Gemini 210 Series

Datasheet

Version 1.2

Revision History

Version	Date	Revision Record
V1.0	2024.04	Compile the first edition
V1.1	2024.05	Revise some contents.
V1.2	2024.11	Add the description of multi-camera synchronization function.

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Glossary

Terms	Descriptions
ASIC	Application-specific Integrated Circuit
Baseline	The distance between the optical centers of the two cameras used for depth calculation
D2C	Depth to Color maps each pixel on a depth map to the corresponding color image according to the intrinsic and extrinsic parameters of the depth camera and color camera
Depth	Depth video streams are similar to color video streams except each pixel has a value representing the distance away from the sensor instead of color information
Depth Camera	Includes depth imaging module and external interface, of which the former is generally composed of an infrared projector, infrared camera, and depth computing processor
FOV	Field of View describes the angular extent of a given scene that is captured by a camera, which can be measured in the horizontal, vertical, and diagonal
I2C	Refers to a simple bi-directional two-wire synchronous serial bus developed by Philips
IMU	Inertial measurement unit.
IR	Light in the infrared spectrum, which ranges from 700 nm and above
IR Camera	A camera capable of seeing light in the IR spectrum
ISP	Image signal processor, which is used for image post-processing
LDM	Laser Diode Module
MIPI	Mobile Industry Processor Interface (MIPI) Alliance. MIPI is an open standard and specification formulated by the MIPI Alliance for mobile application processors
Point Cloud	A discrete set of data points in space
RGBM/RGB Module	Color Camera
ROI	Region of Interest(ROI) in image processing refers to a specific area selected from the entire image
UVC	USB Video Class (UVC) is a protocol standard defined for USB video capture devices and has become one of the USB.org standards
VCSEL	Vertical-Cavity Surface-Emitting Laser (VCSEL) is a type of semiconductor laser where the laser light is emitted perpendicular to the surface of the device
TBD	To Be Determined. Information will be provided in a later revision.

1.Product Brief

Gemini 215 and Gemini 210 are new additions to Orbbec's stereo vision Gemini series, they are specifically designed for high-precision close-range detailed 3D scanning applications such as body part and object scanning.

Powered by Orbbec's custom ASIC MX6600 and a high-performance optical system, Gemini 215 and Gemini 210 excel in close-range indoor scanining, delivering accurate and real-time depth images with fine details.

Supported by the open-source Orbbec SDK, it is easy to develop on platforms such as Windows, Ubuntu, enabling fast, flexible and scalable project implementation.

These two cameras adopt the same optical system and hardware interface. The difference is that the Gemini 215 product comes with a housing, while the Gemini 210 doesn't have one, which leads to differences in their fixing methods.

- Active stereo, reliable indoor scanning even in textureless scenes
- On-chip depth and RGB processing
- Excellent depth accuracy < 0.5mm at 300mm
- Short-range depth 15cm - 70cm
- Real-time depth processing up to 30fps
- Minimum Point Distance/Resolution 0.16mm
- Multi-device sync support for broader field of view

2.Product Specifications

Parameter	Gemini 215	Gemini 210
Use Environment	Indoor	
Technology	Stereo Vision	
Baseline	75mm	
LDM Wavelength	850nm	
Working Range[1]	0.15m - 0.7m	
Ideal Range	0.25m-0.5 m	
Spatial Precision[2]	< 0.5mm（1280 X 800 @ 0.3m） < 1.5mm（1280 X 800 @ 0.6m）	
Depth Resolution @ Frame Rate	Up to 1280 x 800 @ 30fps	
Depth FOV	H60.7°x V43.6° @ 0.7m	
Sensor Type	IR: Global Shutter Color: Rolling Shutter	
RGB Resolution @ Frame Rate	Up to 1920 x 1080 @ 30fps	
RGB Module FOV	H74.7° x V46.2	
3D Resolution	0.16mm (Minimum Point Distance/Resolution)	

IMU	6 DoF; three-axis linear acceleration, and three-axis angular acceleration	
Depth Processing	In-camera processing using Orbbec MX6600 ASIC	
Data Connection	USB 3.0 & USB 2.0 Type-C for data and power	
ESD	Contact discharge: ±4KV, Air discharge : ±8KV Class A	
Power Consumption	Average < 2.5W (Peak <7W)	
Operating Environment	0℃ - 40℃	
Storage Environment	Short Term: -20℃ - 60℃	
Protection	NA	
Supported Functions	Hardware Spatial Alignment of Depth to Color (D2C) Hardware Timestamps Multi-camera Sync UVC Camera	
Dimensions	120mm x 30mm x 26 mm	116.6mm x 24.6mm x 22.6mm
Weight	105g	63g
Installation	Bottom: 1x 1/4-20 UNC, Max Torque: 4.0 N.m Back: 2x M3,Max Torque: 0.4 N.m	Provide camera integration support
Lifespan[3]	3 Years:Default Operating Mode & Operating Environment	

Note:

[1] When the reflectivity of the measured object is greater than 80%, depth data can be provided for a maximum distance of 0.7m. However, the actual precision varies with the distance and the measured object.

[2] The test object is a plane with a reflectivity greater than 80%. The reference range is the depth map area of 81% FOV (81% FOV refers to the remaining central 81% area after cropping 5% from each of the top, bottom, left, and right of the depth map). Calculate the root mean square of the distance sequence from all valid points within the calculation area to the best-fitting point of the fitted plane.

[3] The working mode is the typical mode, and under the working environment of 0 - 40 °C, it can work continuously for 8 hours a day.

3.Product Information

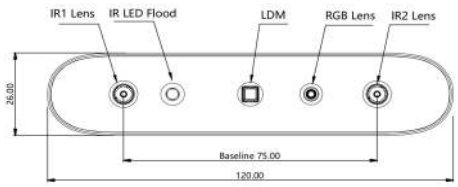
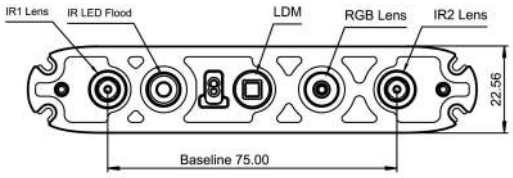
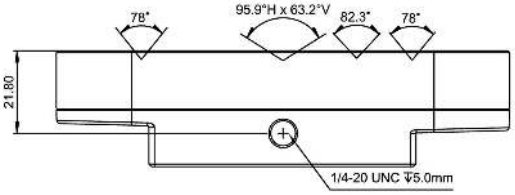
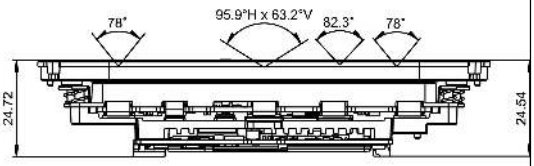
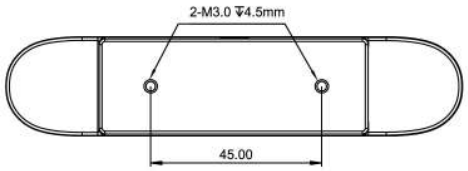
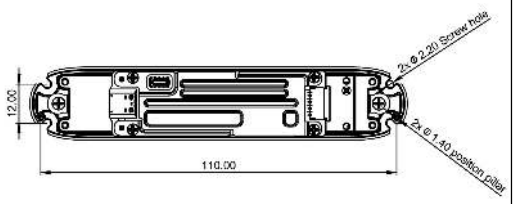
3.1 Product Pictures

Table 3-1-1 Product pictures for Gemini 215 & Gemini 210

Name	Gemini 215	Gemini 210
Front View		
Rear View		

3.2 Product Drawings

Table 3-2-1 Product drawings for Gemini 215 & Gemini 210

	Gemini 210	Gemini 215
Front View		
Bottom View		
Rear View		

3.3 Product Interfaces

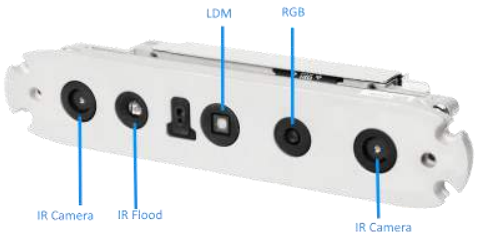
Table 3-3-1 Product interfaces for Gemini 215 & Gemini 210

Gemini 215	Gemini 210
	

3.4 Product Components

3.4.1 Overview of Product Components for Gemini 215/Gemini 210

Table 3-4-1 Overview of product components for Gemini 215/210

Gemini 215	Gemini 210
	

3.4.2 Laser Diode Module

The laser module (LDM), also known as the laser emitting module, consists of a vertical-cavity surface-emitting laser array and a light spot diffuser. It projects a static infrared pattern onto the scene to enhance the texture of low-texture scenes

and improves the ability of the 3D camera system to detect depth information. Under normal circumstances, the Gemini 215/210 laser module comply with Class 1 laser safety.

Table 3-4-2 LDM parameters

Parameters	Gemini 215 / Gemini 210
Type	Infrared
Illumination Component	Vertical Cavity Surface Emitting Laser (VCSEL) + Optical Devices
Laser Controller	Pulse
Laser Wavelength	850nm
Horizontal FOV	95.8°
Vertical FOV	63.9°
FOV Tolerance	±3.0°

3.4.3 Infrared Module

Table 3-4-3 Infrared module parameters

Parameters	Gemini 215 / Gemini 210
Effective Pixels	1280 x 800
Aspect Ratio	16:10
Focusing Mode	Fixed Focus
Shutter Type	Global Shutter
Signal Interface	MIPI

Horizontal FOV	60.7°
Vertical FOV	43.6°
Diagonal FOV	70.7°
FOV Tolerance	±3.0°

3.4.4 RGB Module

Table 3-4-4 RGB module parameters

Parameters	Gemini 215/Gemini 210
Effective Pixels	1920 x 1080
Aspect Ratio	16:9
Data Format	MJPEG&YUYV
Focusing Mode	Fixed Focus
Shutter Type	Rolling Shutter
Signal Interface	MIPI
Horizontal FOV	74°
Vertical FOV	46°
Diagonal FOV	82.3°
FOV Tolerance	±3.0°

3.4.5 IMU

Table 3-4-5 Gemini 210 series IMU Specification

	Parameters		Gemini 215/Gemini 210
IMU	Timestamp		The IR, depth and RGB data all use the same time reference value and clock frequency to achieve timestamp synchronization (in microseconds)
	Orientation of the X/Y/Z axis		The X-axis is consistent with the depth and points to the right side of the camera. The Y-axis is consistent with the depth and points to the bottom of the camera. The Z-axis is consistent with the depth and points to the front of the camera.
	Gyroscope	format	3 x 16-bit
		range	±17.45rad/s(1000dps)
		output frequency (Hz)	100/200/500/1000
	Accelerometer	format	3 x 16-bit
		range	±39.2m/s²(4g)
		output frequency (Hz)	100/200/500/1000
	Temperature	format	1 x 16-bit
		range	-40 ~ 85℃
		output frequency （Hz）	Follow the frequency of the gyroscope and accelerometer.

4.Functional Specifications

4.1 Vendor Identifier (VID) and Product Identifier (PID)

Table 4-1-1 VID & PID

Name	Gemini 215	Gemini 210
Model	G20000-150	G25000-150
PID	0x0808	0x0809
VID	0x2BC5	

4.2 Platform and System Requirements

This product connects to the host computer using USB, which is compatible with various platforms and system requirements.

Table 4-2-1 Gemini 210 series Recommended Platforms and Systems

Chip	x86/x64		ARM	
OS	Windows 10/11	Ubuntu 20.04/22.04	Android OS 10 and above	Ubuntu 18.04/20.04
USB	USB 3.0	USB 3.0	USB 3.0	USB 3.0
CPU	Quad-core, 2.9GHz	Quad-core, 2.9GHz	Quad-core Cortex-A73, dual-core Cortex-A53	Quad-core A57
Reference	Intel i3 10100 / Intel i5 8400	Intel i3 10100 / Intel i5 8400	Qualcomm Snapdragon RB5	NVIDIA Jetson Orin Nano / Raspberry Pi 5
RAM	8GB RAM and above	4GB RAM and above	4GB RAM and above	4GB RAM and above
Status	Done	Done	In progress[1]	Done

Note:

[1] The adaptation of the open-source Orbbec SDK is currently underway and it will be released in February 2025.

4.3 Gemini 215/Gemini 210 FOV

4.3.1 Definition of Depth Field of View

The image below shows the depth camera field-of-view, or the angles that the sensors "see". We use the IR cameras for illustration.

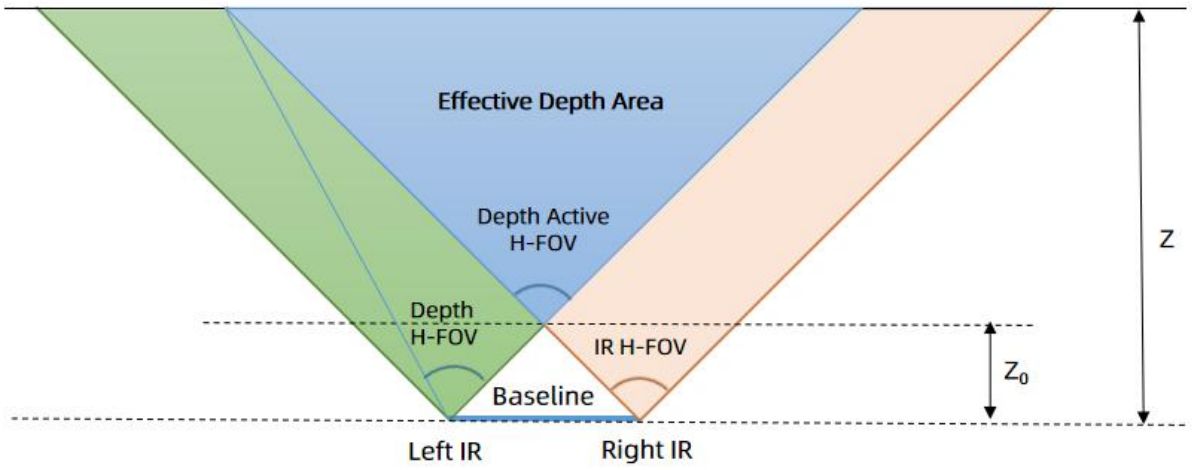


Figure 4-3-1 Depth Field of View to Depth Map illustration

Depth Field of View (Depth FOV) at any depth (Z) can be calculated using the following equation:

Table 4-5-1 Depth FOV calculation formulas

calculation formulas	Definitions
$\text{Depth H} - \text{FOV} = \arctan\left(\frac{cx}{fx} - \frac{B}{Z}\right) + \arctan\frac{width - 1 - cx}{fx}$	1. cx = X-direction image coordinates of the principle point of the depth image 2. fx= Depth camera focal length 3. cy= Y-direction image coordinates of the principle point of the depth image 4. fy=Depth camera focal length 5. width= Depth image width 6. Height=Depth image height 7. Depth active H-FOV =Left IR H-FOV
$\text{Depth Active H} - \text{FoV} = \arctan\frac{cx}{fx} + \arctan\frac{width - 1 - cx}{fx}$	
$Z_0 = \frac{\text{B}}{2*\tan(\frac{\text{Depth Active H} - \text{FOV}}{2})}$	
$\text{Depth V - FOV} = \arctan\left(\frac{cy}{fy}\right) + \arctan\frac{height\text{-}1\text{-}cy}{fy}$	

Note:

1. *cx, fx*, and width parameters are obtained through the SDK Depth Intrinsic for the relevant camera parameters, and each depth camera parameters are not the same.

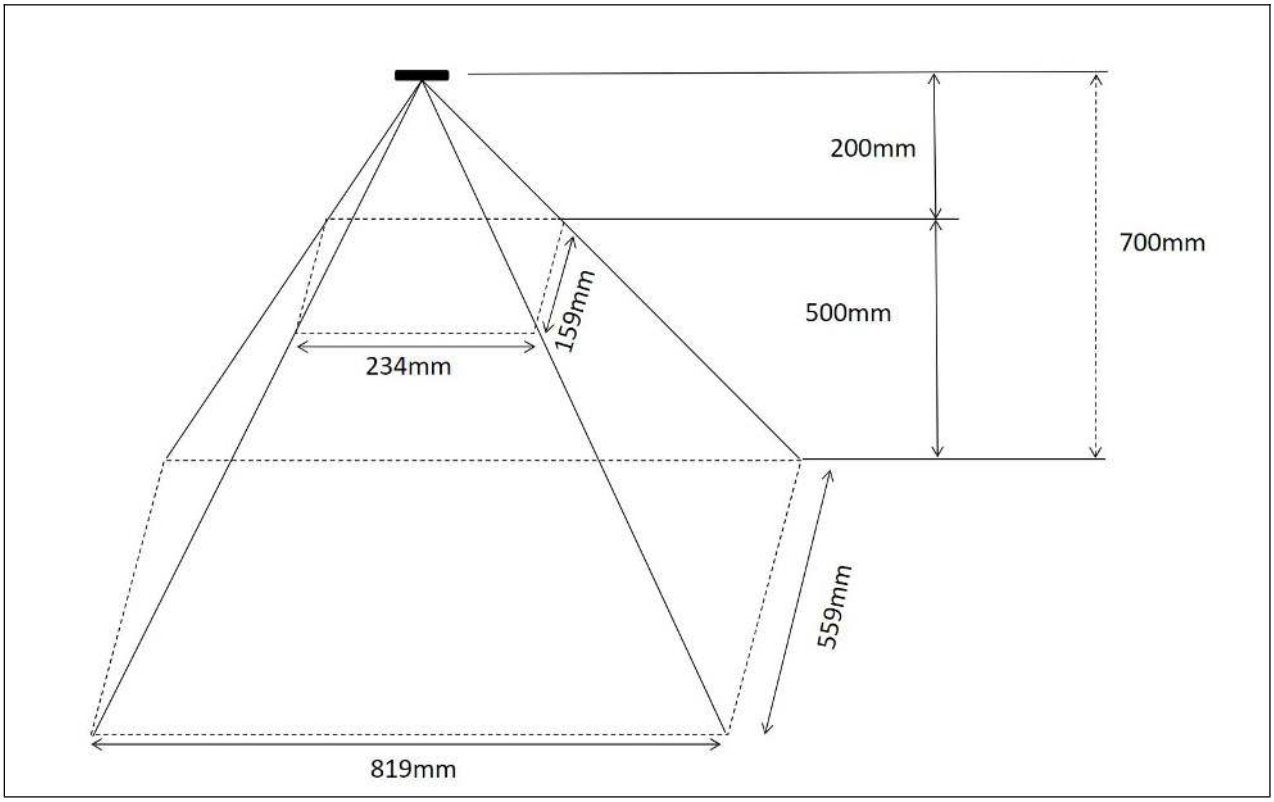
2. At different depth values, the depth FOV is different. The farther the depth, the greater the depth FOV.

4.3.2 Depth field of view

The table below presents the reference values of the depth field of view angle (FOV) for Gemini 215 / Gemini 210, including the horizontal FOV, vertical FOV, diagonal FOV and the tolerance range.

Table 4-3-1 Gemini 215 /Gemini 210 FOV

	Value
Gemini 215 /Gemini 210 Depth FOV@700mm	**Horizontal** FOV 60.7°
	Vertical FOV 43.6°
	Diagonal FOV 70.7°
	FOV Tolerance ±3.0°



Schematic Diagram of the FOV of Gemini 215/Gemini 210

4.4 Depth Data Acquisition and Output Functions

Gemini 215 / Gemini 210 can provide depth data acquisition and output. The depth data is generated by active stereo technology, and it can respectively acquire and output the depth data of objects within the range of 0.2m - 0.7m. The output format of the depth map is Y14/RLE.

4.5 Functions of Color Data Acquisition and Output (UVC)

Gemini 215 / Gemini 210 can collect and output depth data, and at the same time, they can also collect color image data. The color camera supports collecting and outputting color image data of objects within the range of 0 to infinity. The output format of color images is MJPEG and YUYV.

4.6 Format of Depth and Color Data Streams

Gemini 215 / Gemini 210 provide high-quality, multi-resolution depth image data, and also offer high-definition color image data. The Y14/RLE format of the depth image data is the output format of the camera, while the output format of the SDK is Y16. The format of the color image data output by the camera is MJPEG/YUYV, and the SDK supports outputting in the formats of MJPEG/YUYV/RGB888.

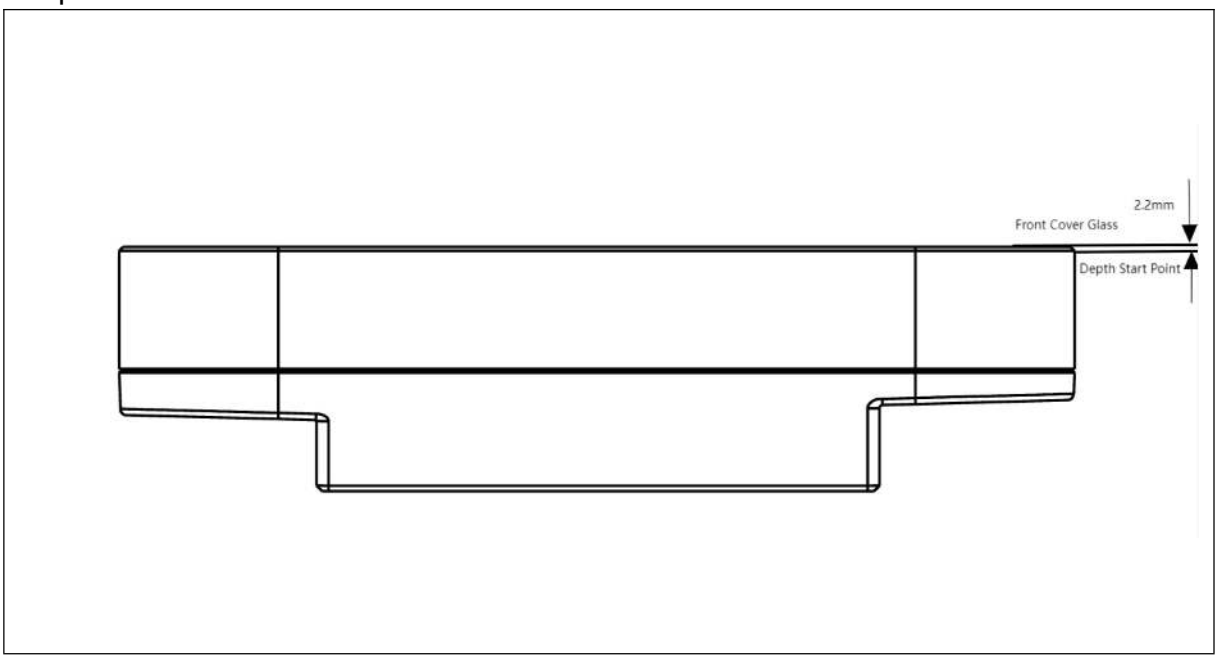
Table 4-6-1 Gemini 215/Gemini 210 Image Format

Data Format	Resolution	Frame Rate	Notes
Y14	1280 x 800	5, 10, 15, 20, 30	Depth Image
	640 x 400	5, 10, 15, 20, 30	
RLE	1280 x 800	5, 10, 15, 20, 30	
	640 x 400	5, 10, 15, 20, 30	
Y8	1280 x 800	5, 10, 15, 20, 30	Infrared Image
	640 x 400	5, 10, 15, 20, 30	
MJPEG	1280 x 800	5, 10, 15, 20, 30	
	640 x 400	5, 10, 15, 20, 30	
YUYV	1920 x 1080	5, 10, 15, 20, 30	Color Image
	1280 x 720	5, 10, 15, 20, 30	

	640 x 360	5, 10, 15, 20, 30	
MJPEG	1920 x 1080	5, 10, 15, 20, 30	
	1280 x 720	5, 10, 15, 20, 30	
	640 x 360	5, 10, 15, 20, 30	

4.7 Reference for the Starting Point of Depth of Gemini 215

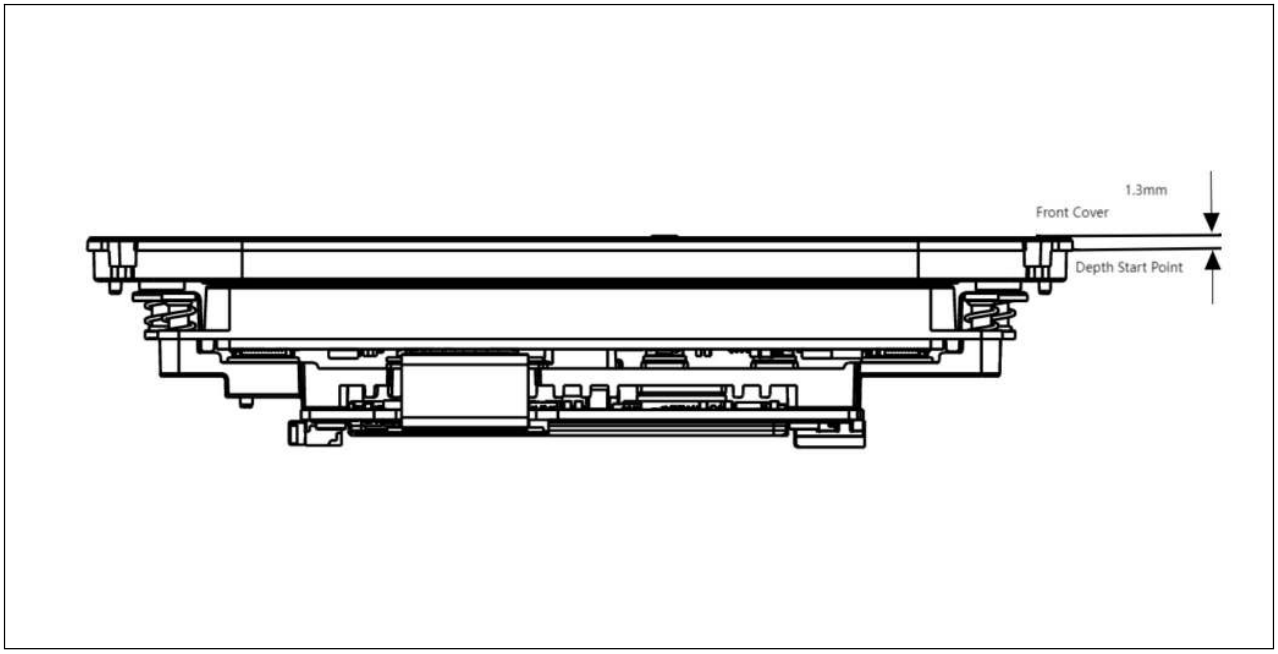
The depth starting point or ground zero reference can be described as the starting point or plane where the depth equals 0. For Gemini 215, the distance from the depth zero point to the front surface of the module is 2.2 mm.



Schematic diagram of the depth starting point of Gemini 215

4.8 Reference for the Starting Point of Depth of Gemini 210

The depth starting point or ground zero reference can be described as the starting point or plane where the depth equals 0. For Gemini 210, the distance from the depth zero point to the front surface of the module is 1.3 mm.



Schematic diagram of the depth starting point of Gemini 210

4.9 Depth-to-Color (D2C) Alignment

Gemini 215 / Gemini 210 can support the aligned and synchronous output of D2C (Depth To Color) depth and color images. D2C (Depth To Color) refers to mapping each pixel point on the depth map to the corresponding position on the color map according to the internal and external parameters of the depth camera and the color camera, so as to obtain the RGBD map.

The maximum resolution supported for depth image alignment is 1280×800@30fps, and the maximum resolution supported for color image alignment can reach 1920 x 1080@30fps.

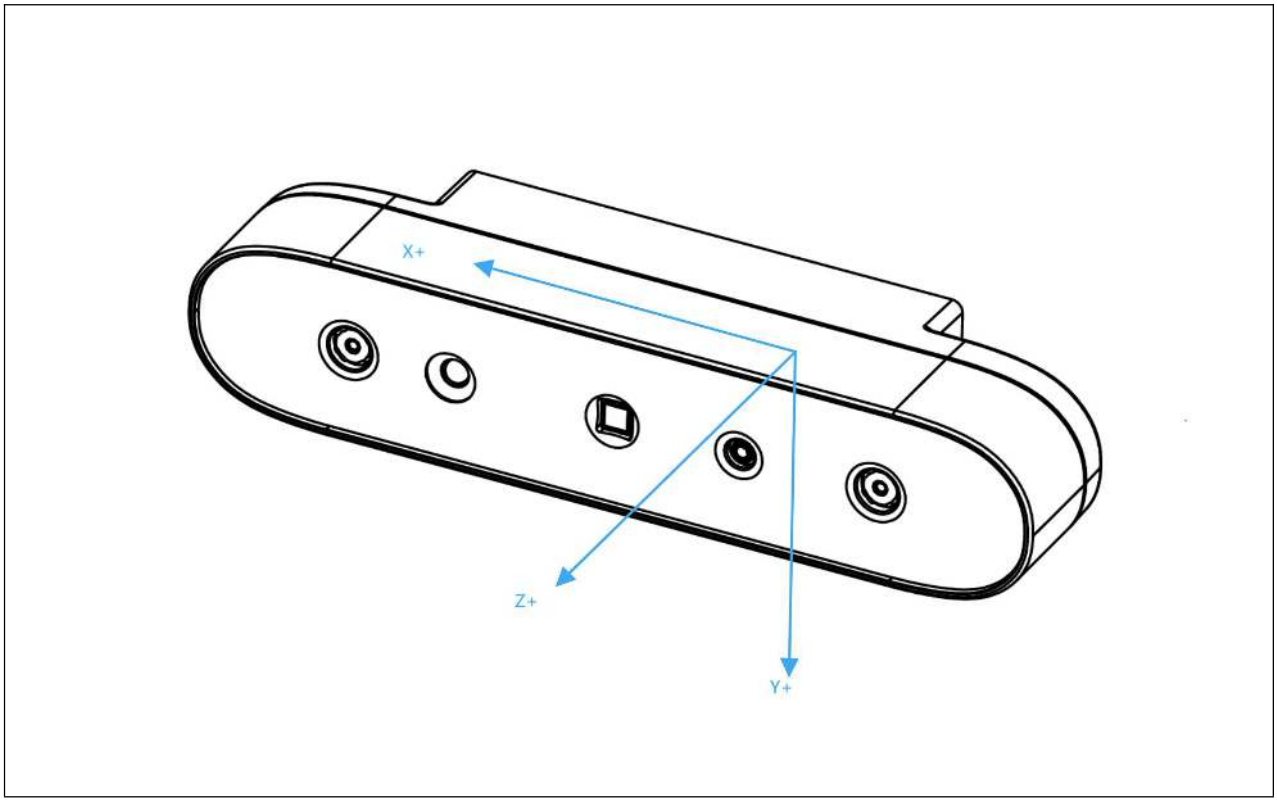
Depth Before D2C	Color Image	Depth After D2C
1280 x 800@5/10/15/20/30fps	1920 x 1080@5/10/15/20/30fps	1920 x 1080@5/10/15/20/30fps
1280 x 800@5/10/15/20/30fps	1280 x 720@5/10/15/20/30fps	1280 x 720@5/10/15/20/30fps
640 x 400@5/10/15/20/30fps	1920 x 1080@5/10/15/20/30fps	1920 x 1080@5/10/15/20/30fps
640 x 400@5/10/15/20/30fps	1280 x 720@5/10/15/20/30fps	1280 x 720@5/10/15/20/30fps
640 x 400@5/10/15/20/30fps	640 x 360@5/10/15/20/30fps	640 x 360@5/10/15/20/30fps

Table 4-9-1 Alignment of the depth-color maps of Gemini 215/Gemini 210 for D2C

4.10 IMU Specifications

4.10.1 IMU Coordinate System

The origin of the IMU coordinate system of Gemini 215 / Gemini 210 is consistent with the position of the center point of the physical sensor. The direction of the coordinate axis is consistent with the depth direction.



Schematic Diagram of the IMU Coordinate System of Gemini 215 / Gemini 210

4.11 Multi-camera Data Synchronization Function

4.11.1 Multi-Camera Synchronization

For a multi-camera use case, one camera can be initialized as primary, and the rest configured as secondary. Alternatively, an external signal generator can also be used as the primary trigger with all cameras set to secondary mode. When applying an external sync pulse, the HW SYNC input requires a 100-microsecond positive pulse at the nominal camera frame rate, e.g. 33.33ms for a 30Hz frame rate. Inputs are high impedance, 1.8V CMOS voltage levels. However, it is important to make sure to use a high-resolution signal generator. The frequency of the signal generator needs to exactly match the sensor frame rate. For example, if the sensor is set up as 30FPS, the real frame rate may be 30.015FPS. You may need to use an oscilloscope to measure the real frame rate and configure the signal generator to the same frequency. For this reason, it may be better to just use one additional camera as the primary sync signal generator.

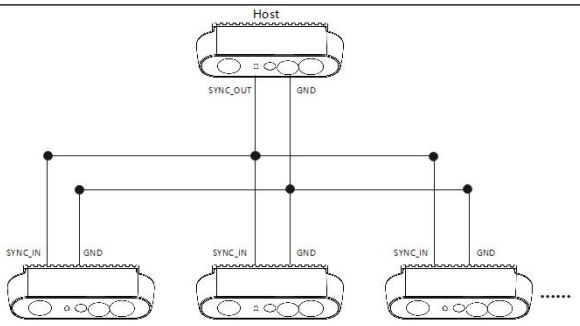
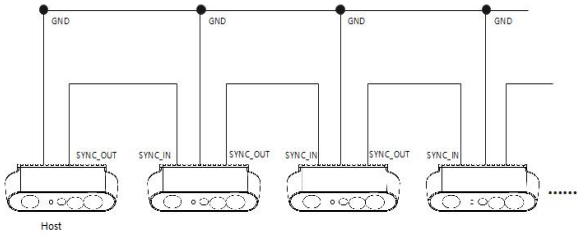
Advantages of multi-camera setup：

- Increase camera coverage in a given space and fill in the occlusions where a single camera may have blind spots
- Capture multiple images of the same scene and scan objects from different angles
- Increase the effective frame rate to greater than 30 FPS

Using an 8-pin connector and matching cable, a multi-camera and multi-sensor network can be designed. (Please follow the instructions in the SDK).

Multi-camera frame synchronization in two topologies is supported, including depth image synchronization and RGB image synchronization (time difference ≤ 5ms, when auto exposure off), using the multi-camera synchronization function.

Table 4-11-1 Topologies schematic diagram

Star Topology	Daisy-chain Topology
	

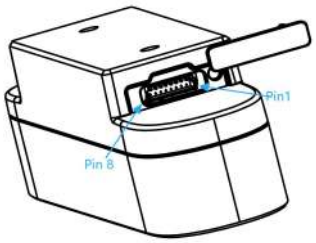
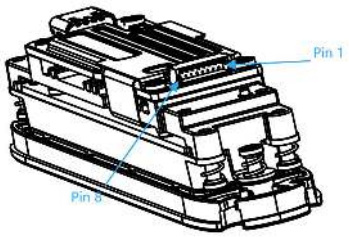
4.11.2 Description of multi-machine synchronization interface

Table 4-11-2 Synchronization Interfaces of Gemini 210 Series

Pin	Definitions	Description
Pin_1	VCC	The default electrical level setting is 1.8V; when 3.3V or 5V drive voltage is provided on the VCC interface, the I/O level setting can be adjusted to 3.3V or 5V as required.
Pin_2	GPIO_OUT	Synchronization drive signal: Active high. The high-level interval coincides with the IR exposure time. Typical application is to drive external fill light.
Pin_3	VSYNC_OUT	Synchronous trigger signal: Active high. The high level provides the triggering signal for the secondary devices.
Pin_4	TIMER_SYNC_OUT	Pulse signal source, reset hardware timestamp of secondary devices.
Pin_5	RESET_IN	Hardware reset signal: Triggers the camera to power down and automatically power up and reset. Detect the input signal: 20 Hz / 50% duty cycle / more than 5 consecutive cycles, that is, judged as normal input signal, other signals filtered out; allowed fluctuations for frequency ± 1 Hz, duty cycle ± 2%.
Pin_6	VSYNC_IN	Synchronous trigger signal: Active high, used for the

		triggering/sync signal from primary device, with a duration of 1 ms.
Pin_7	TIMER_SYNC_IN	Hardware timestamp reset signal input, hardware timestamp clearing.
Pin_8	GND	Ground

Table4-11-3 Gemini 210 series Multi-camera Synchronization Pin Placement

Gemini 215	Gemini 210
	

5.Performance

5.1 Electrical Performance

5.1.1 Power Supply

Gemini 215 / Gemini 210 use the standard Type C USB 5V direct current for power supply.

5.1.2 Power Consumption

Table 5-1-1 Power Consumption Mode Configuration for Typical Scenarios of Gemini 215 / Gemini 210

Operating Modes	Power Consumption Mode Configuration									
	Depth Parameter Configuration / Simultaneously opening IR images with the same resolution							RGB Parameter Configuration		
	Resolution @ Frame Rate	Image Format	Hardware D2C Status	AE Status	Exposure (in microseconds)	Gain	Laser Energy Level	Resolution @ Frame Rate	Image Format	AE Status
Close_Up Precision Mode	1280x800@30fps	RLE	on	off	5000	1000	5	1920x1080 @30fps	MJPEG	on
Extended Distance Mode	1280x800@30fps	RLE	on	off	5000	1000	5	1920x1080 @30fps	MJPEG	on
Notes	1.In order to test the maximum power consumption of RGB, it is necessary to maintain a low-light environment so that the exposure time of RGB can be extended. 2.The parameter configuration of the IMU sets the Output Data Register (ODR) to 1000 Hz.									

Table5-1-2 Reference for Typical Average Power Consumption and Peak Power Consumption of Gemini 215 / Gemini 210

Scenario	Test State	Peak Current (mA)	Average Current (mA)	Average Voltage (V)	Peak Power (mW)	Average Power (mW)
Power Consumption	Close_Up Precision Mode	1226	467	5	6085	2313
	Extended Distance Mode	/	/	/	/	/
Power-on	Instantaneous current at power-on	7720	/	5.0	/	/
Standby State	Power on and boot up to enter the standby state	82	63	5.01	419	324
	Standby state (turn on the IR stream and then turn it off).	104	84	5.01	532	429

Notes:

Under different corresponding scenarios, the power consumption of the whole device may increase as the overall load of the device increases and decrease as the load decreases.

The table corresponds to the power consumption performance of the Gemini 215/Gemini 210 products in typical scenarios.

5.1.3 ESD Performance

Table 5-1-3 Gemini 215/Gemini210 ESD Performance

Conditions	Powered-On	Powered-Off	Certification Standards
Contact Discharge	±4KV Class A	±4KV Class A	EN 61000-6-2 EN 61000-6-4
Air Discharge	±8KV Class A	±8KV Class A	

6. Firmware

Gemini 215 / Gemini 210 products support camera firmware updates.

6.1 Gemini 215 /Gemini 210 Camera Firmware Upgrade

1.Firmware upgrades do not require entering a specific mode.

2.When upgrading the firmware, please make sure that all data streams have been closed.

3.The Android or Ubuntu upgrade tools currently do not check the firmware version of the current device. It is possible to upgrade or downgrade the version. Please confirm whether an "upgrade" is needed.

6.2 Camera Firmware Update Restrictions

After the camera firmware is successfully upgraded, it is necessary to power off the entire Gemini 215 / Gemini 210 device. After powering it on again, the new camera firmware version will take effect.

7.Orbbec SDK

7.1 Description of Orbbec SDK

Orbbec SDK is a cross-platform (Windows, Android, Linux) software development kit for Orbbec's structured light, binocular, iToF and other 3D cameras. It provides device parameter configuration, data stream reading and stream processing. The functions provided include:

1. Access and control of hardware devices;
2. Access, control and data acquisition of sensors included in the device;
3. Control of frame synchronization and alignment;
4. Acquisition of point cloud data (this function can be obtained by updating the SDK version in subsequent versions);
5. Provision of algorithm capabilities such as filtering;
6. Support for different systems and Wrappers;
7. Effect display tool Orbbec Viewer;
8. Please select the corresponding SDK and display tool according to the different system versions of Gemini 215 / Gemini 210;
9. For Orbbec SDK download and update, please go to: Orbbec SDK v2 Open-Source Repo.

8. Instructions for Use

8.1 Packing List

Table 8-1-1 Gemini 215/Gemini 210 Package List

Package Type	Package List	Gemini 215	Gemini 210	Notes
Bulk	Camera			Minimum batch packaging quantity: 100pcs
Box	Camera		Retail version not available	Minimum batch packaging quantity: 20pcs
	1x Tripod			
	1x USB Cable (2m)			

8.2 Initialization and Operation

- Connect Gemini 215/Gemini 210 via the USB cable to the host PC
- Download Orbbec SDK from：Orbbec SDK v2 Open-Source Repo
- Use Orbbec Viewer to validate that images can be streamed from all sensors with the following settings:
  - Depth stream: 640 x 400
  - Color stream: 1280 x 720

- IMU enabled

- If for any reason that the camera is not responding or not being detected, please unplug all cables from the camera and replug the cable into the host PC for resetting the camera state.

9.Regulatory Compliance

These products are certified as follows:

9.1 Laser Safety Certification

Class 1 Laser Product under the EN/IEC 60825-1:2014
CLASS 1 LASER PRODUCT

9.2 EMC Regulatory Compliance

CE-Declaration	FCC part 15 Declaration of Conformity	KC
CE	FC	KC

9.3 Environment Regulatory Compliance

RoHS 2.0, REACH, WEEE

RoHS	REACH	WEEE
RoHS COMPLIANT	REACH compliant	

10.System Integration Guide

Before users choose the Gemini 215/Gemini 210 3D camera for development, they should first contact the sales staff of Orbbec Group Co., Ltd. to obtain the user manual and apply for the SDK development kit. Through steps such as evaluation, debugging, and verification, confirm whether the scheme meets the mass production requirements.

Suggested process:

1. Read the product specification of Gemini 215/Gemini 210 3D camera;
2. Purchase and obtain the Gemini 215/Gemini 210 3D camera from the official mall;
3. Before development, contact the sales staff of Orbbec Group Co., Ltd. to obtain the user manual and apply for the SDK development kit;
4. Conduct product development according to the functions, and contact the Orbbec staff in time if encountering technical problems;
5. Confirm the mass production scheme of the final product;
6. Mass produce the final product according to the mass production scheme.

11.Cautions

1. Please operate the product correctly according to the instructions. Illegaloperations may cause damage to internal components.

2. Do not drop or impact this product to prevent damage to internal components and a decrease in accuracy.

3. Do not attempt to modify or disassemble this product in any way during assembly and use to avoid damage to the 3D camera and a decrease in accuracy.

4. It is normal for the temperature of the product to rise after being used for a period of time.

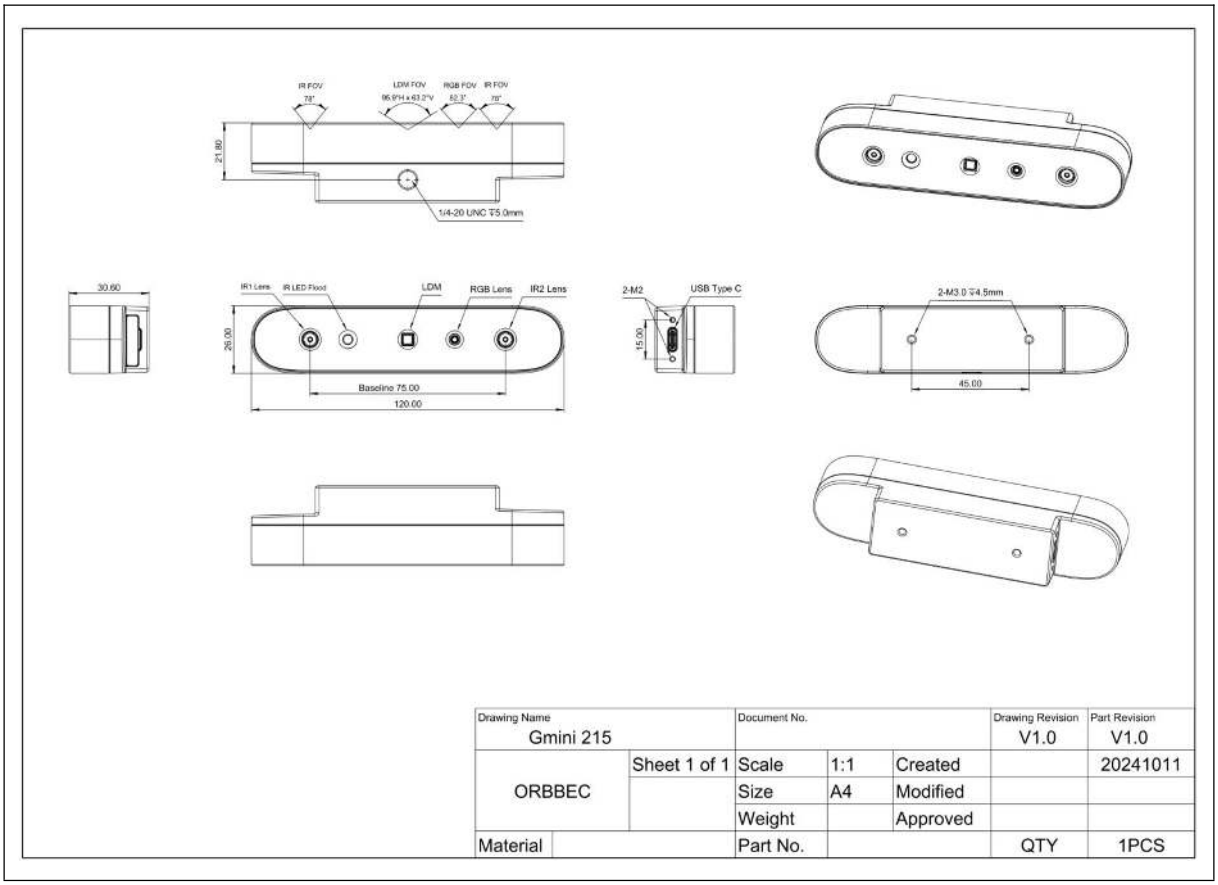
5. Do not touch the lens to avoid leaving foreign objects that may affect the image capture effect.

6. Do not place the product where it can be touched by children or animals to avoid accidents.

7. If the camera cannot be recognized, please first check whether the cable meets the power supply requirements and re-plug the USB for inspection.

8. Although this product uses a Class 1 laser, we also do not recommend looking directly at the laser emitter for more than 20 seconds to avoid discomfort.

Appendix 1: Structural Drawings of Gemini 215



Appendix 2: Structural Drawings of Gemini 210