



OAK-D



Overview

The OAK-D baseboard has three on-board cameras which implement stereo and RGB vision, piped directly into the OAK SoM for depth and AI processing. The data is then output to a host via USB 3.1 Gen1 (Type-C).

Hardware Specification

This OAK camera uses USB-C cable for communication and power. It supports both USB2 and USB3 (5Gbps / 10Gbps).



Camera Specification:

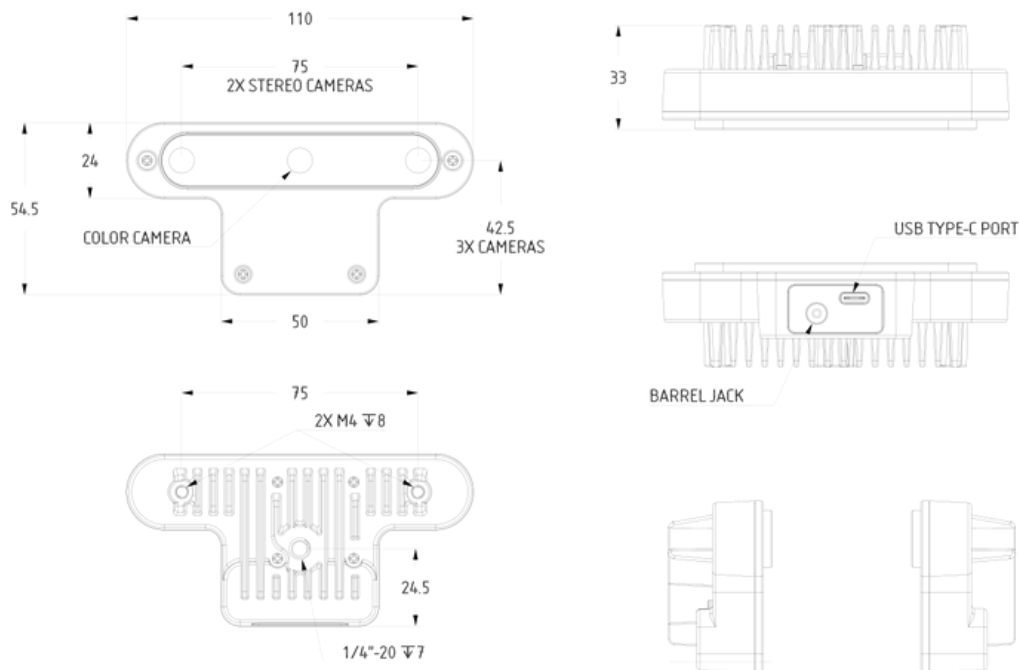
Camera Specs	Colour Camera	Stereo Pair
Sensor	IMX378 (PY004 AF, PY052 FF)	OV9282 (PY003)
Shutter	Rolling	Global
DFOV/HFOV/VFOV	81° / 69° / 55°	89° / 80° / 55°
Resolution	12MP (4056x3040)	1MP (1280x800)
Focus	AF: 8cm - ∞, FF: 50cm - ∞	FF: 19.6cm - ∞
Max Framerate	60 FPS	120 FPS
F-Number	1.8 ±5%	2.0 ±5%
Sensor Size	1/2.3"	1/4"
Effective Focal Length	4.81mm	2.35mm
Distortion	< 1% AF, < 1.5% FF	< 1%
Pixel Size	1.55µm x 1.55µm	3.0µm x 3.0µm

RVC2 inside

This OAK device is built on top of the RVC2. Main features:

- **4 TOPS** of processing power (1.4 TOPS for AI - RVC2 NN Performance)
- **Run any AI model**, even custom-architected/built ones (models need to be converted)
- **Encoding** H.264, H.265, MJPEG - 4K/30FPS, 1080P/60FPS
- **Computer Vision** warp/dewarp, resize, crop via ImageManip node, edge detection, feature tracking. You can also run custom CV functions
- **Object Tracking** 2D and 3D tracking with ObjectTracker node
- **Stereo Depth** perception with filtering, post-processing, RGB-depth alignment and high configurability

Dimensions and Weight



Weight: 115g total, OAK-D-PCBA 43g

Stereo depth perception

This OAK camera has a baseline of 7.5cm - the distance between the left and the right stereo camera. Minimal and maximal depth perception (MinZ and Max) depends on camera FOV, resolution, and baseline- more information here.

- Ideal range: 70cm - 8m
- MinZ: ~20cm (400P, extended), ~35cm (400P OR 800P, extended), ~70cm (800P)
- MaxZ: ~15 meters with a variance of 10% (depth accuracy evaluation)

Extended means that StereoDepth node has Extended disparity mode enabled.

Integrated IMU

This OAK camera has an integrated BNO085, a 9-axis IMU (Inertial Measurement Unit). See [IMU node](#) for the API details on how to use it.

Note: due to supply chain issues, most of the OAK camera that were manufactured between Q2 2021 and Q2 2023 have integrated BMI270 - 6-axis IMU instead.

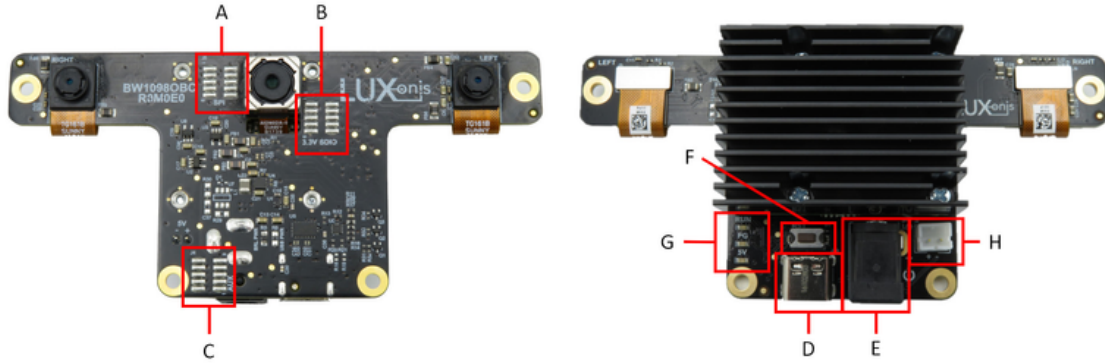
OAK-D PCBA

OAK-D PCBA is essentially an OAK-D without an enclosure and instead has a heatsink. This could still be useful for some applications where size/weight is really critical (eg. drones), and PCBA also exposes some additional connectors.

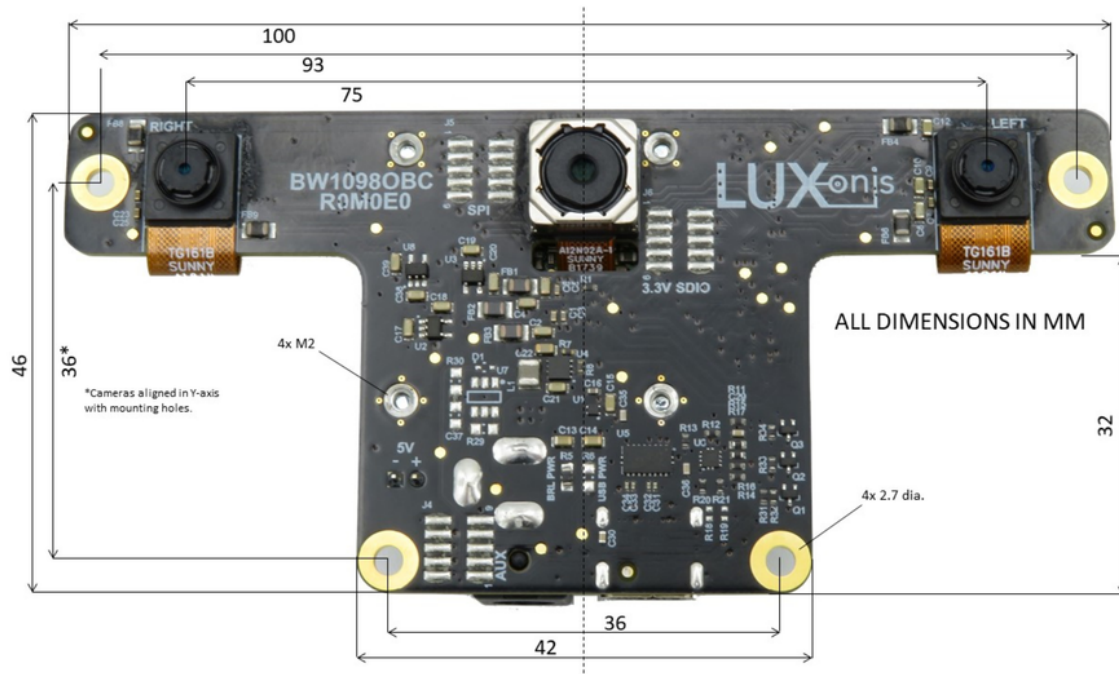
PCBA dimensions are on the next page



OAK-D PCBA Dimensions



- | | |
|--|--|
| <ul style="list-style-type: none"> A. J5 1.8V SPI access B. J6 3.3V SDIO access C. J4 AUX IO access | <ul style="list-style-type: none"> D. USB 3.1 Gen1 Type-C E. 5.5mm x 2.5mm 5V PWR F. DepthAI SoM Reset G. Indicator LEDs H. 5V FAN/AUX header |
|--|--|



Getting Started

The OAK-D is powered via USB Type-C or from a 5V, 5.5mm x 2.5mm barrel jack. USB3 5Gbps speeds are standard for streaming video or data from the device. With cameras and the OAK-SoM, total power consumption usually stays below the 900ma specification of USB 3, but Type-C power of 1.5A or greater is recommended.

Interfacing with the OAK-SoM is also possible with OAK-D connector pads J4, J5, and J6. These pads are designed for the Amphenol/FCI 20021121-00010T1LF or equivalent. Please refer to the schematics for pinout information.

The reset button is not populated by default on the OAK-D, but can be added. Alternatively, the :ref:`OAK-SoM` can be reset by shorting RST to ground.

The 5V LED indicates 5V power is present on the PCBA. The PG LED indicates "power good" from the OAK-SoM. The "RUN" LED indicates that the OAK-SoM is not in reset.

Brochures

- [Brochure](#)
- [Datasheet](#)

3D Models

- Board (PCBA) STEP files [here](#)
- Enclosure STEP files [here](#)

Files

- [Altium project files](#)
- [Assembly Drawing](#)
- [Assembly Outputs](#)
- [Fabrication Drawing](#)
- [Fabrication Outputs](#)
- [Schematic](#)