ORBBEC

Astra Mini Pro

Datasheet v1.0
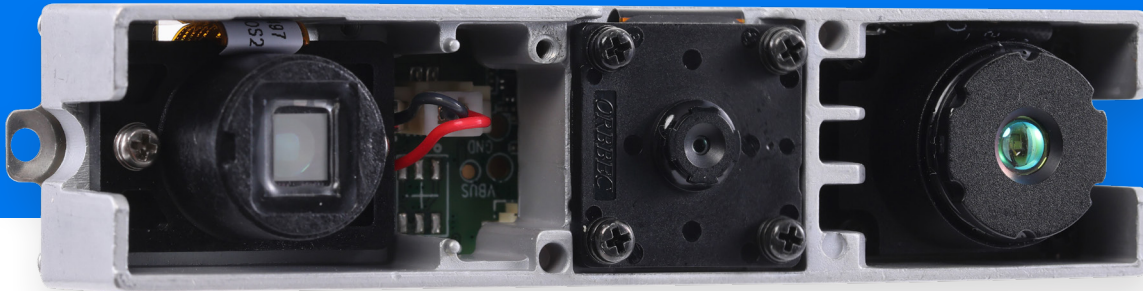
1. Product Brief

Product Overview

The Astra Mini series 3D cameras are offered as bare modules for ease of integration into embedded applications. Astra Mini series are based on structured light technology with Orbbec's custom ASIC for high quality depth processing and single cable USB 2.0 power + connectivity. The Astra Mini S (short range) and Astra Mini Pro (long range) versions provide developers with the freedom to fine-tune their needs best suited for operating requirements.

With Orbbec/OpenNI SDK, Astra Mini series cameras are easy to setup and deliver highly accurate and reliable data for in-door operation.

Product Features:

- Field of View at 58.4° Horizontal and 45.5° Vertical
- High quality depth data output from 0.35–5m (depending on camera model)
- Up to 30 fps at 640X480 for depth
- Up to 30 fps at 640X480 RGB resolution
- USB 2.0 for power and data connectivity

2. Product Specifications

Parameter	Specifications
Model	A25101-05; Astra Mini S
VID/PID	0x2BC5/0x065B; 0x2BC5/0x0407 (S)
Technology	Structured Light
Shutter Type	IR: Rolling Shutter; Color: Rolling Shutter
Wavelength	855nm

Product Specifications (continued from previous page):

Mode	Resolution	FoV	FPS	Range	Format
Depth	1280 x 1024	H 58.4° x V 45.5°	7	0.6–6m 0.35–1m (S)	Y16
	1280 x 960		7		
	640 x 480		10, 15, 30		
	320 x 240		10, 15, 30		
	160 x 120		10, 15, 30		
RGB	1280 x 960	4:3 H 62.7° x V 49°	7		YUYV
	640 x 480		10, 15, 30		
	320 x 240		10, 15, 30		
Depth precision: ± 3mm @ 1m (81% ROI)					

Parameter	Specifications
IMU	N/A
Mirror Mode	Supported, non-mirror by default
Processing	MX6000
Data and Power Connection	USB 2.0 DF13 connector
Power Consumption	Average < 2.0W (Peak 2.5W)
Operating Environment	10° – 40°, < 95% RH (non-condensing) Indoor/Semi-Outdoor
Supported Functions	D2C
Dimensions	84.90 mm × 20.00mm × 19.92 mm
Weight	34g
Certifications	ROHS, Reach, CE, FCC, Class 1 Laser Product
Installation	2 x M2

3. Product Information

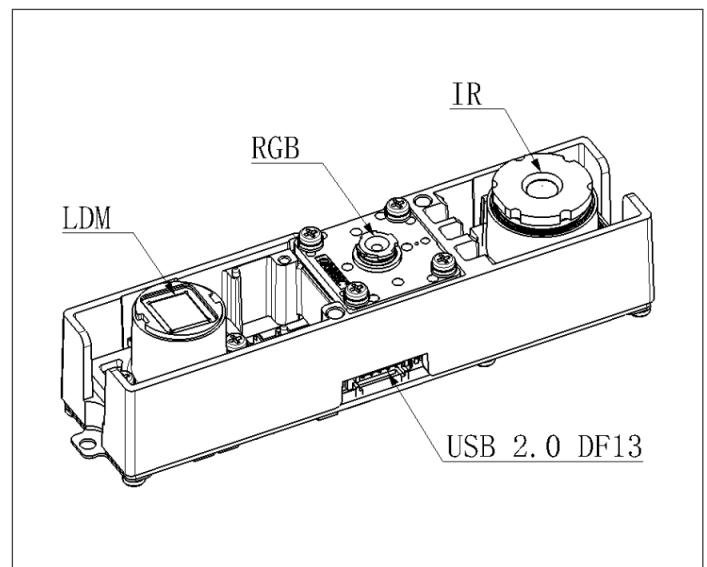## 3.1 Product Images

Front View

Rear view

3.2 Product Components and Interfaces

Astra Mini Pro Components

4. Software Development Kit (SDK)

Orbbec SDK is a flexible and modular platform for easy camera setup and runs on multiple platforms with a rich set of APIs. It supports camera access; device setup and configuration; data stream reading, processing, and viewing; RGB–D registration; and frame synchronization.

Included functions:

- Access and control of camera devices.
- Control of frame synchronization and alignment.
- Acquisition of point cloud data.
- Orbbec Viewer for camera testing.

Please check https://orbbec3d.com/developers/ for the latest SDK.

5. Camera Setup and Operation

6. Installation Guide

Packing List

- Orbbec Astra Mini Pro Camera
- USB 2.0 Cable

Initialization and Operation

- Connect Astra Mini Pro via the cable to the host device.
- Download Orbbec SDK from
  https://orbbec3d.com/developers/
- Validate that cable can stream reliably on all sensors in the Orbbec Viewer, with the following settings:
  - Depth camera: 640 x 480
  - RGB Camera: 640 x 480
- If for any reason the camera is not responding or not being detected, please unplug all cables from the camera and replug to the host device to reset the camera state.

Use outside of the specified conditions could cause the device to fail and/or function incorrectly. These conditions are applicable for the environment immediately around the device under all operational conditions. When used with an external enclosure, active temperature control and/or other cooling solutions are recommended to ensure the device is maintained within these ranges.

a. Mounting / Fixing Solutions

1. When using external housing around the camera for dust proofing, use foam inserts or rubber gaskets between the front of the camera and the external housing.
2. Avoid the application of external forces to the camera chassis during the installation process.
3. During installation, do not remove the screws between the camera chassis and the bridging brackets.

Installation Guide (continued from previous page):

b. Heat Dissipation

1. Avoid any direct heat sources around the camera.

**2**. Maximizing the space inside the external housing may help lower operating temperature.

c. Transmittance Requirements

The current light transmission of the Astra Mini Pro front cover glass lens is as follows:

1. RGB (395~639nm) transmittance rate ≥92%

2. IR, LDM (855 ±20nm) transmittance rate ≥92%

d. Cable Design Guide

It is recommended to use the included USB 2.0 cable. If a longer cable needs to be customized, a maximum cable length of 1-1.5m is recommended.
Please refer to the pin out definition below:
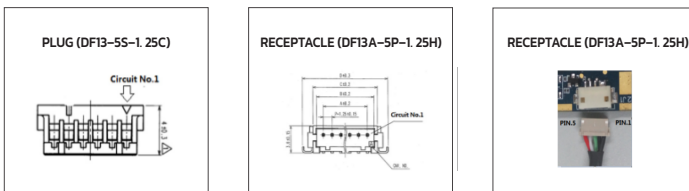
| POSITION	NAME	Modify NAME	TYPE	DESCRIPTION
1	GND			Ground
2	GND			Ground
3	DP			Data+
4	DM			Data−
5	VDD			supply Voltage, Connect to 5V

7. Safety and Handling

1. Follow the instructions to operate the camera. Improper operation may cause damage to internal components.

2. Do not drop or hit the camera with external force.

3. Do not attempt to modify the camera as such modifications may cause permanent damage or inaccuracy.

4. The temperature of the camera may increase during long periods of continuous usage.

5. Do not touch the lens. Fingerprints on the lens may affect image quality.

6. Keep the product beyond the reach of children or animals to avoid accidents.

7. If the camera is not recognized by the computer, check if the cable meets the power/data transfer requirements and reinsert the USB cable for reconnection.

8. This product uses a Class 1 laser. Looking at the laser for more than 20s is not recommended.
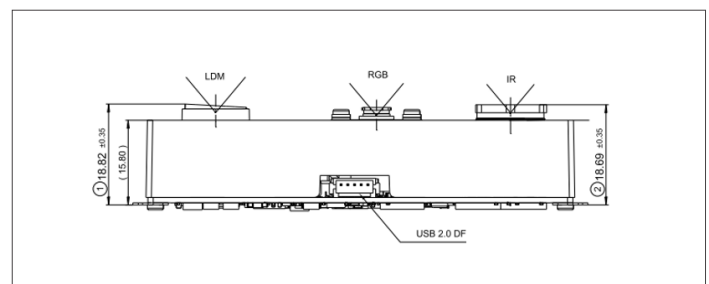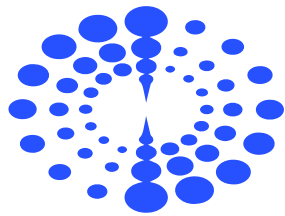
8. Product Drawings
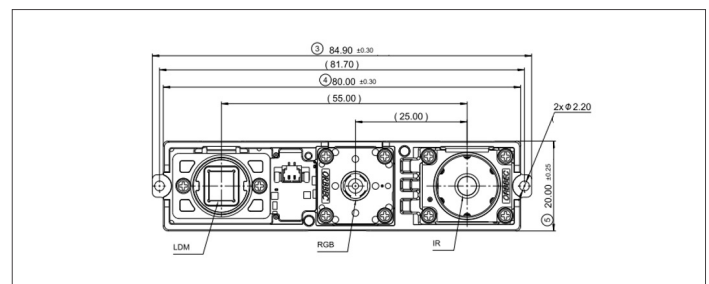
Front View
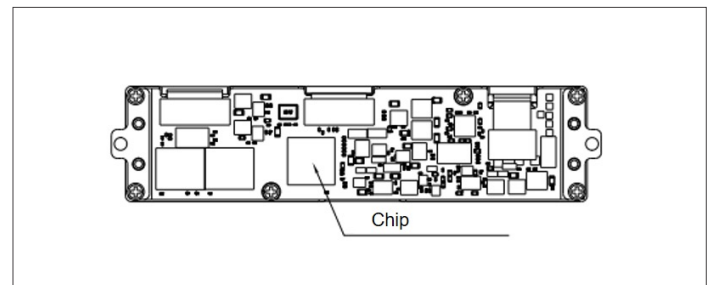
Bottom View

Side View

9. Glossary of Terms

Term	Definition
D2C	Depth to Color function maps each pixel on depth map to the corresponding color image according to the intrinsic and extrinsic parameters of depth camera and color camera.
Depth	Depth video streams are like 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 only, of which the former is generally composed of infrared projector, infrared camera and depth computing processor.
FOV	Field of View (FoV) describes the angular extent of a given scene that is captured by a camera, which can be measured in horizontal, vertical, or diagonal.
I2C	I2C bus refers to a kind of simple bidirectional two-wire synchronous serial bus developed by Philips. It can be used for transferring information among devices connected to the bus with two wires.
IR Camera	Infrared camera.
IR Flood	IR floodlights are used to illuminate the environment.
ISP	Image Signal Processor, which is used for image post-processing.
MIPI	Mobile Industry Processor Interface (MIPI) is an open standard and specification formulated by the MIPI Alliance for mobile application processors.
PCBA	Circuit board consists of depth computing processor, memory, and other electronic devices.
Point Cloud	A point cloud is a discrete set of data points in space.
SoC	System on Chip, integrated circuit (IC) that integrates all components of a computing system.
TBD	To Be Determined. In the context of this document, information will be available in a later revision.