Skyworth
创维

Skyworth Standalone VR SDK (Unity)

DevelopDoc

Drafted by _____Date _____

Checked by _____Date _____

Approved by _____Date _____

SHENZHEN SKYWORTH NEW WORLD TECHNOLOGY CO., LTD

1 Introduction to SDK

1.1 SDK Introduction

This document describes VR content and application development made for and run on Skyworth all-in-one VR equipment by utilizing SkyworthVRAndroidSDK_Unity (hereinafter referred to as SDK) within the Unity development engine environment. The SDK provides the following functionality:

- Binocular stereo rendering
- optical distortion correction
- asynchronous time warping
- single buffer rendering
- 3DoF multi-interaction support
- power supply and thermal dissipation management

1.2 Supported devices

Skyworth standalone VR headset S8000, S801, V901, S1

1.3 Development environment requirements

Unity：

1. Using S800 V901 Setting

Support Unity 2017.1.0~2018.3.3f1, recommend to use Unity2017.3.1f1 version, do not support 2018.1.9f2, 2018.1.2f1,2018.2.5f1

2. Using S801 Setting and Using S8000 V901 Legacy Setting

Support Unity 2017.1.0~2019.2.3f1, recommend to use Unity2017.3.1f1 version, do not support 2018.1.9f2, 2018.1.2f1,2018.2.5f1

Android SDK：API Level 19 and above

JDK： jdk1.7.0_01 and above

For more details, please refer 2.4

1.4 SDK Directory structure of SDK plugin

The SDK is provided in the format of UnityPackage. After importing, the developers can see the following directories:

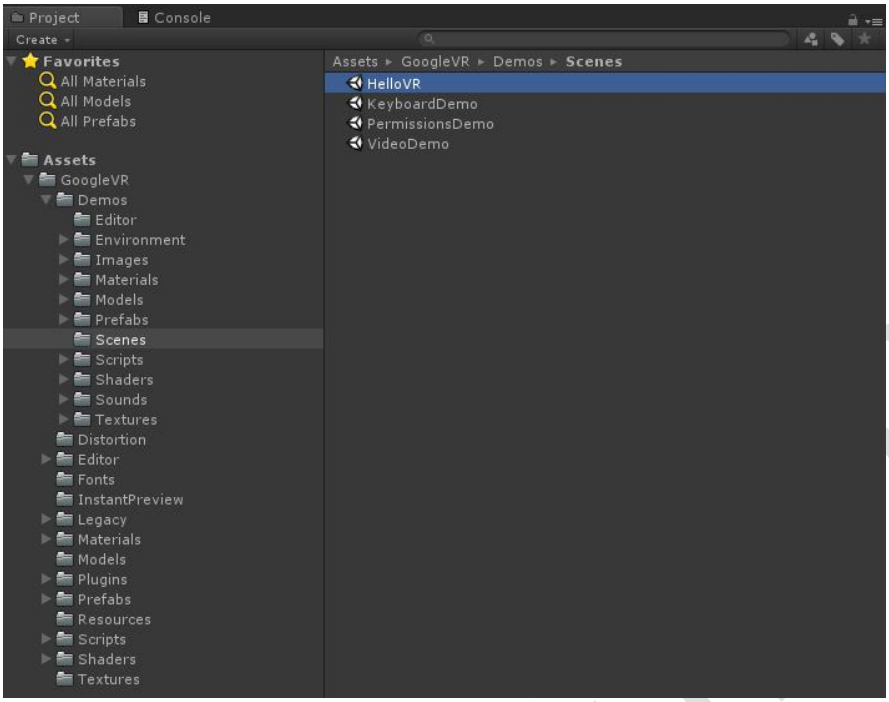

Figure 1.3 Directory structure of SDK plugin

2 SDK Instructions

2.1 Creat a new project

Create a new project as follows：

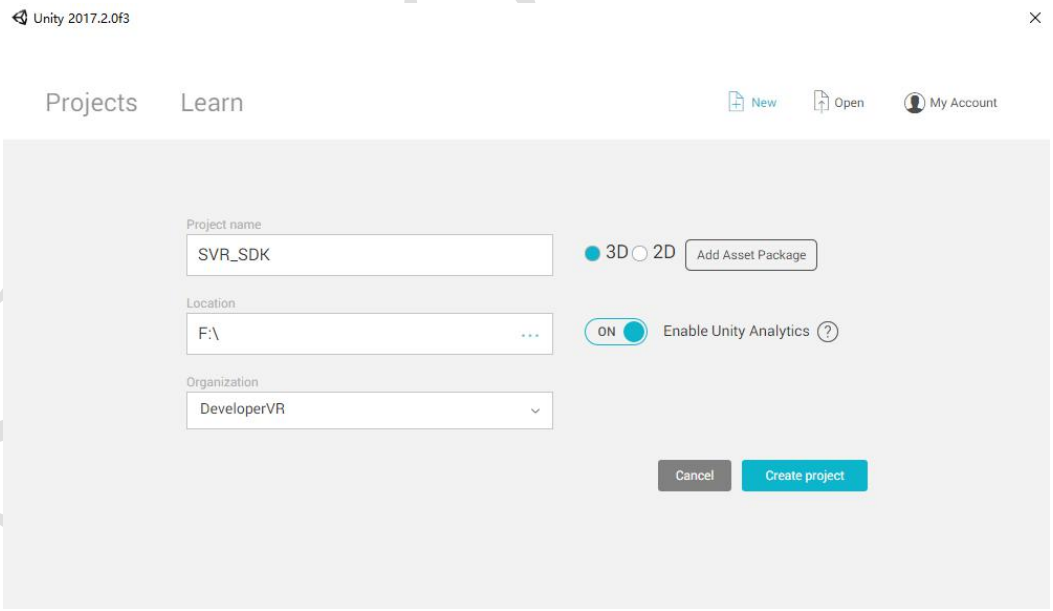

Figure2.1 Create new project

2.2 Import SDK

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

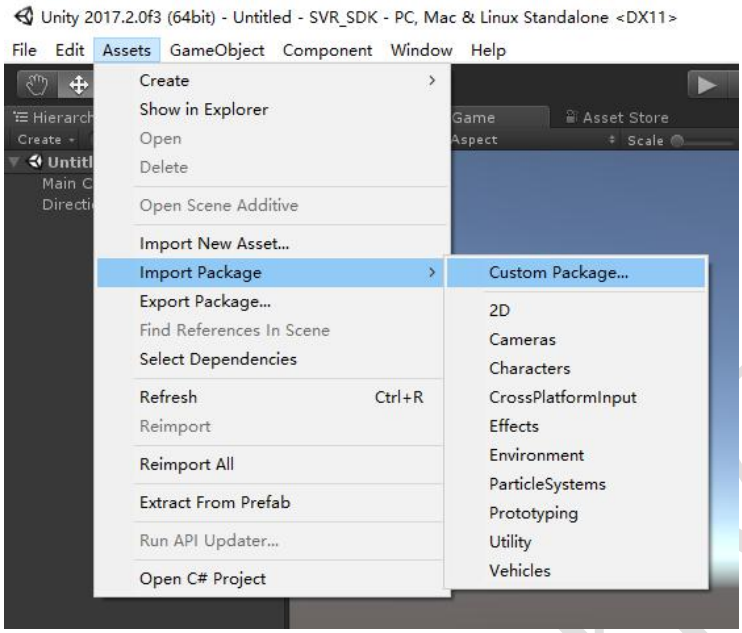

Figure 2.2 Import of custom package

Dialog box will pop up, navigate to the appropriate directory and select “svr_unity_sdk.unitypackage” and click to open:

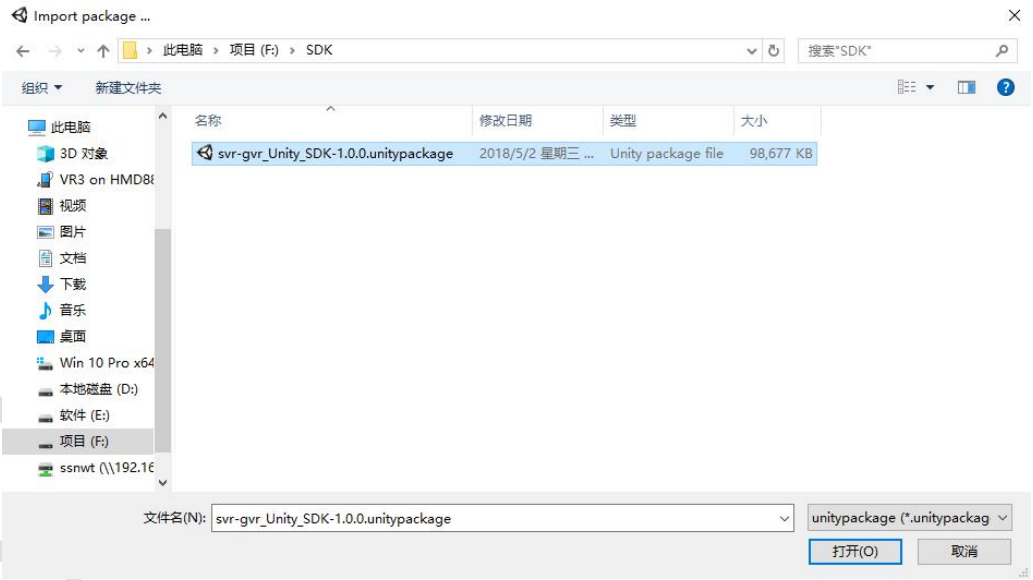

Figure2.3 Select Unity Package

Click to return to the unity interface. The dialog box will pop up. Please import as needed:

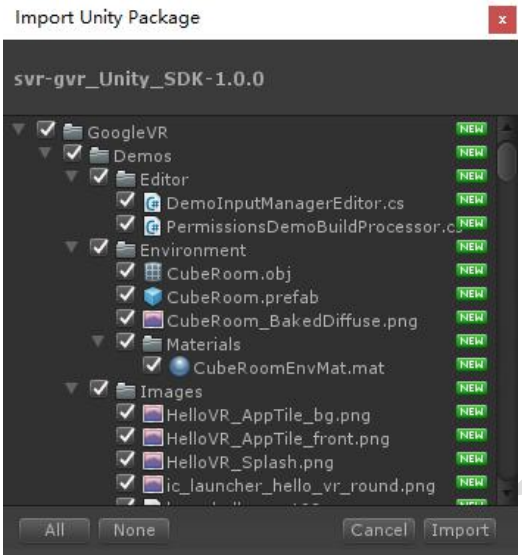

Figure 2.4 Import options

2.3 Use SDK

Enter Project options，expand the Assets->GoogleVR->Demos->Scenes，Select HelloVR scene，click import button, please check the Game window as below:

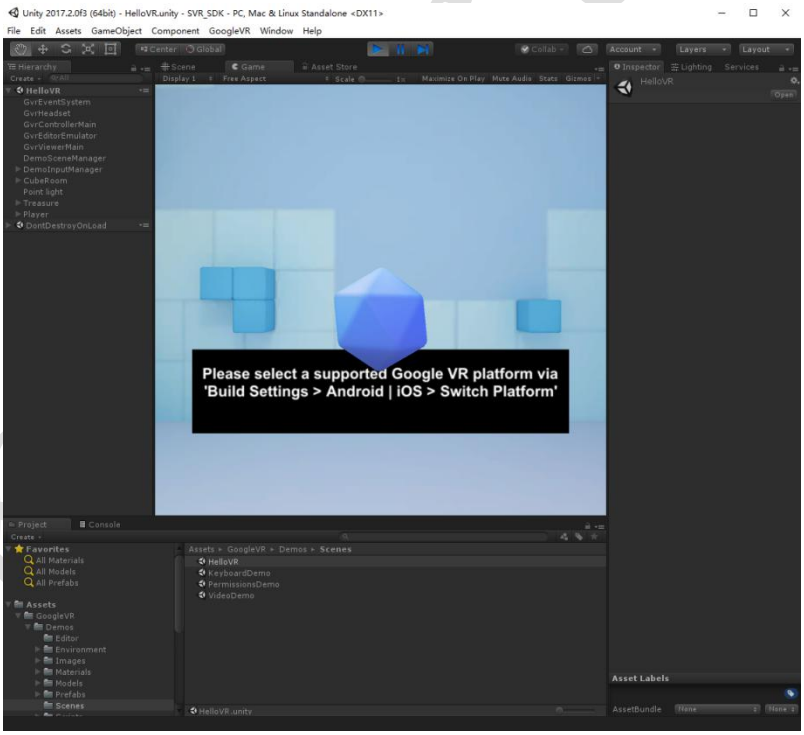

Figure 2.5 Simulation run

Hold ‘Alt’ key to move mouse and the screen can be rotated up, down, left and right. Hold ‘Shift’ key to move mouse to simulate handle operation.

2.4 Unity project setting

We need to configure Unity to run properly on the device. The latest SDK supports three types of settings.

After use, it will automatically set these items mentioned later, such as QualitySettings settings, PlayerSettings settings, Blit Type settings, etc. However, the latest Unity may have compatibility issues. We recommended you to compare 2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.4.5 and check one by one after using automatic settings.

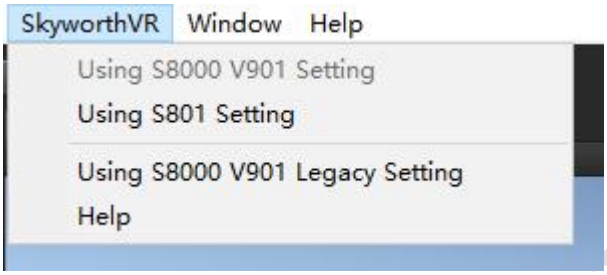

Figure 2.4 sdk setting

2.4.1 QualitySettings

Select Medium for Android platform first and apply settings pictured below under Levels, and ensure that V Sync Count under Other is Don’t Sync (Required):

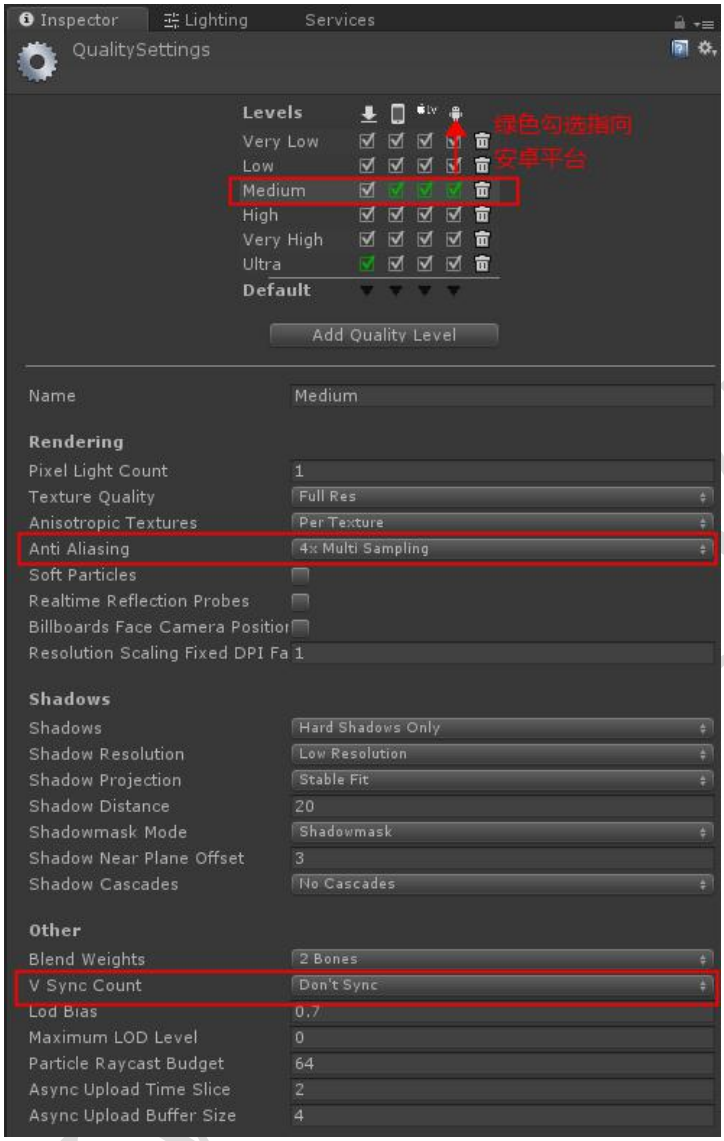

Figure 2.6 QualitySettings

Noted：In the Levels setting, you should select the Android platform first, and then set Anti Aliasing and V Sync Count. If you do not select the Android platform first, the two project settings of Anti Aliasing and V Sync Count will not take work in the Android export package, resulting in a black screen when the application runs.

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

V Sync Count：Must be 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 as below：

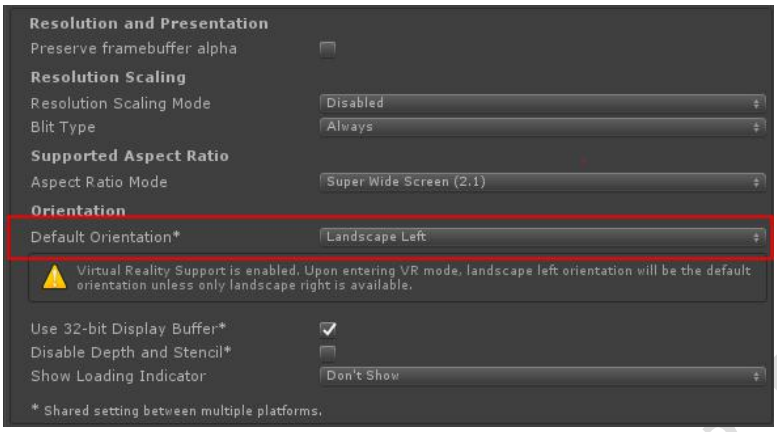

Figure 2.7 Default Orientation sketch map

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

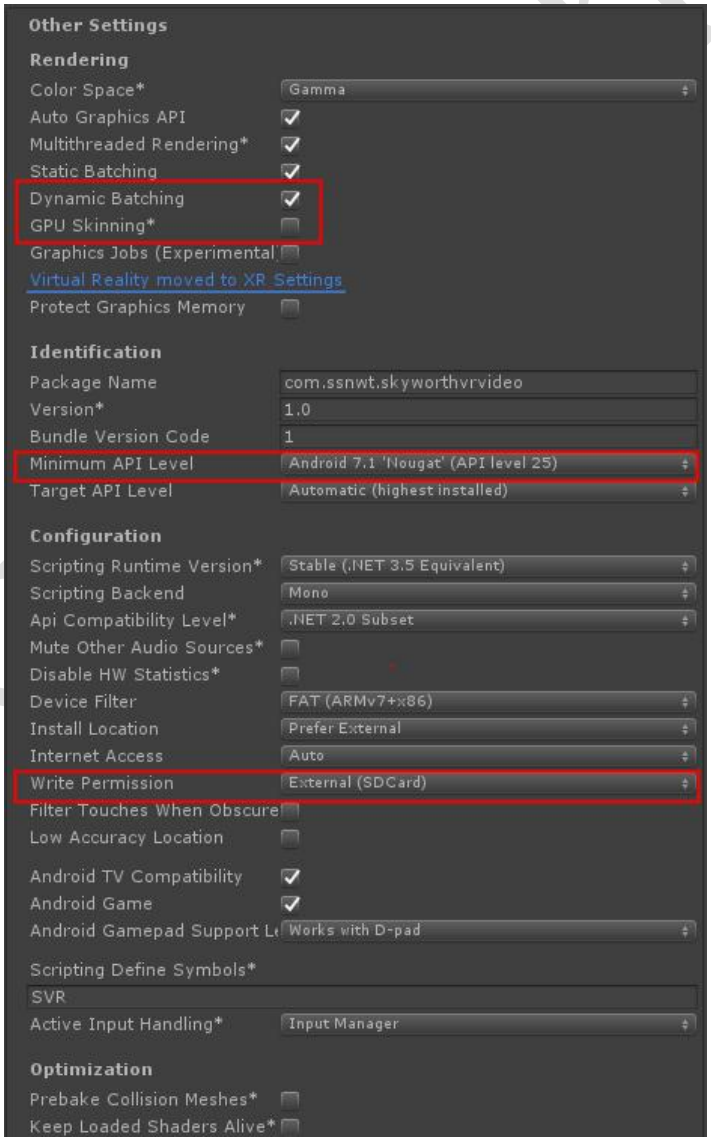

Figure 2.8 PlayerSettings Sketch map

3. In XR Settings option， select Virtual Reality Supported， select “None”， Select ‘Single Pass’ in Stereo Rendering Methods.

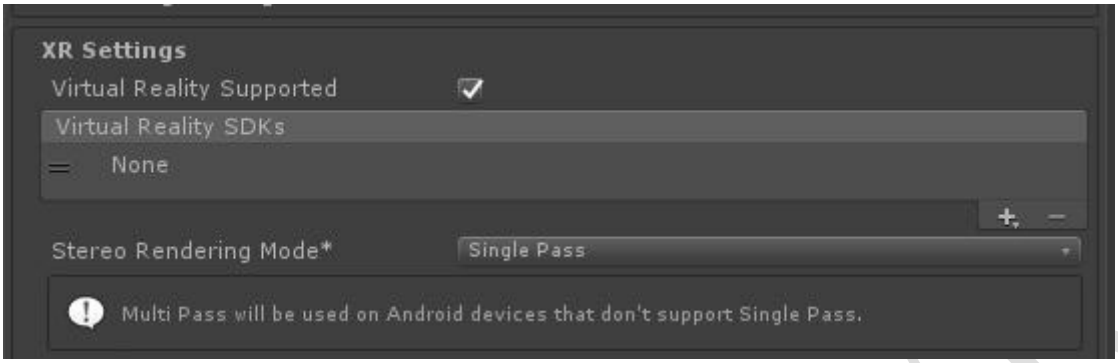

Figure 2.9 XR Settings Sketch map

2.4.3 Build Settings

Select ‘Android’ as default platform, select ‘Internal’ mode in Build System.

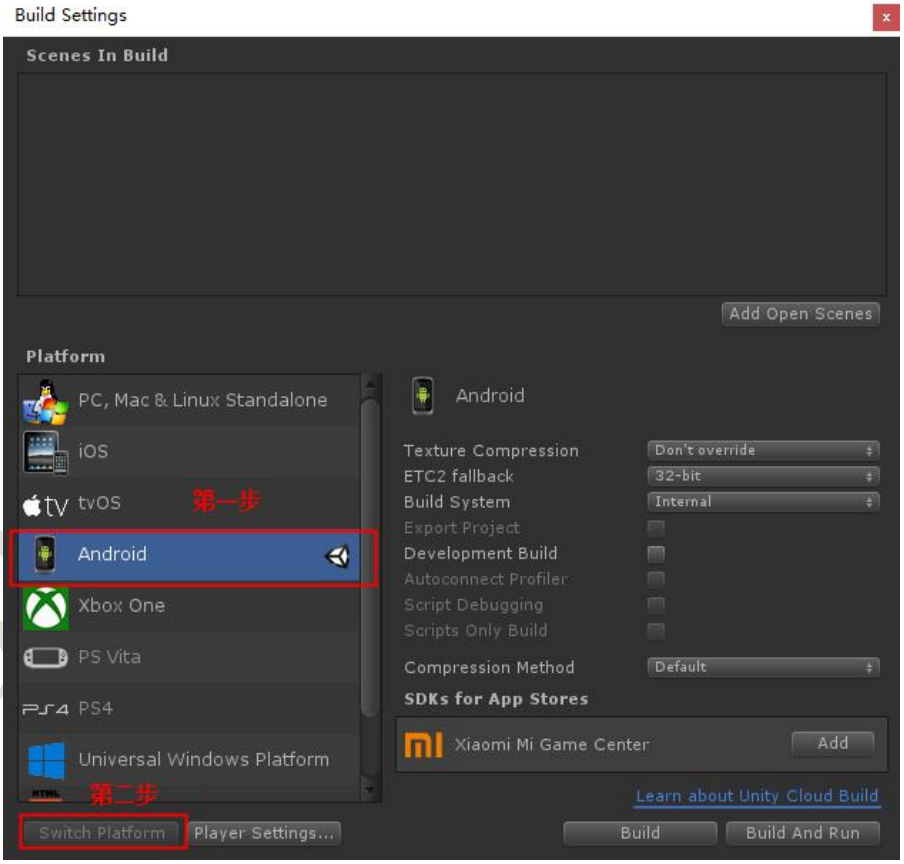

Figure 2.10 Build Settings Sketch map

2.4.4 AndroidManifest

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

1. If your project uses own Manifest and also configurate own Activity, all Activity that needs to be displayed needs to inherited from MainActivity.

2. For a new project created, you need to create 'Plugins/Android/' content first, then move ‘GoogleVR/Plugins/Android/AndroidManifest.xml’ file to the new content.

2.4.5 Setting of Blit Type

The system version must be above Unity2017.3 before Blit Type can be set. Blit Type needs to be set manually. Select ‘never’ for S801 and ‘always’ for S8000,V901 and S1 VR headset.

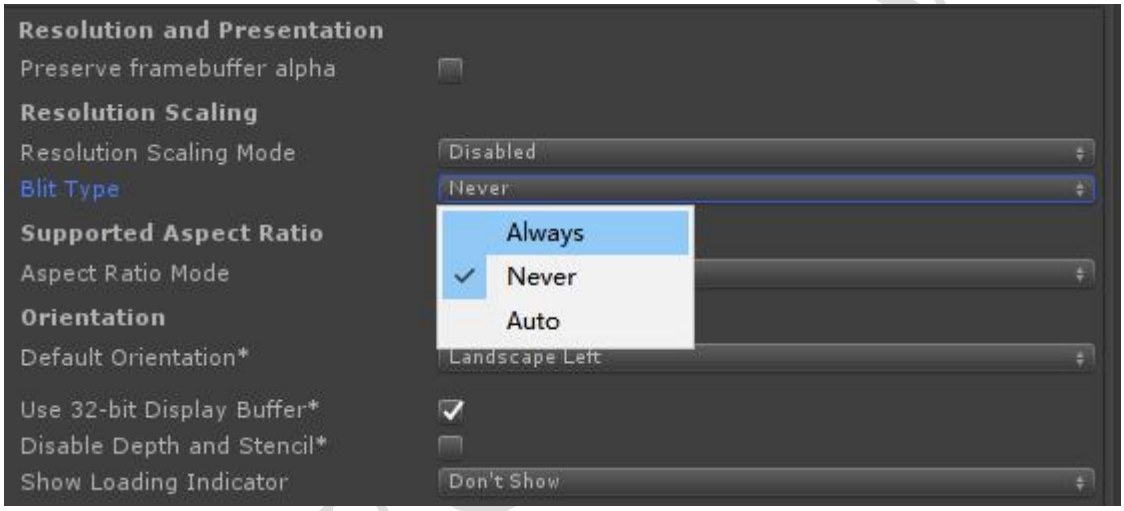

Figure 2.11 Blit Type Sketch map

2.5 Export to equipment operation

1. Connect the VR device to your computer via USB. Then, the battery icon in launcher interface of VR will be displayed as the charging state.

2. Click File->Build & Run, and waiting for the progress run off.

3 API Interface function

The SDK was developed based on GVR SDK v1.40.0. Please check the details of some of the API interface as below. For more details of API interface, please visit (https://developers.google.com/vr/unity/reference/) .

3.1 GvrPointerInputModule

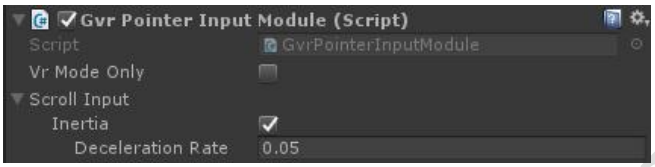

Figure 3.1 GvrPointerInputModule Sketch map

Functions：

GvrPointerInputModule inherits from BaseInputModule，With this script, the UI (UGUI) 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->GoogleVR->Prefabs->UI in turn, and replace the original Event System with the GvrEvent System prefabricated into the scene.

3.2 GvrPointerPhysicsRaycaster

Figure 3.2 GvrPointerPhysicsRaycaster Sketch map

Functions：

GvrPointerPhysicsRaycaster inherits from GvrBasePointerRaycaster， provide a collision detection for GvrPointerInputModule.

Use：

Creat an empty object in the scene. Named it ‘Player’. Drag the original Main Camera under Player. Add GvrPointerPhysicsRaycaster script for Main Camera.

3.3 StereoController

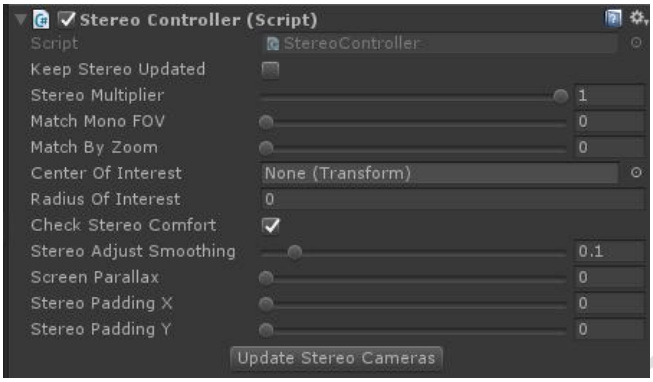

Figure 3.3 StereoController Sketch map

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

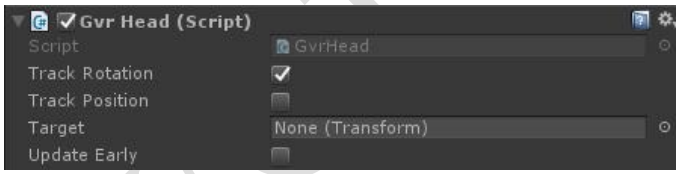

Figure 3.4 GvrHead Sketch map

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

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

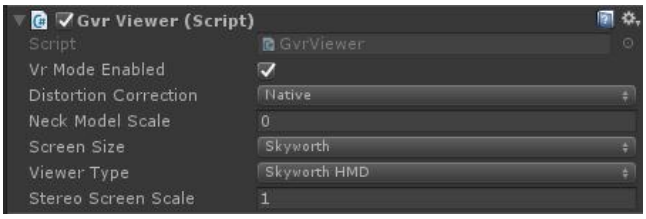

Figure 3.5 GvrViewer Sketch map

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 Introductions for Use With Controllers

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.

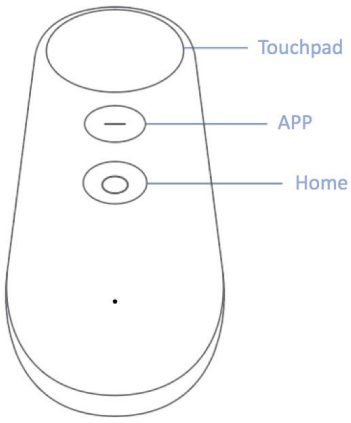

Figure 5.1 3DoF Controller

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.

6 Project optimization

6.1 S801 optimization

6.1.1 Player Settings

Blit Type：setting as ‘Never’

6.1.2 QualitySettings

Anti Aliasing：setting as ‘disable’

6.1.3 Camera

Clean Flags: setting as ‘Solid Color’ or ‘Depth only’，to save unnecessary drawing operations.

6.1.4 Skybox

Do not use skybox or sphere built in unity to achieve 360 panoramic background, because the built-in model and shader of unity are complex. Please build a 3D sphere model and map it to display. Shader can control about 3000 vertices with use of utile / texture.