EFFERENCE

GENERATION 1

CAMERA OVERVIEW & DATA SHEET

Human-Inspired Embedded Vision for Real World Autonomy

The Efference H1 is a WiFi and Bluetooth-enabled embedded compute device designed for high-fidelity perception and low-latency decision-making in real world environments. It delivers high-resolution imagery, accurate depth estimation, precise localization and mapping, and on-device inference for AI models.

Designed around human visual geometry, the H1 supports teleoperation, egocentric data collection, and downstream robotic deployments in challenging indoor and outdoor environments.

H1 General Specifications

Dual High-Performance Global Shutter Sensors

Capture high-speed motion and diverse lighting conditions with two best-in-class 2.3MP sensors with high dynamic range (HDR) and superior low-light sensitivity.

Dual 6-DOF Inertial Measurement Units (IMUs)

Achieve ultra-low latency pose estimation and localization using our proprietary sensor fusion algorithms that integrate data from two 6-DOF IMUs to ensure stable, high-frequency spatial awareness.

Wide-angle, Low-Distortion Optics

Enable expansive environmental coverage and reliable hand-tracking using a low-distortion design that minimizes the need for post-processing and ensures high-fidelity 3D vision.

Wireless Connectivity & Teleoperation

Optimized for both data collection and downstream robot deployments, integrated WiFi and Bluetooth plus a physical baseline calibrated to human visual specifications enables intuitive teleoperation, remote camera control, and wireless data streaming.

Neural ISP & Depth Estimation

An AI-first processing pipeline transforms RAW data into rich and robust observations. Integrated Neural Depth estimation and Image Signal Processing (ISP) deliver high-accuracy 3D mapping and localization for real-time downstream decision-making.

Edge AI Compute

Built for autonomous workloads, onboard compute supports low-latency neural inference directly on the device, functioning as either a high-performance robotic peripheral or a standalone host for lightweight robotic stacks.

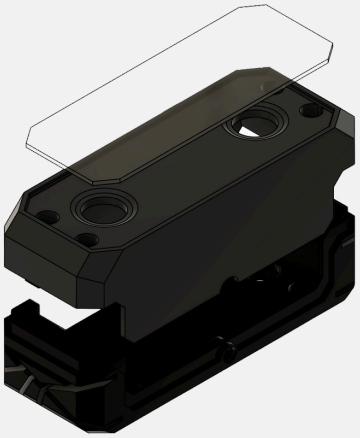
H1 Detailed Specifications

Dual Image Sensors

Sensor Type	1/2.6” 2.3MP RGB
Pixel Size	3.0µm x 3.0 µm
Shutter	Electronically Synchronized Global
Output Resolution	Side by Side 2x 3840x1200 @ 60, 30, 15, 5, 1 fps 2x 3840x1080 @ 60, 30, 15, 5, 1 fps [cropping mode] 2x 1920x600 @ 120, 60, 30, 15, 5, 1 fps [binning 2x2 mode]
Dynamic Range	91.5 dB
Sensitivity	9606 mV/lux*s

Physical

Dimensions	120.0 x 43.0 x 41.5mm (4.72 x 1.69 x 1.63”)
Baseline	65mm (2.6”)
Weight	235g (0.52 lbs)
Interfaces	USB-C 3.2, Wi-Fi 6, Bluetooth 5
Mounting Options	2x M4 threads (back; 75 mm VESA compatible), 1/4"-20 UNC threaded mount (bottom)
Power	USB-C 3.2 (PoC), M8
Operating Temperatures	-20 °C to 60 °C



Optics

Focal Length	2.5mm (0.1”)
Field of View	Max. 100° (H) x 71° (V) x 112° (D)
Aperture	f/2.6
TV Distortion	<-4%
Minimum Focus Distance	0.025m (1.0”)
Depth Range Max	0.025m to 50m (0.08 ft to 164 ft)
Ideal Range	0.1m to 20m (0.33 ft to 66 ft)

Compute

CPU	Quad-core high-performance cores + Quad-core efficiency cores, up to 2.2 GHz
Memory	4 GB
Storage	32GB
NPU	6 TOPS, supports INT4/INT8/INT16/FP16/TF32 mixed precision
GPU	High-performance Mali-class GPU @ 0.9 GHz
OS	Embedded Linux

Motion

Accelerometer Range	+/- 16G
Accelerometer Resolution	0.48 mg
Accelerometer Noise Density	4.0 mg
Gyroscope Range	+/- 1000 dps
Gyroscope Resolution	0.04 mg
Gyroscope Noise Density	0.08 dps
Output Data Rate	2x 400Hz

H1 Technical Drawings