iHawk P100R Datasheet

Document History

Revision	Modify	Description	Submission Date
V1.0			2024.9.20

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1. Product overview

iHawk P100R is based on 3D structured light and polarized light technology. The product can significantly improve noise and depth loss in some scenes.

iHawk P100R can provide high-precision depth maps, with no computing power requirements. Deep operations are completed within the module, and we provide customers with a self-developed SDK for the entire platform, supporting Android/Windows/Linux and meeting different customer applications.

2. Specification parameters

2.1 physical object

The physical object is shown in the figure below.

Figure 1. physical object

2.2 Parameters

Tablet 1 parameters

Items	Specs
Module	iHawk P100R
baseline	40mm
Size	90*25*25mm
Range	0.3-8.0m
Accuracy	±1mm@60cm
Power Consumption	2.5W，Peak current<2A
Interface	Type-C
Power Supply	USB 5V
wavelength	940nm
Operation temperature	-10°C~60°C
Resolution/Frame	640x400@30fps
FOV	72°(±3°)x 50.5°(±3°)
Format	RGB: MJPEG、Depth: Raw16bit

3. System components

3.1 Component diagram

The product can be shown in the schematic diagram below. It is composed of a metal front shell, a metal rear shell, lenses, screws, and other components; The

transmitting module and receiving module can be seen through the lens; Both the front and rear shells are equipped with positioning holes; The module adopts a Type-C interface from the side.

Figure2. Component diagram

3.2 Transmitting module

The transmitting module generates the structured light and projects it into the measured scene.

Tablet 2. transmitting module specification

Item	specification
Type	VCSEL

Wavelength	940nm
FOV	H83.1° x V56.9°
Power Level	Class 1

3.3 Receiving module

The receiving module is an infrared camera, which works with the transmitting module to capture the speckle light on the object surface.

Tablet 3. receiving module specification

item	specification
resolution/frame	640 x 400@30fps
format	Raw10
Exposure mode	Global Shutter
FOV	H74° x V50.5°
Focusing mode	FF
Image distortion	<1.5%

3.4 Color camera

The color camera can take color images as a supplement to the depth camera.

Tablet 4. Color camera specification

item	specification
resolution/frame	up to 1920x 1080@30fps
format	RAW RGB
Exposure mode	Rolling Shutter
FOV	H88° x V56.8°
Focusing mode	FF
Image distortion	<1%

3.5 Polarizer

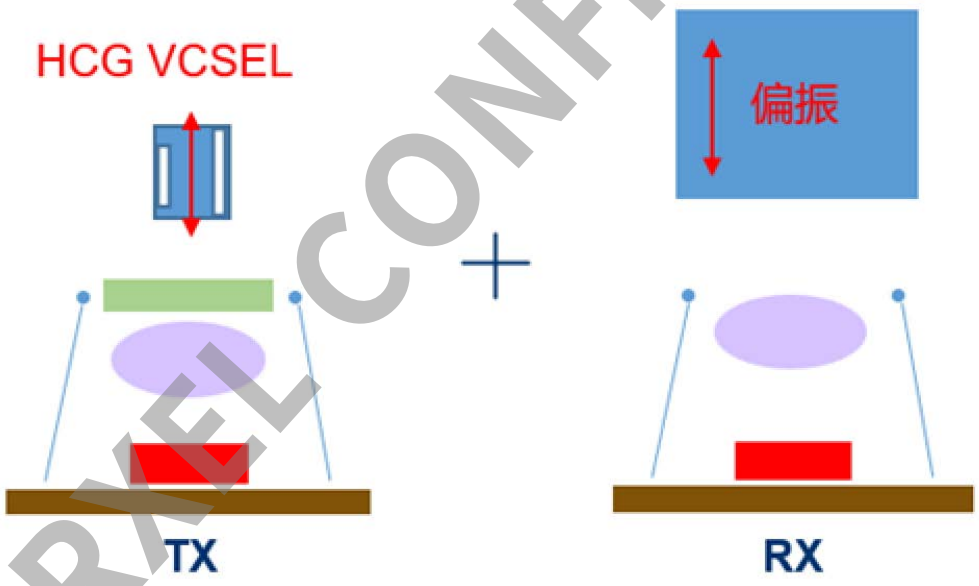


Figure 3 Diagram of system polarization principle

The above figure is a schematic diagram of the polarization direction of iHawk P100R. The TX polarization direction is the same as the direction of the RX front polarizer, which only allows light in that direction to pass through.

Figure 4 polarization direction in physical objects

The polarization direction of polarized light is perpendicular to the horizontal direction of the camera, as shown in the above figure.

3.6 Distance sensor (Optional)

The distance sensor is used to sense whether there are obstacles within 10cm in front of the module. If there are obstacles, turn off the laser emission module to avoid human eyes getting too close to being hurt by the laser.

Tablet 5. distance sensor specification

item	specification
Wavelength	850nm
safe distance	10cm

3.7 Type-C

iHawk P100R interface is standard Type-C.

4. Structure description

4.1 Structural drawings

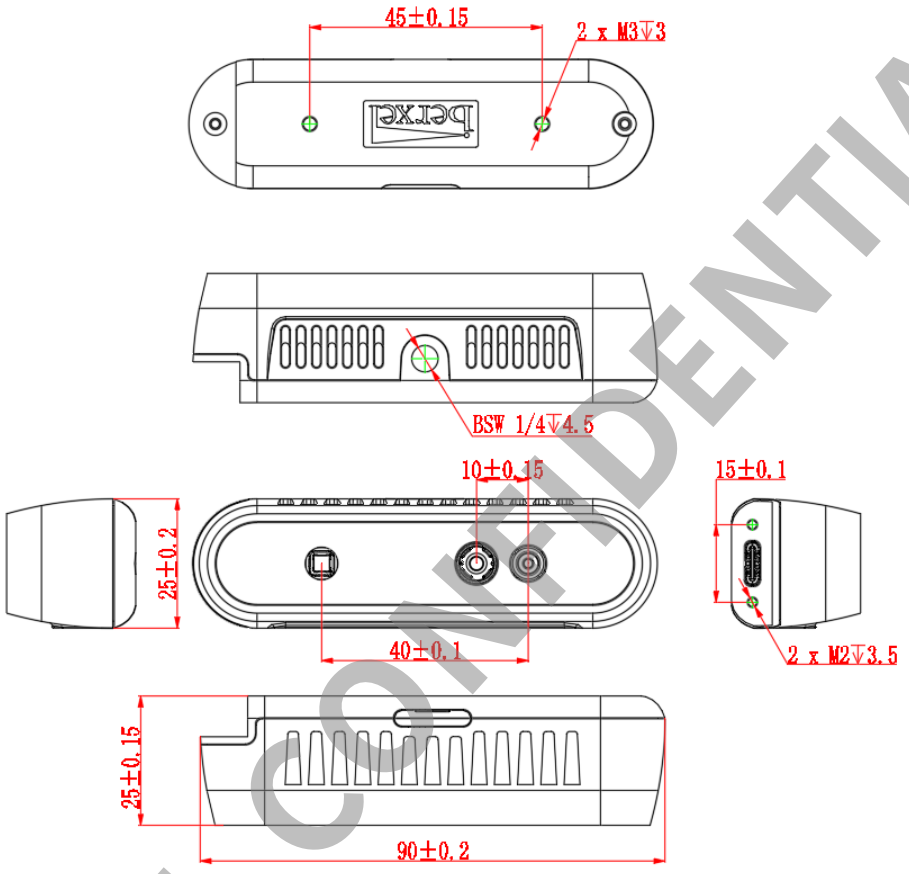


Figure 5. Structural drawings

4.2 Installation recommendations

It is recommended to fix the module with 2 M3 holes not longer than 3mm, as shown in the figure below. If the customer adopts other fixing methods, the module shall be installed in the customer's equipment. Deformation and extrusion of the module are not allowed, so as to avoid extrusion and deformation of the module and affect the product accuracy.

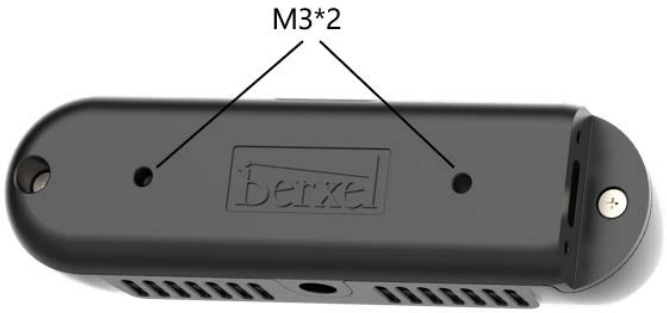


Figure 6. module with strip steel

4.3 Heat dissipation suggestions

iHawk P100R shell can export the internal heat to the shell surface quickly and effectively. The surface of the product shell is a heat dissipation area, and it is prohibited for objects other than heat dissipation materials to adhere or cover it. It is recommended to provide a 1cm heat dissipation space around it, which is more conducive to convective heat transfer.

5. Electrical characteristics

5.1 Power supply and consumption

iHawk P100R is powered by Type-C. The peak current of the system at the working time of the transmitting module is high. The Type-C interface with power supply capacity up to 2A must be used for power supply. If it is lower than this standard, the depth map may not be started.

Tablet 6. Power specifications

Average power consumption	2.5W
average current	500mA
peak current	2A
working voltage	5V

5.2 Reliability standard

iHawk P100R reliability standards are shown in the table below. Please refer to the production and use process.

Table 7. Reliability standards

Operation environment	-10~60℃
Storage environment	-20~70℃
ESD	CD+/-4KV；AD+/-8KV
RE	GB 17799
Mainboard and Casing	Non-conductive

6. Software description

Provide SDK related to Android, windows and Linux platforms.

Please contact relevant sales personnel to obtain the latest SDK.

Table 8 SDK parameters

SDK	Provide general SDK development packages, including basic APIs, sample programs, help documents, and tool software
	Support cross platform development. Windows (win7 and above), Android (Android 5.1 and above), Linux (Ubuntu 14 and above)

7. Appendix:

7.1 Rapid assessment

7.1.1 Connection

Connect the device to the USB port of the computer (it is recommended to insert the USB port directly connected to the motherboard, that is, the USB behind the chassis), open the standby manager and wait for about 5s. The information in the red box in the figure below indicates that the device connection is successful.

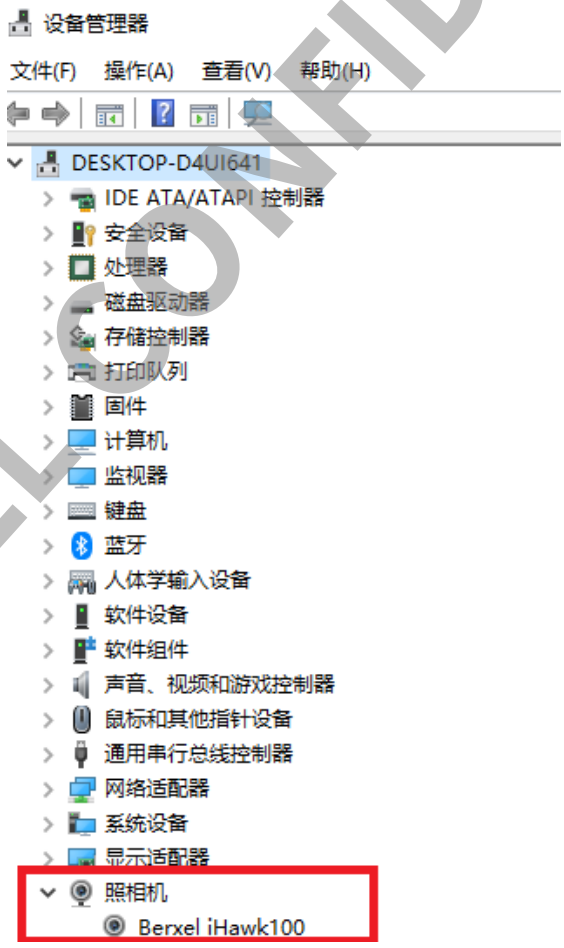


Figure 7．iHawk P100R Connection succeed

7.1.2 Open Berxel Tools

After installing the program, double-click berxeltools.exe on the desktop and check the corresponding option to open the corresponding function, as shown in the opening three picture effect of the operation below:

Figure 8．iHawk P100R two pictures effect in tool program

7.1.3 Open Sample

A variety of example demonstration programs are provided under the "C: \program files (x86) \ berxel \ berxelsdk \ samples \ bin" file. For example, doubleclick hawkmixcolordepth.exe to open the three figures. The corresponding effects are shown in the following figure:

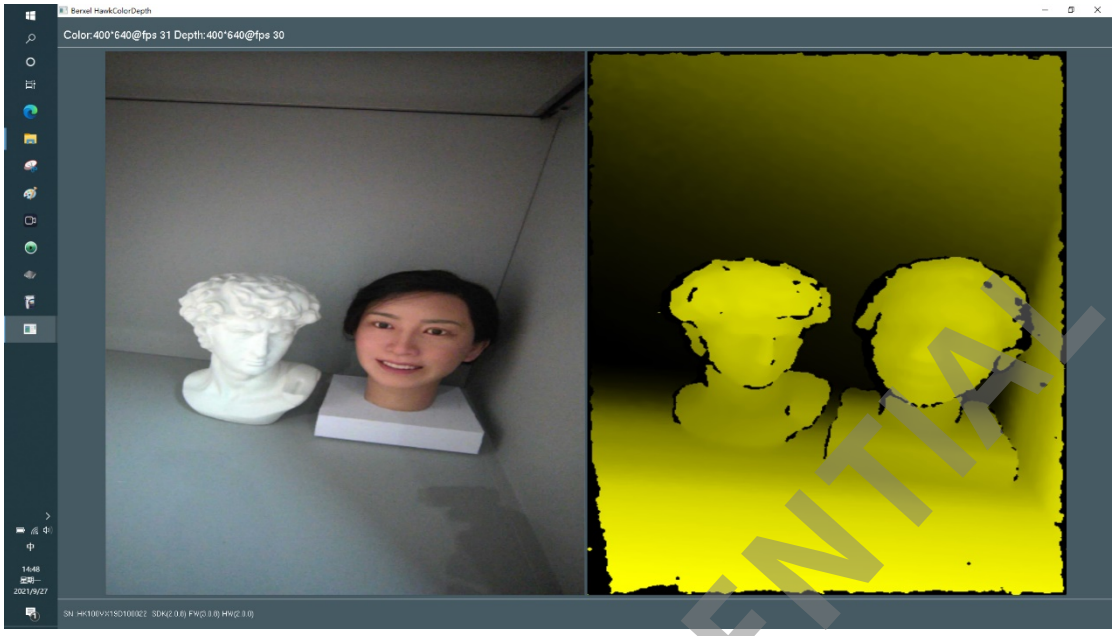


Figure 9．iHawk P100R two pictures effect in sample program

7.2 Packing list

1、iHawk P100R module；

2、Type-C cable.

7.3 Application of polarized

Scenarios for optimizing polarizers:

1. Remove speckled noise caused by mirror materials and improve signal-to-noise ratio;

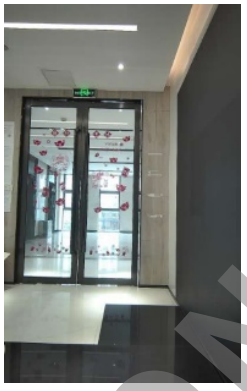
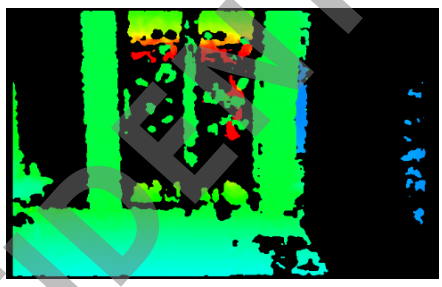
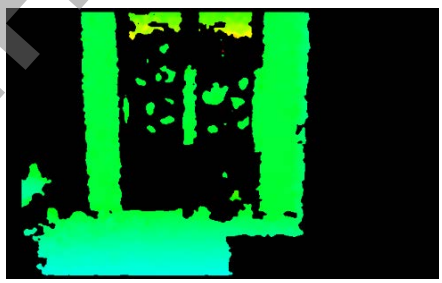
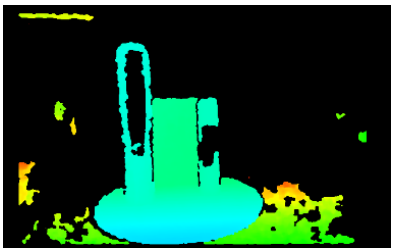
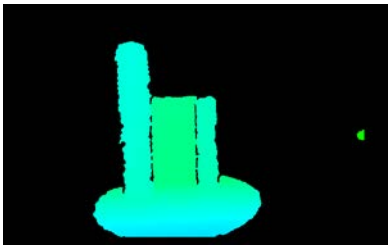
2. Reduce the interference of glare;

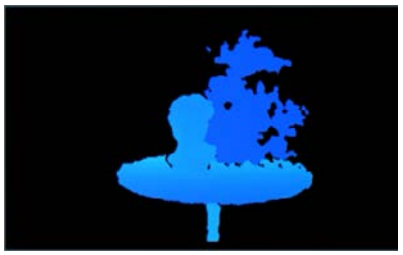
3. See through the glass.

The experimental results can be referred to the images in the table below. The color images in each column of the experimental image column are the color

images of the experimental scene, the normal non polarized depth map is in the upper right corner, and the depth map with polarization effect is in the lower right corner. It can be compared that polarization improves the depth map effect in these scenes.

Tablet 9

scenes	pics
Remove speckled noise caused by mirror materials	  
Reduce glare interference	  

See through glass	  

7.4 Precautions for use

1. Prohibited power supply with overvoltage exceeding 6V;

2. When using or testing the camera, do not work in situations such as flipping tables or objects to prevent damage to components caused by overheating of the laser;

3. During the operation of a 3D camera, it is important to avoid direct eye contact with the lens at close range;

4. Do not disassemble 3D cameras.

7.5 Usage suggestions

1. When using a 3D camera, the lens protective film needs to be removed;

2. When installing and using 3D cameras, they should be kept as far away from heat sources as possible (especially the lens position);

3. Appropriate protective conditions should be added in scenarios where 3D

cameras are subjected to external shocks or strong high-frequency vibrations;

4. When using 3D cameras in harsh environments such as excessive humidity or strong sand and dust, appropriate protective conditions should be added;

5. Avoid sharp objects scratching the surface of the lens;

6. Avoid any assembly methods that cause significant deformation of the 3D camera;

7. Avoid frequent use of alcohol (organic solvents) to wipe the surface of the lens, as there is a risk of coating damage.