OAK-D-PoE

Overview

The OAK-D-PoE baseboard offers full 802.3af, Class 3 PoE compliance with 1000BASE-T speeds. The OAK-D-POE baseboard has three on-board cameras which implement stereo and RGB vision, piped directly into the OAK-SoM-Pro for depth and AI processing. The data is then output to a host via USB 3.1 Gen1 (Type-C) or via 1000BASE-T ethernet connection. The OAK-D-POE board exposes boot selection switches, allowing the end user to boot the OAK-SoM-Pro module from USB or the on-board eMMC or NOR flash.

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

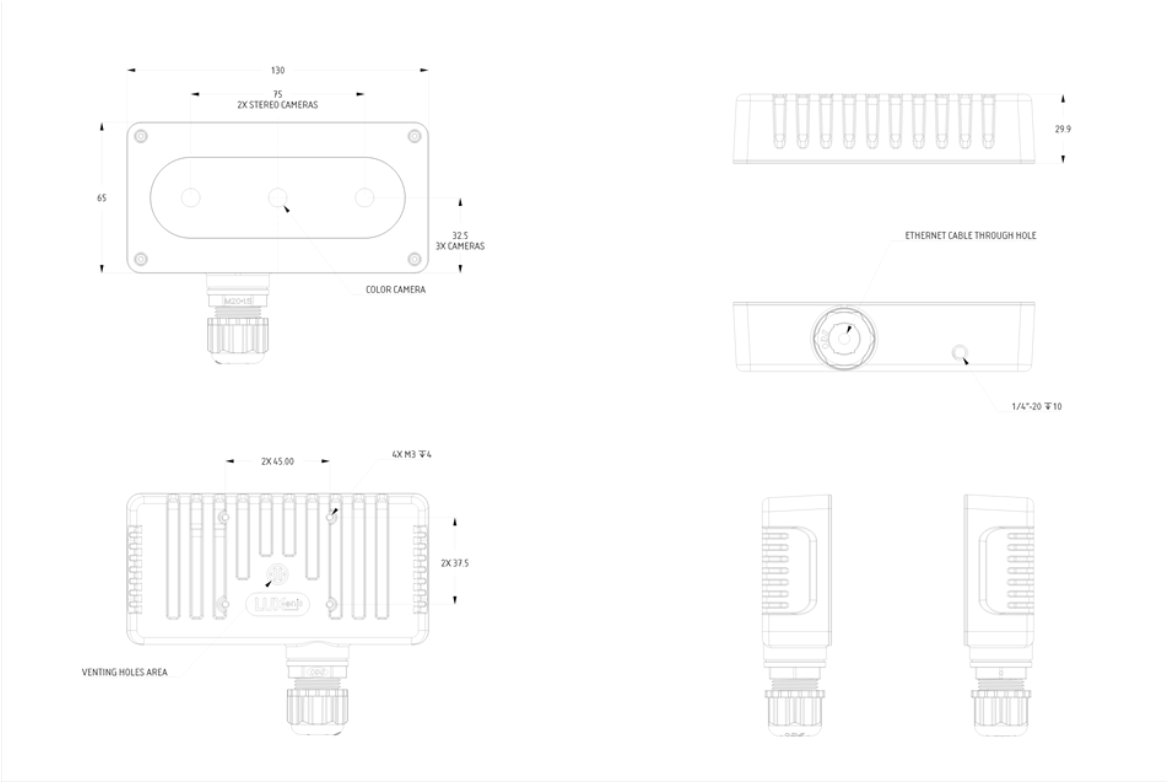
RVC2 inside

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-architectured/built ones (models need to be converted)
- **Encoding** H.264, H.265, MJPEG - 4K/30FPS, 1080P/60FPS
- **Computer Vision** warp/dewarp, resize, crop ia 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

- Width: 130 mm
- Height: 101 mm
- Length: 31 mm
- Weight: 361g



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)

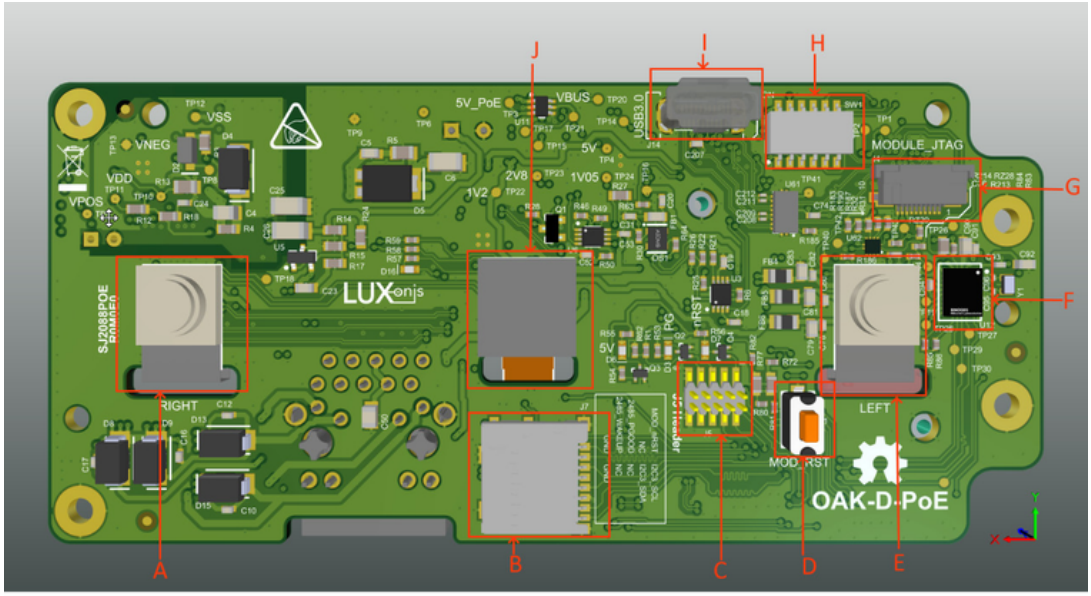
Extended means that StereoDepth node has Extended disparity mode enabled.

Integrated IMU

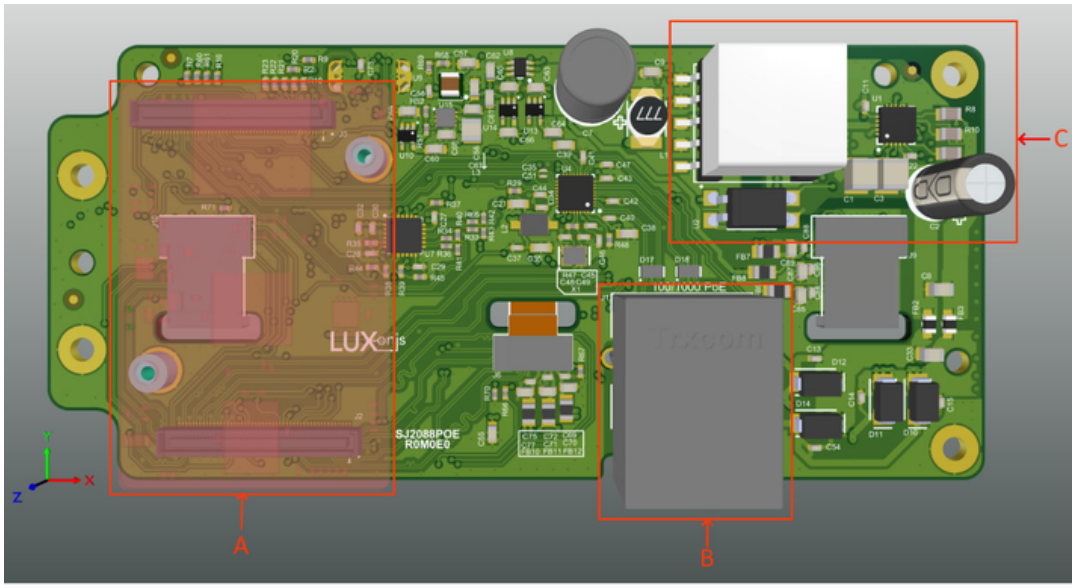
This OAK camera has an integrated BNO085, a 9-axis IMU (Inertial Measurement Unit). See IMU node for the API details on how to use it.

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.

Board Layout



A. OV9282 Camera (Right)
B. BW2099 uSD
C. BW2099 Module Aux IO Header
D. Module Reset Button
E. OV9282 Cemera (Left)
F. BNO085 IMU Module
G. BW2099 Module Jtag
H. Boot Selection Switch
I. USB 3.1 Type C
J. IMX378 12MP Camera



A. BW2099 Module
B. RJ-45, 1000BASE-T, PoE Connector
C. Power Over Ethernet (PoE)

Power Usage

Power usage for OAK-D-PoE ranges between 2.00 W (standby) and 5.5 W (max consumption). More information on the power usage is below:

- Standby: 2.00 W
- Normal operation (running `python depthai_demo.py`): 5.25 W
- Max consumption power (running `python depthai_demo.py -s left right color disparity rectified_left depth`): 5.50 W

Getting Started

Note

For more information on how to start with POE devices, see guide Getting started with OAK PoE devices.

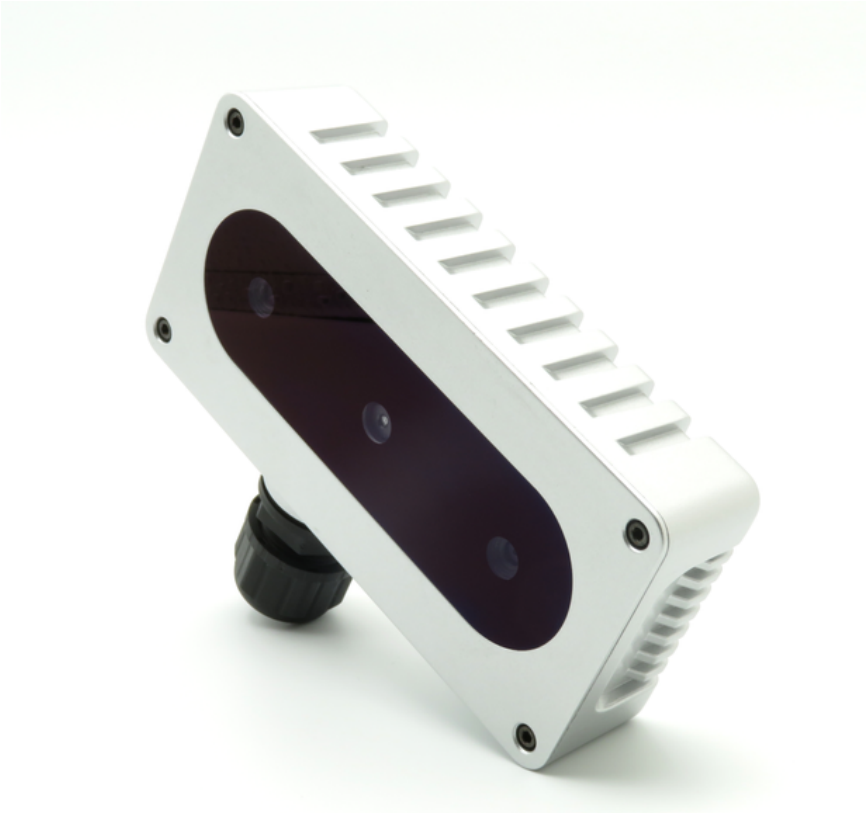
This OAK PoE camera accepts power input from the 802.3af, Class 3 PoE circuitry. It can also accept power through the on-board USB C connector - which is not exposed through the enclosure, so enclosure needs to be removed.

Booting can be accomplished from either the USB interface or from the eMMC or NOR flash on the OAK-SoM-Pro, and boot selection is configured with the DIP switch bank near the USB connector.

Interfacing with the OAK-SoM-Pro is also possible with PoE Board connector pads J5 and J8, which expose OAK-SoM-Pro auxiliary I/O and BW2099 Quad SPI, respectively. These headers are Amphenol/FCI 20021121-00010T1LF or equivalent. Please refer to the schematics for pinout information.

- The reset button resets the OAK-SoM-Pro only.
- The 5V LED indicates 5V power is present on the BW2098POE.
- The PG LED indicates “power good” from the OAK-SoM-Pro.
- The “RUN” LED indicates that the OAK-SoM-Pro is not in reset.

Caution should be taken when handling any PoE circuit board. Do not directly touch the circuitry as potentials up to and exceeding 57V may exist. Always use electronics handling best practices.



Datasheet

- Datasheet

3D Models

- Board STEP files here
- Enclosure STEP files here

Files

- Altium Design Files
- Assembly Drawing
- Assembly Outputs
- Fabrication Drawing
- Fabrication Outputs
- Schematic