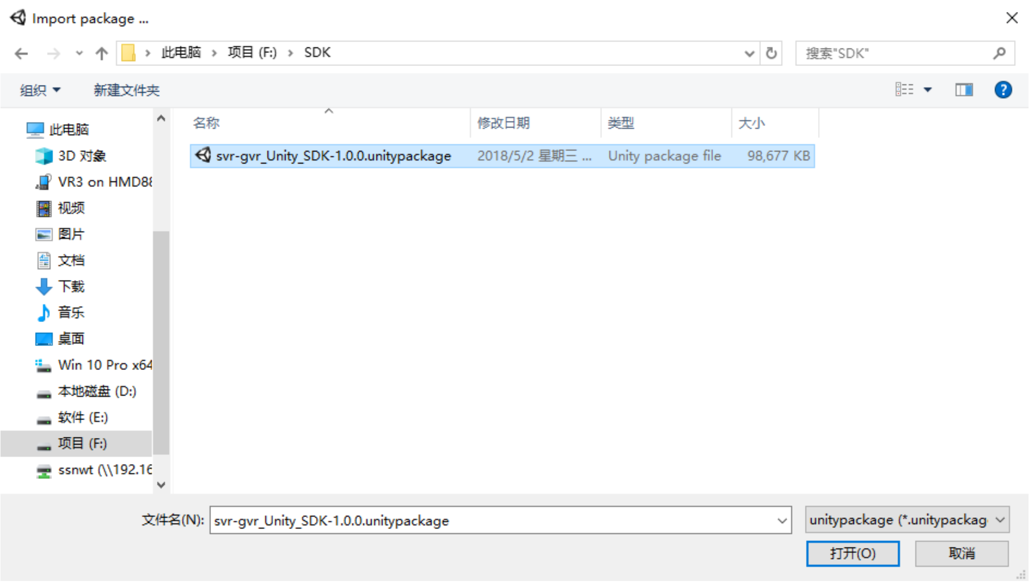


Figure 2.2 Import SDK

pop up the File Selection dialog box, select "svr-unity-sdk.unitypackage" and click to open it as follows:



Import package ...

此电脑 › 项目 (F:) › SDK

搜索"SDK"

组织 ▾　新建文件夹

- 此电脑
- 3D 对象
- VR3 on HMD8
- 视频
- 图片
- 文档
- 下载
- 音乐
- 桌面
- Win 10 Pro x64
- 本地磁盘 (D:)
- 软件 (E:)
- 项目 (F:)
- ssnwt (\\192.16

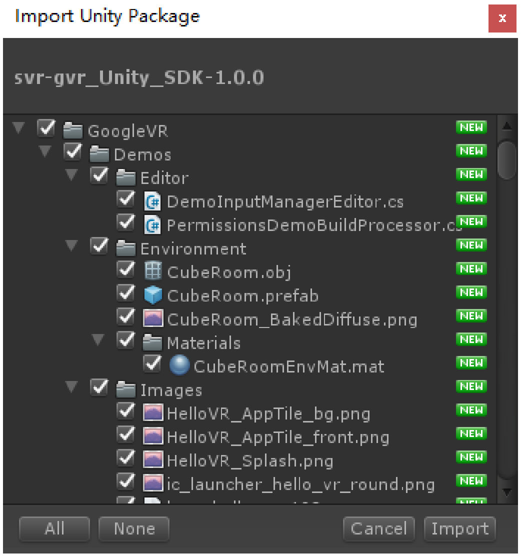
名称	修改日期	类型	大小
svr-gvr_Unity_SDK-1.0.0.unitypackage	2018/5/2 星期三 ...	Unity package file	98,677 KB

文件名(N): svr-gvr_Unity_SDK-1.0.0.unitypackage

unitypackage (*.unitypackag

Figure 2.3 Select Unity Package

After clicking back to Unity interface, the system pops up SDK content hierarchy, please import as needed:



Import Unity Package

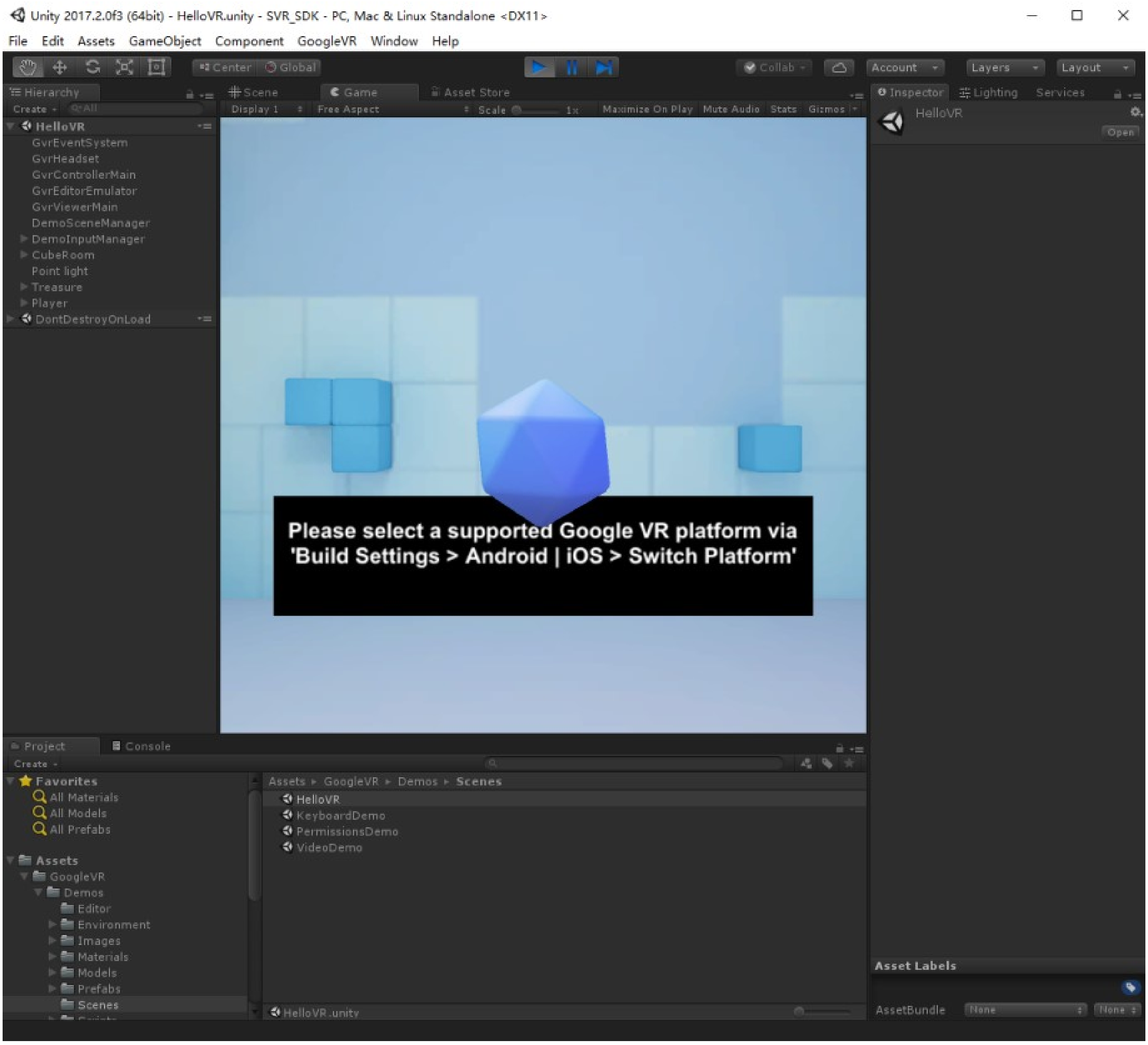
svr-gvr_Unity_SDK-1.0.0

```
▼ ☑ GoogleVR                                      NEW
  ▼ ☑ Demos                                       NEW
    ▼ ☑ Editor                                    NEW
        ☑ DemoInputManagerEditor.cs               NEW
        ☑ PermissionsDemoBuildProcessor.c         NEW
    ▼ ☑ Environment                               NEW
        ☑ CubeRoom.obj                            NEW
        ☑ CubeRoom.prefab                         NEW
        ☑ CubeRoom_BakedDiffuse.png               NEW
      ▼ ☑ Materials                               NEW
          ☑ CubeRoomEnvMat.mat                    NEW
    ▼ ☑ Images                                    NEW
        ☑ HelloVR_AppTile_bg.png                  NEW
        ☑ HelloVR_AppTile_front.png               NEW
        ☑ HelloVR_Splash.png                      NEW
        ☑ ic_launcher_hello_vr_round.png          NEW
```

Figure 2.4 Import options

2.3 Use SDK

Enter Project options， open Assets->GoogleVR->Demos->Scenes successively， select HelloVR scene， click import button and below content can be seen in Game window：



Please select a supported Google VR platform via 'Build Settings > Android | iOS > Switch Platform'

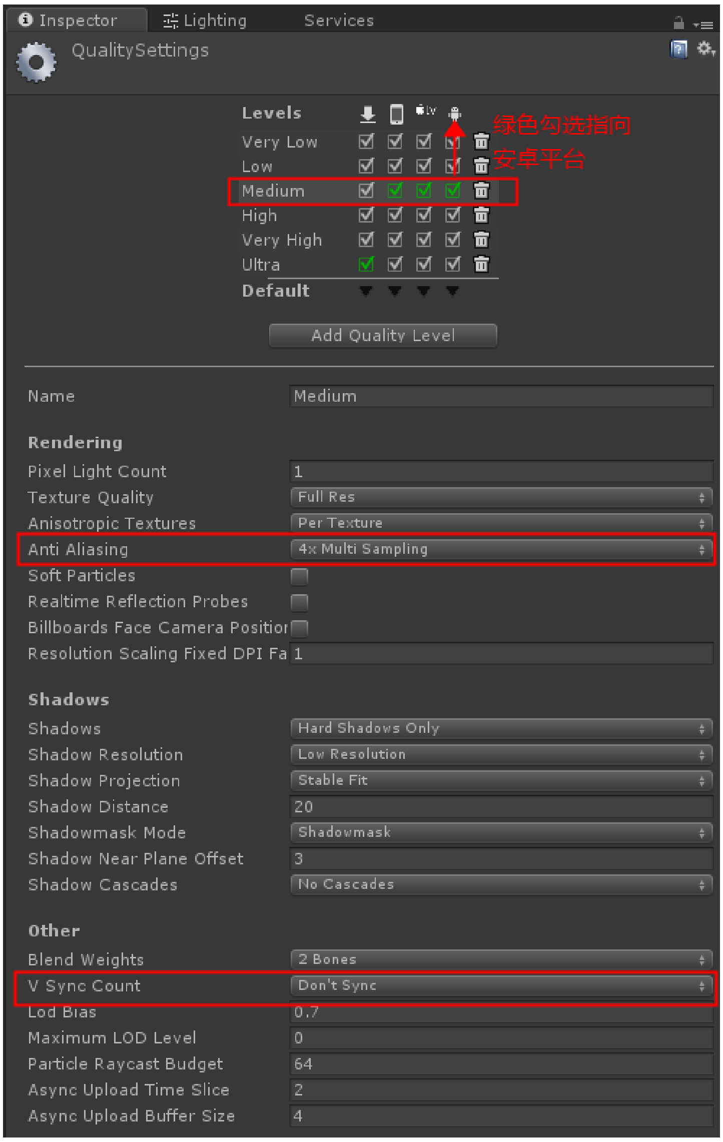
Figure 2.5 Simulation run

Press Alt to move mouse and the screen can be rotated up, down, left and right. Press Ctrl to move mouse and the screen can be slipped up and down. Press Shift to move mouse to simulate handle operation.

2.4 Project Settings

2.4.1 Quality Settings

As shown in Figure 2.6, for Levels choose Medium level of the Android Platform with Green Check. Specific parameters are shown in Figure 2.6 below.



绿色勾选指向安卓平台

Levels				
Very Low	☑	☑	☑	☑
Low	☑	☑	☑	☑
Medium	☑	☑	☑	☑
High	☑	☑	☑	☑
Very High	☑	☑	☑	☑
Ultra	☑	☑	☑	☑
Default	▼	▼	▼	▼

Name	Medium
Rendering	
Pixel Light Count	1
Texture Quality	Full Res
Anisotropic Textures	Per Texture
Anti Aliasing	4x Multi Sampling
Soft Particles	□
Realtime Reflection Probes	□
Billboards Face Camera Positior	□
Resolution Scaling Fixed DPI Fa	1
Shadows	
Shadows	Hard Shadows Only
Shadow Resolution	Low Resolution
Shadow Projection	Stable Fit
Shadow Distance	20
Shadowmask Mode	Shadowmask
Shadow Near Plane Offset	3
Shadow Cascades	No Cascades
Other	
Blend Weights	2 Bones
V Sync Count	Don't Sync
Lod Bias	0.7
Maximum LOD Level	0
Particle Raycast Budget	64
Async Upload Time Slice	2
Async Upload Buffer Size	4

Figure 2.6 QualitySettings sketch map

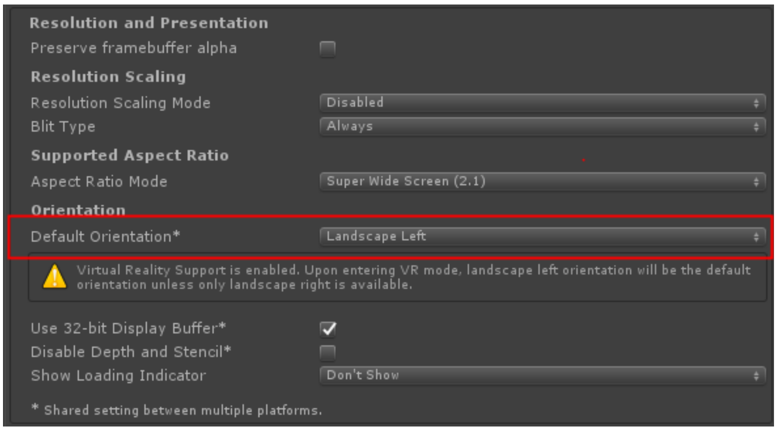
Note: In Levels settings, first let the gray bar select the row to mark green on the Android platform, as shown in Figure 2.6. Then set Anti Aliasing and V Sync Count. If you don't select the Android platform first, these two project settings will not work in the Android export package, resulting in the application running on a black screen.

Anti Aliasing： Adjustments can be made as needed. 4 multi sampling is recommended .

V Sync Count： Must set as Don’t Sync。

2.4.2 PlayerSettings

1. In Resolution and Presentation option, Default Orientation must be set as Landscape Left. Specific parameters are shown in Figure 2.7 below.



Resolution and Presentation

Preserve framebuffer alpha ☐

Resolution Scaling

Resolution Scaling Mode: Disabled

Blit Type: Always

Supported Aspect Ratio

Aspect Ratio Mode: Super Wide Screen (2.1)

Orientation

Default Orientation*: Landscape Left

Virtual Reality Support is enabled. Upon entering VR mode, landscape left orientation will be the default orientation unless only landscape right is available.

Use 32-bit Display Buffer* ☑

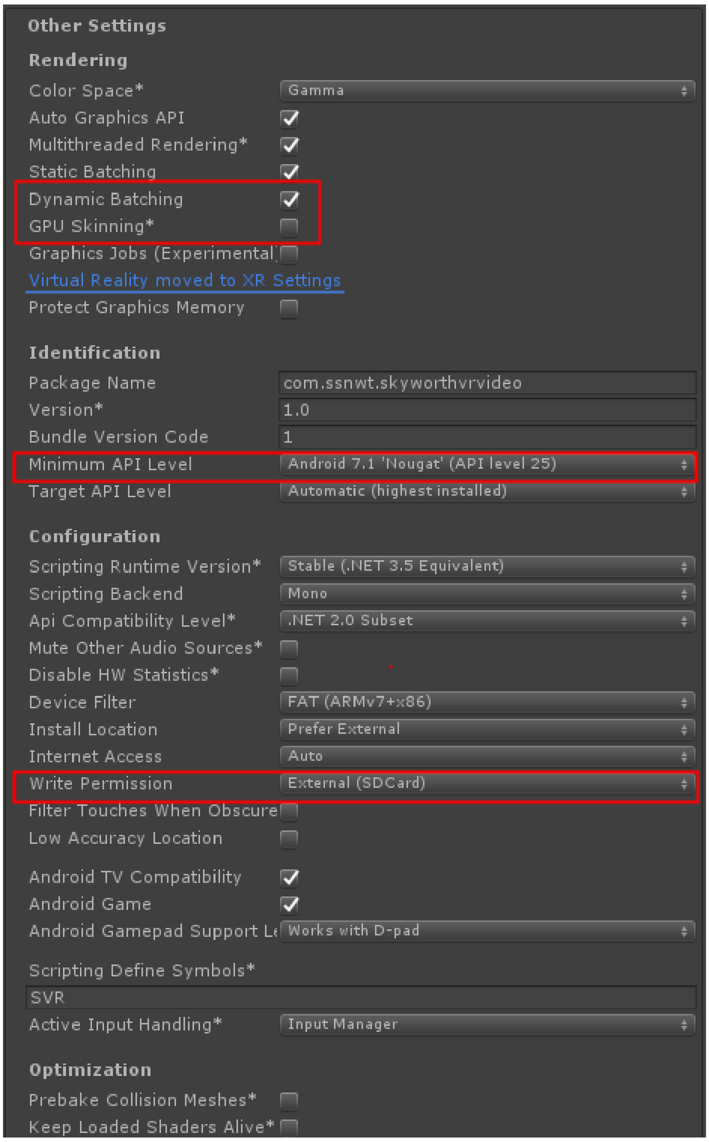
Disable Depth and Stencil* ☐

Show Loading Indicator: Don't Show

* Shared setting between multiple platforms.

Figure 2.7 Default Orientation sketch map

2. In Other Settings option，Don’t select GPU Skinning，API Level is Android 7.1，Write permission select SDCard Specific parameters are shown in Figure 2.8 below：



Other Settings

Rendering

Color Space*: Gamma

Auto Graphics API ☑

Multithreaded Rendering* ☑

Static Batching ☑

Dynamic Batching ☑

GPU Skinning* ☐

Graphics Jobs (Experimental) ☐

Virtual Reality moved to XR Settings

Protect Graphics Memory ☐

Identification

Package Name: com.ssnwt.skyworthvrvideo

Version*: 1.0

Bundle Version Code: 1

Minimum API Level: Android 7.1 'Nougat' (API level 25)

Target API Level: Automatic (highest installed)

Configuration

Scripting Runtime Version*: Stable (.NET 3.5 Equivalent)

Scripting Backend: Mono

Api Compatibility Level*: .NET 2.0 Subset

Mute Other Audio Sources* ☐

Disable HW Statistics* ☐

Device Filter: FAT (ARMv7+x86)

Install Location: Prefer External

Internet Access: Auto

Write Permission: External (SDCard)

Filter Touches When Obscure ☐

Low Accuracy Location ☐

Android TV Compatibility ☑

Android Game ☑

Android Gamepad Support Le: Works with D-pad

Scripting Define Symbols*

SVR

Active Input Handling*: Input Manager

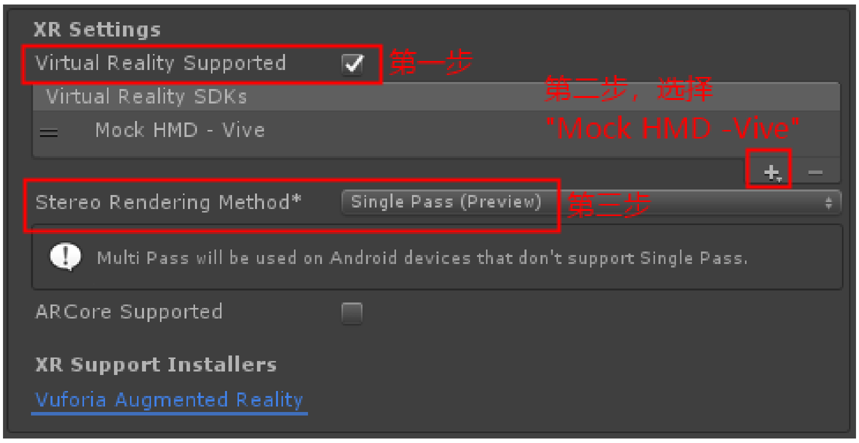
Optimization

Prebake Collision Meshes* ☐

Keep Loaded Shaders Alive* ☐

Figure 2.8 PlayerSettings Sketch map

3. In XR Settings option, select Virtual Reality Supported，Select “Mock HMD - Vive”，Set Stereo Rendering Methods as “Single Pass(Preview)”。 Specific parameters are shown in Figure 2.9 below：



XR Settings

Virtual Reality Supported ☑

Virtual Reality SDKs

Mock HMD - Vive

Stereo Rendering Method* Single Pass (Preview)

Multi Pass will be used on Android devices that don't support Single Pass.

ARCore Supported □

XR Support Installers

Vuforia Augmented Reality

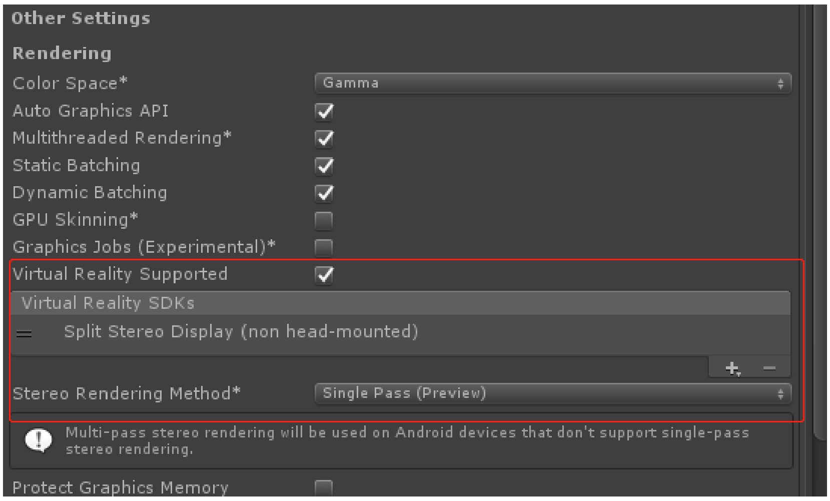
第一步

第二步，选择

"Mock HMD -Vive"

第三步

Figure 2.9 Above 2017.2 Vrsion XR Settings Sketch map



Other Settings

Rendering

Color Space* Gamma

Auto Graphics API ☑

Multithreaded Rendering* ☑

Static Batching ☑

Dynamic Batching ☑

GPU Skinning* □

Graphics Jobs (Experimental)* □

Virtual Reality Supported ☑

Virtual Reality SDKs

Split Stereo Display (non head-mounted)

Stereo Rendering Method* Single Pass (Preview)

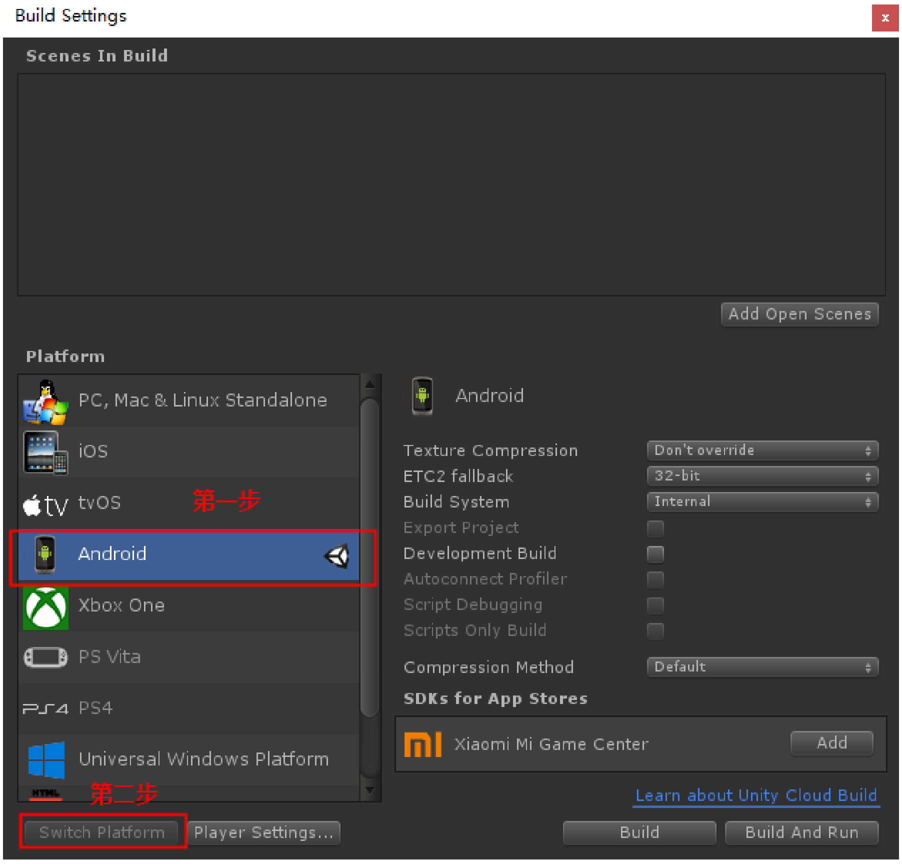
Multi-pass stereo rendering will be used on Android devices that don't support single-pass stereo rendering.

Protect Graphics Memory □

Figure 2.10 Above 2017.1.0Version VR Settings Sketch map

2.4.3 Build Settings

Select default platform “Android”， (Build System) select “Internal” mode。Specific parameters are shown in Figure 2.10 below：



Texture Compression: Don't override
ETC2 fallback: 32-bit
Build System: Internal
Export Project: □
Development Build: □
Autoconnect Profiler: □
Script Debugging: □
Scripts Only Build: □
Compression Method: Default

Figure 2.10 Build Settings Sketch map

2.4.4 AndroidManifest

Set Activity as “com.ssnwt.sdk.MainActivity”

1. If your project uses own Manifest and also configurate own Activity, and it need to make your Activity inherit from MainAcitivity。

2. If the project is newly created, you need to create Plugins/Android/ contents in your project and then move GoogleVR/Plugins/Android/AndroidManifest.xml to the newly created Plugins/Android/contents

2.5 Export to equipment operation

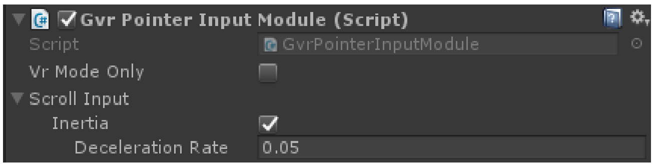
1. Connect the device to the computer via USB. When connected to the computer, the battery icon of Launcher interface will be in the state of charging.

2. Click File - > Build & Run; and wait for the progress bar to finish.

3 API Interface

The SDK is developed on the basis of GVR SDK v1.40.0. Some interfaces are described below. For the rest, please go to the official website (https://developers.google.com/vr/unity/reference/) for details.

3.1 GvrPointerInputModule Introduction



☑ Gvr Pointer Input Module (Script)

Script GvrPointerInputModule

Vr Mode Only ☐

Scroll Input

Inertia ☑

Deceleration Rate 0.05

Figure 3.1 GvrPointerInputModule setting sketch map

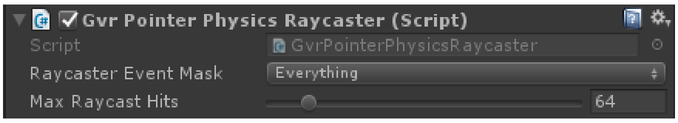
Functions:

GvrPointerInputModule inherits from BaseInputModule. With this script, the (UGUI) UI elements and 3D scene objects based on Canvas can interact in the application program. So UI elements that are highlighted from a Pointer, Trigger, Touching events, can be passed.

Use:

Enter the Project tab, expand Assets - > Google VR - > Prefabs - > UI in turn, and replace the original Event System with the GvrEvent System prefabricated into the scene.

3.2 GvrPointerPhysicsRaycaster Introduction



☑ Gvr Pointer Physics Raycaster (Script)

Script GvrPointerPhysicsRaycaster

Raycaster Event Mask Everything

Max Raycast Hits 64

Figure 3.2 GvrPointerPhysicsRaycaster Sketch map

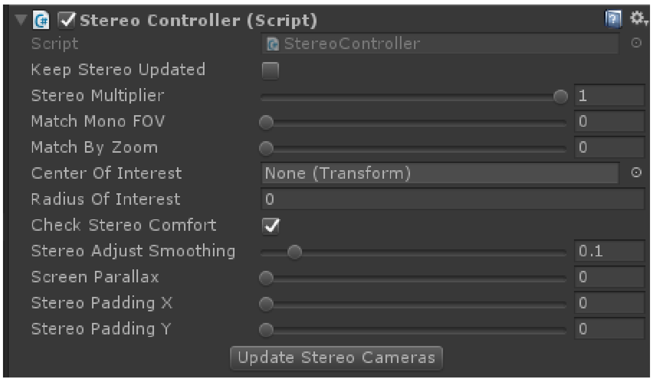
Functions:

GvrPointerPhysics Raycaster inherits from GvrBasePointerRaycaster and provides a collision detection for GvrPointerInputModule.

Use:

Create an empty object in the scene and name it Player. Drag the original Main Camera under Player. Add GvrPointerPhysics Raycaster script for Main Camera.

3.3 StereoController Introduction



☑ Stereo Controller (Script)

Script StereoController

Keep Stereo Updated ☐

Stereo Multiplier 1

Match Mono FOV 0

Match By Zoom 0

Center Of Interest None (Transform)

Radius Of Interest 0

Check Stereo Comfort ☑

Stereo Adjust Smoothing 0.1

Screen Parallax 0

Stereo Padding X 0

Stereo Padding Y 0

Figure 3.3 StereoController setting Sketch map

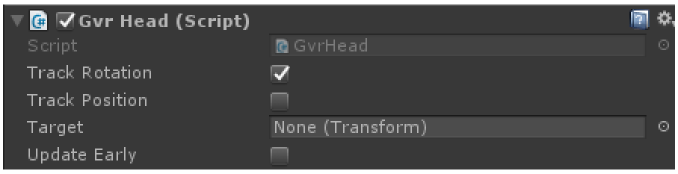
Functions:

Binding to MainCamera, two GvrEye rendering controllers of stereo view content, this script needs to be bound to the VR rendering camera.

Use:

Add the StereoController script for Main Camera.

3.4 GvrHead Introduction



☑ Gvr Head (Script)

Script GvrHead

Track Rotation ☑

Track Position ☐

Target None (Transform)

Update Early ☐

Figure 3.4 GvrHead Setting sketch map

Functions:

User head tracking simulation provides the data of head tracking to Camera, and the Transform attributes attached to it will change synchronously during head movement.

Use:

Add GvrHead scripts for Main Camera.

3.5 GvrHeadset Introduction

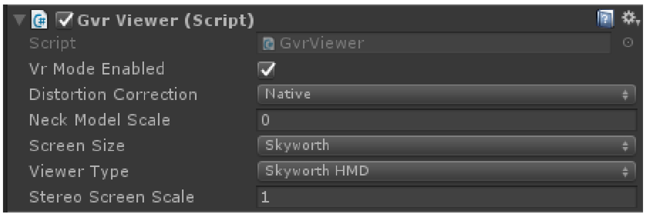
Functions:

GvrHeadset is the main interface of VR headset API. There is and can only be one GvrHeadset prefabrication in a scenario.

Use:

Enter the Project tab, expand Assets - > Google VR - > Prefabs - > Headset in turn, and put the Gvr Headset prefabrication into the scene.

3.6 GvrViewer Introduction



Gvr Viewer (Script)

Script	GvrViewer
Vr Mode Enabled	✓
Distortion Correction	Native
Neck Model Scale	0
Screen Size	Skyworth
Viewer Type	Skyworth HMD
Stereo Screen Scale	1

Figure 3.5 GvrViewer Setting sketch map

Functions:

Used to initialize Devices. Devices of Editor are initialized when the editor runs. There is and can only be one GvrViewerMain prefabrication in a scenario.

Use:

Enter the Project tab, expand Assets - > Google VR - > Prefabs in turn, and put the GvrViewerMain prefabrication into the scene.

4 3DoF Handle Introduction

4.1 Interface Introduction

SDK provides the response events of keys and touchpad of the 3DoF handle controller. When calling the relevant interface of the handle, please refer to the description of GvrControllerInput, the API interface function in Chapter 3. The following introduces the corresponding relationship between interface parameters and physical handle keys.

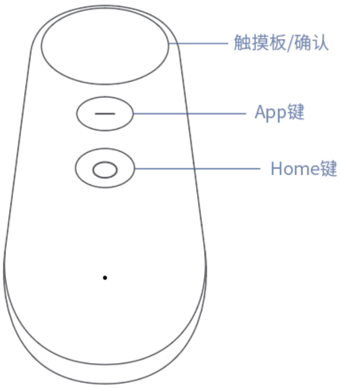


Figure 5.1 3dof Handle sketch map

The corresponding relationship between the physical keys of the handle and the parameters in API interface function is as follows:

Physical keys	Key value	API relevant interface
touchpad /confirm	1 << 0	ClickButton ClickButtonDown ClickButtonUp
App key	1 << 1	AppButton AppButtonDown AppButtonUp
Home key	1 << 3	HomeButtonDown HomeButtonState

4.2 Shield the Handle Function of Home Key Returning to Home

When you click the Home button after connecting the handle, it will return to the Home interface. If you want the Home button not to return to Home, you need to add some code in Android Manifest. xml.

```
<uses-feature android: name="android.software.vr.ignore.home" android: required="false"/>
```

"True" means that clicking on Home does not return to Home, and "false" means that clicking on the Home key returns to Home, which defaults to false.

5 Gaze Click

The function of countdown start click is provided in SDK. Stare countdown can be used to trigger click events when no handle operation is needed. This function needs to be used with Gvr ReticlePointer. (Note: At present, the 3DoF handle has become the standard interactive mode of VR AIO. For specific reasons, please use the 3D oF handle by default as the interactive mode.)

5.1 Instruction

On the assets-> googlevr-> prefabs-> UI, place the SvrReticleDownClick prefabricated body under the GvrReticlePointer, create a Button in the scene, and click on it to run.

The countdown effect appears when the anchor point Hover on the Button.

SvrReticleDownClick only checks on objects that implement PointerClick. If you don't use PointerClick, neither does it.

By default, the countdown is 1 second, and we also provide a uicounounder component to control the countdown time.

5.2 Module UICountDown

When you need to control the countdown time of the button, you can lay the UICountDown.cs script on the corresponding PointerClick object, and then set the Count value in seconds.