OAK-FFC RPi HAT
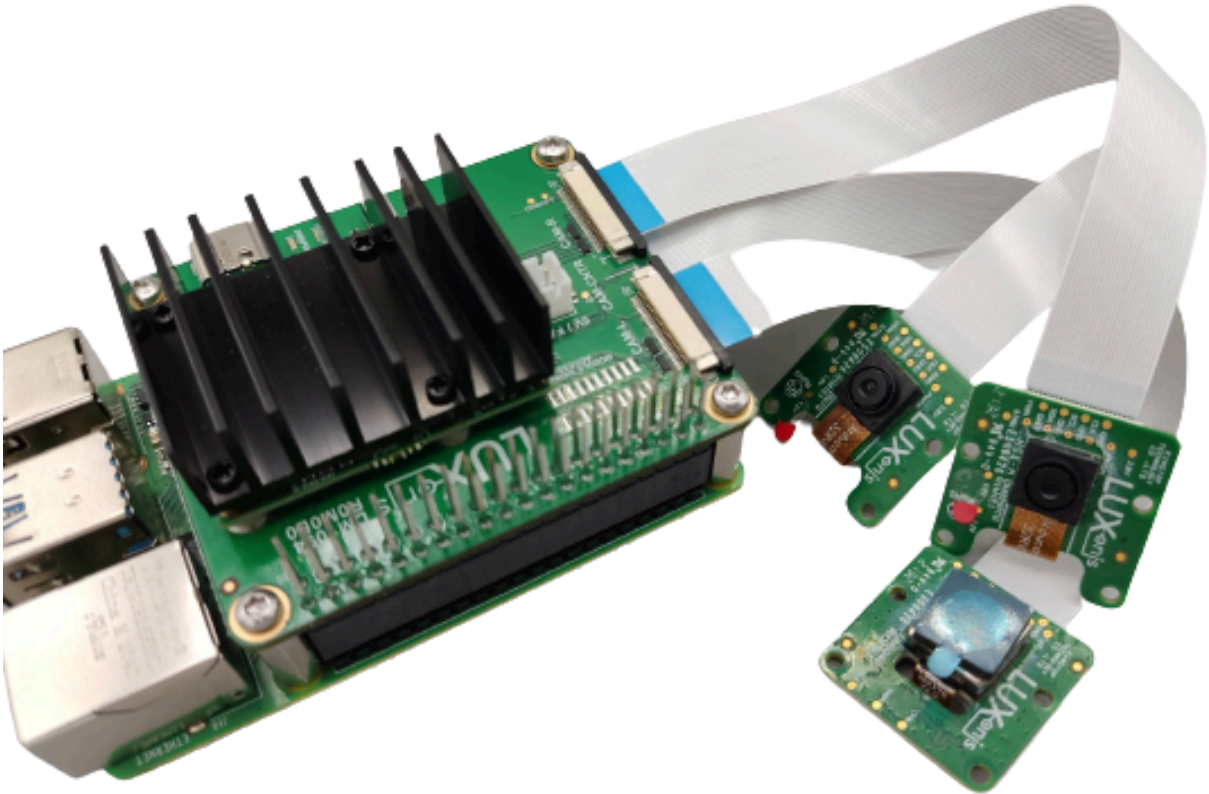
Overview

The **OAK-FFC RPi HAT** (BW1094) baseboard has three FFC interfaces which allow connecting two OAK-FFC-OV9282 camera modules (stereo pair) and one OAK-FFC-IMX378 RGB camera module. The GPIO interface from the Raspberry Pi Model B variants is passed through the BW1094 with the exception of the 5V pins, GND pins, and BCM GPIO26 (pin 37), which is used as a way for the Raspberry Pi to reset the OAK-SoM, parallel to the RST button.
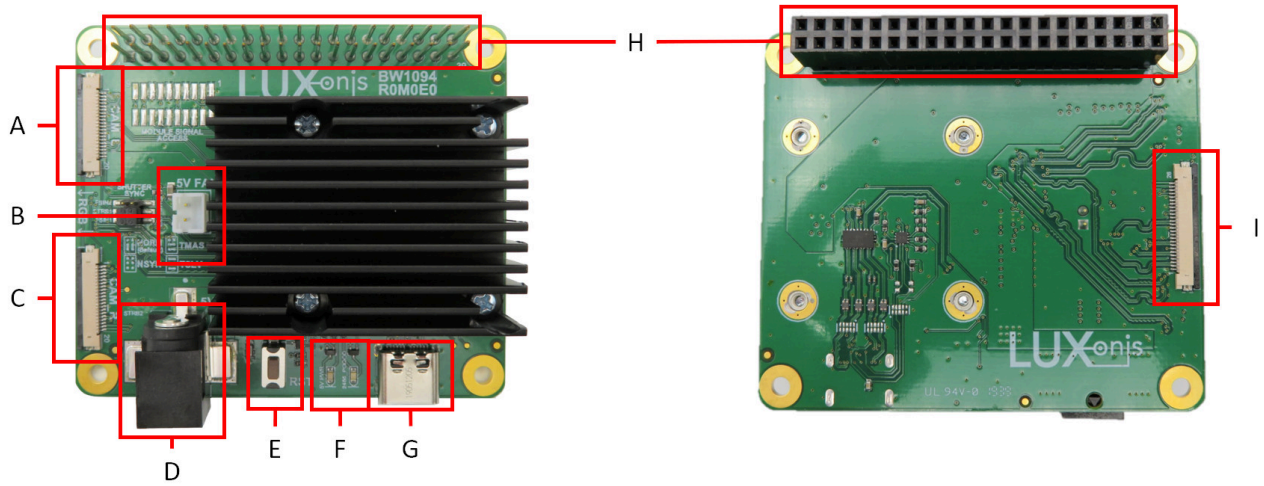
To see **which cameras are compatible with this OAK FFC baseboard**, see the guide here: OAK FFC camera modules. Some of camera modules have a M12 mount, so you can use different lenses to get **custom FoV** (with wide or narrow FOV M12 lenses).

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
- **Computer vision**: warp/dewarp, resize, crop via ImageManip node, edge detection, feature tracking. You can also run custom CV functions
- **Stereo depth** perception with filtering, post-processing, RGB-depth alignment, and high configurability
- **Object tracking**: 2D and 3D tracking with ObjectTracker node

Board Layout and Dimensions

A.	Mono Cam L connector	**F.**	Indicator LEDs
B.	5V Fan/Aux Header	**G.**	USB 3.1 Gen1 Type-C
C.	Mono Cam R connector	**H.**	RPI Pass-thru header
D.	5.5mm x 2.5mm 5V PWR	**I.**	RGB Cam connector
E.	DepthAI SoM reset		

ALL DIMENSIONS IN MM
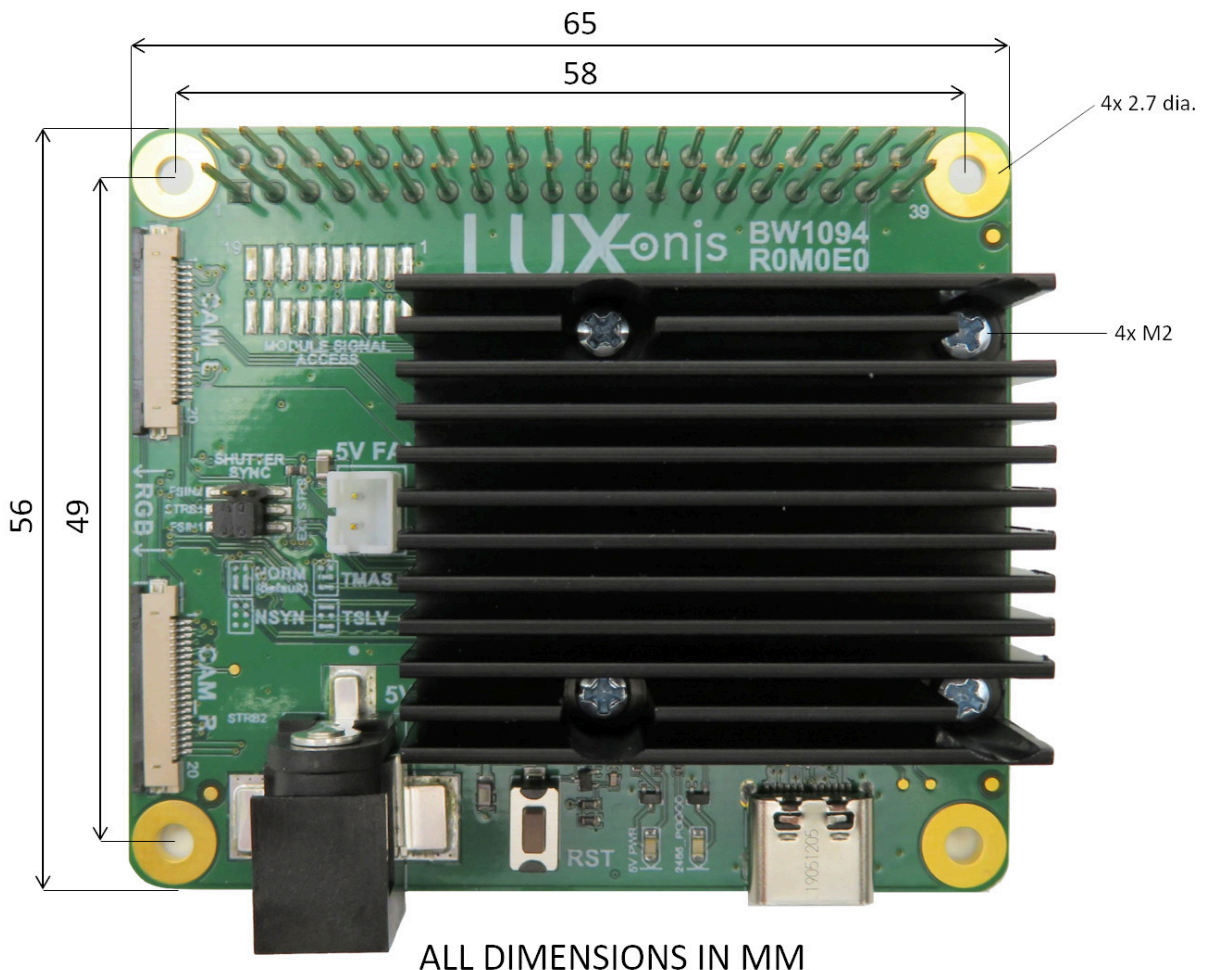
General information

- 2 x 2-lane MIPI channels
- 1 x 4-lane MIPI channels
- Pass-thru for standard RPi Model B GPIO header
- Level-shifted reset (BCM GPIO26)
- 5V power input via barrel jack or GPIO header
- USB 3.1 Gen 1 Type-C
- 5V Fan/Aux header
- Design files produced with Altium Designer 20
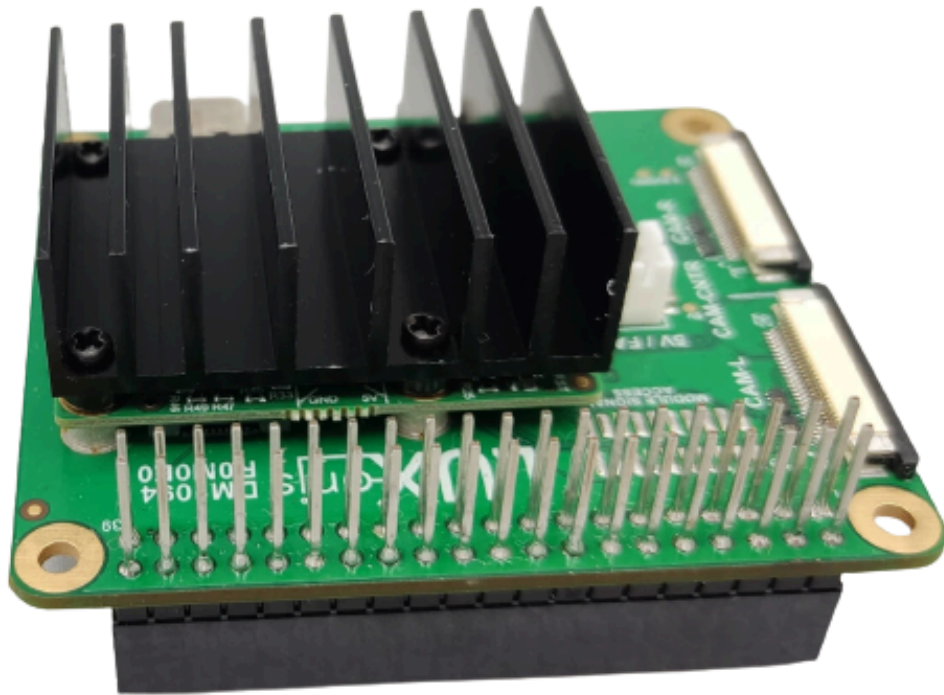
Power consumption

Most of the power is consumed by the RVC2, so the power consumption mostly depends on the workload of the VPU:

- Base consumption + camera streaming: 2.5W - 3W
- AI subsystem consumption: Up to 1W
- Stereo depth pipeline subsystem: Up to 0.5W
- Video Encoder subsystem: Up to 0.5W

So the total power consumption can be up to ~5W if you are using all the features at 100% at the same time. To reduce the power consumption, you can reduce FPS of the whole pipeline - that way, subsystems won't be utilized at 100% and will consume less power.

Operating temperature

The ambient operating temperature of RVC2 based devices is between **-20°C and 50°C** when fully utilizing the VPU.

Similarly to the Power consumption, max operating temperature depends on VPU utilization. The higher the VPU utilization, the more heat the VPU will generate. The RVC2 VPU can continuously operate at 105 °C, after which the depthai library will automatically shut down the device (to avoid chip damage).

To find out more, see our Operative temperature range documentation.

Getting started

The stereo mono cameras (OAK-FFC-OV9282) can be connected via FFC to connectors J8 and J9 on the top of the board, while the RGB camera module (OAK-FFC-IMX378) is connected via FFC to connector J6 on the bottom of the board. These connectors have a Left/Right configuration as perceived by the subject rather than the camera, so "CAM_L" is the subject's left. These designations are somehwhat arbitrary, however, due to the flexibility in positioning the cameras allowed by the FFC. Note that the RGB FFC connector is a top-contact connector while the mono FFC connectors are bottom-contact. This results in the FFCs and cameras all facing the same direction when mounted.

This OAK baseboard accepts 5V power from the 5.5mm x 2.5mm barrel jack, or through the Raspberry Pi GPIO header 5V pins. This allows support for standalone use of the baseboard when it is not mounted as a HAT. When using this device it is recommended to power it from the Raspberry Pi via the 5V GPIO pins. It is also possible to back-power the Raspberry Pi from this device, but this is not recommended. Do not apply power to the BW1094 barrel jack and to the Raspberry Pi at the same time.

The Raspberry Pi GPIO header mostly passes through the OAK-FFC RPi Hat with exception of the 5V pins, GND pins, and BCM GPIO26 (pin 37), which is used as a way to toggle reset on the OAK-SoM. Reset is active high when toggled from the Raspberry Pi on BCM GPIO26. The 3.3V Raspberry Pi GPIO line is level shifted with an inverter to 1.8V, which is the standard IO for the OAK-SoM. OAK-SoM reset is active-low 1.8V. The reset button on board the this device resets the OAK-SoM only.

Auxiliary 1.8V IO for the OAK-SoM exist as J10 pads. The unpopulated connector is Amphenol/FCI 20021121-00020T1LF. Quad SPI, UART, I2C, SoM PGOOD, and, SoM WAKEUP are exposed at these pads. NOTE: these are all 1.8V signals and will require appropriate level shifting if connected to the 3.3V GPIO of the Raspberry Pi.

The 2485_PGOOD LED indicates "power good" for the OAK-SoM. The 5V_PWR LED 5V power is applied to the OAK-FFC RPi Hat.

Brochures

- Brochure

3D Models

- Board STEP files here

Files

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

Got questions?

Head over to **Discussion Forum** for technical support or any other questions you might have.