Developer-Kit 1 Pre-Launch Prototype
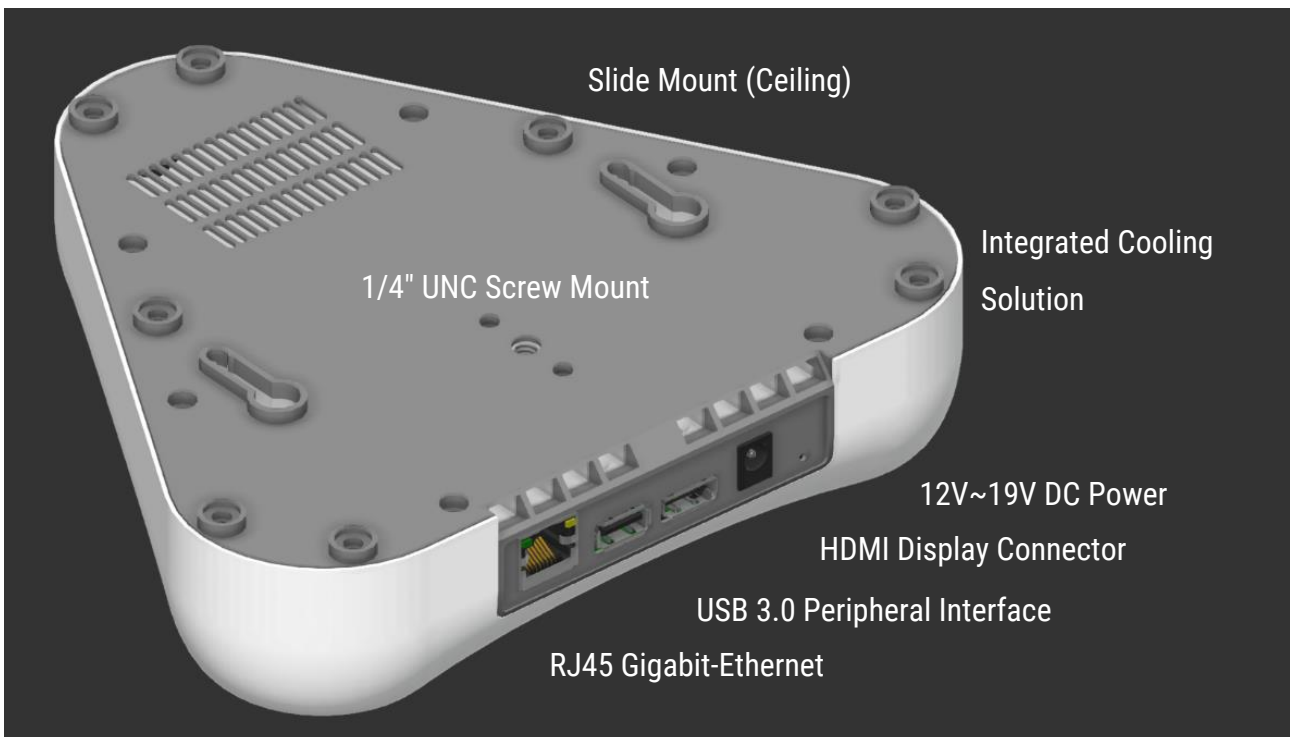
HS-DK1 PL Rev 2.2 (06/2018, with internal IO Panel)
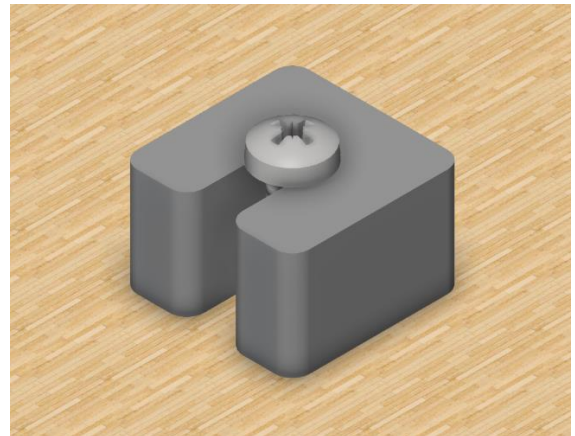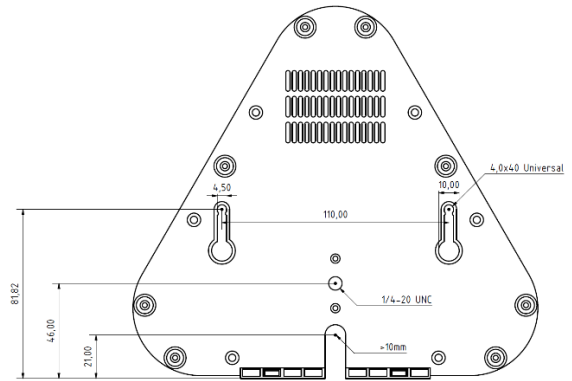
Quick Start Guide

EN

Overview

HemiStereo® is the world's first depth sensing camera for capturing hemispherical RGB-D data (color images and depth information). Based on a special trinocular camera setup, it allows to measure depth for an extremely large volume with both large lateral resolution and high axial accuracy. The sensing device integrates AI supercomputer NVIDIA Jetson TX2 in order to allow real-time GPU-based inference using deep neural networks.

Fisheye Lenses

Top-Cover

IO-Panel

Slide Mount (Ceiling)

Integrated Cooling Solution

1/4" UNC Screw Mount

12V~19V DC Power

HDMI Display Connector

USB 3.0 Peripheral Interface

RJ45 Gigabit-Ethernet
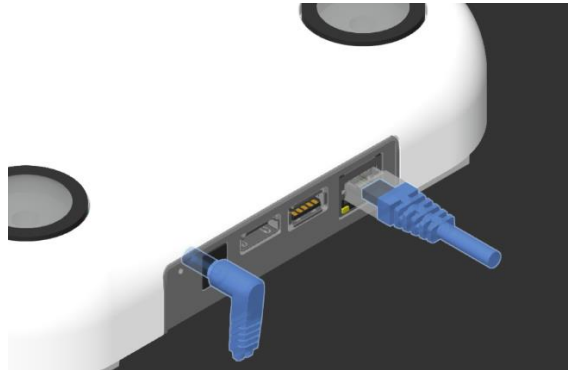
Getting started

1   Mount

- Take the HS-DK1PL device and all included accessories from the box. Remove the protectors from the two slide mount holes on the back.
- Pre-drill two 2.0 mm holes (for wood) or 6.0 mm holes (for drywall / concrete) into the ceiling using the included drilling pattern. Additionally, for drywall / concrete ceiling, insert the included wall plugs.

- Screw in the included universal / wood screws (4.5x40mm) as shown on the right, using the included spacer to ensure the correct protruding length. Tighten the screws loosely. Remove the spacer.
- Insert the screws into the mounting holes on the back. Hold the device at the bottom and slide it towards the IO panel until you hear two distinct clicking sounds.
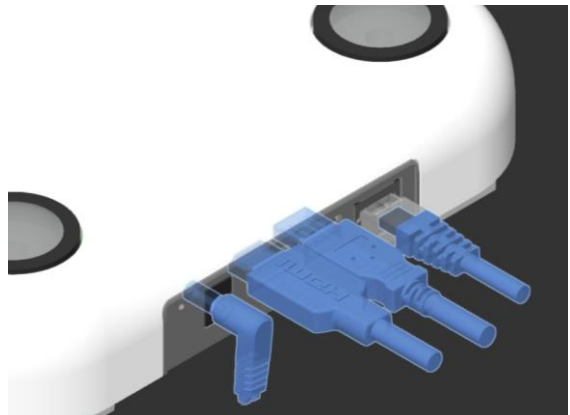
2 Connect

Remote Access (Default)

– Connect the Ethernet cable to the RJ45 port of the device. Connect the other end to your router (DHCP is required).

– Connect the DC plug of the included power supply to the DC jack on HS-DK1PL. The device will now boot automatically.
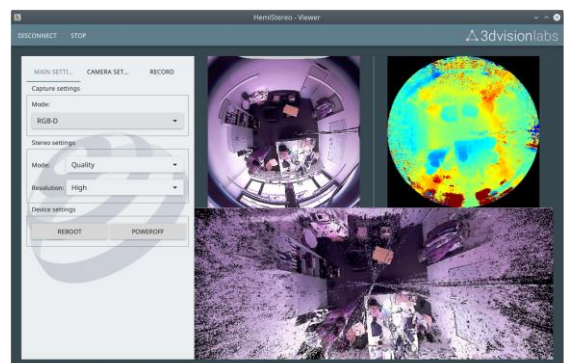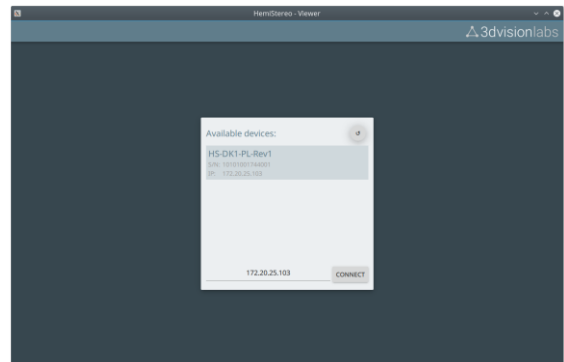

Host Access (Advanced)

– If you would like to access the sensor operating system directly, connect the sensor via HDMI to an external display.

– Use the integrated USB 3.0 Type-A port to connect keyboard and mouse.

– Use the following login information:
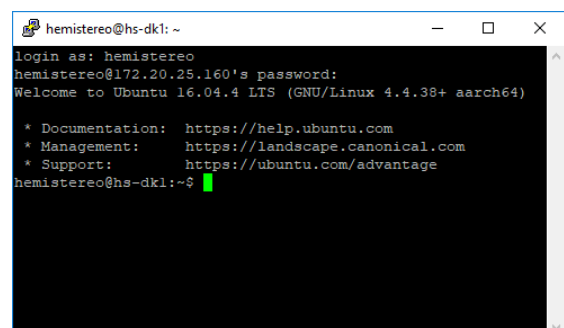Username: *hemistereo*
Password: *hemistereo*

3 Develop

Viewer Software

– Check out our website and download the latest version of the device software:

https://3dvisionlabs.com/downloads/

– Make sure the following requirements are fulfilled:

1. DHCP is enabled in your router settings. Otherwise, you may configure different IP settings on the sensor side by using the host access method as described above.

2. Your router needs to allow UDP broadcast for automatic detection of the sensor.

– Follow the onscreen instructions to access and configure the sensor.

SSH-Access

– Use the IP address shown by the viewer software. Connect using your SSH client.

– Use the following login information:

Username: *hemistereo*

Password: *hemistereo*

Warnings and Restrictions

HS-DK1PL is still a prototype of the HemiStereo technology and is hence subject to certain restrictions. Please carefully consider the warnings below in order to prevent damage to health or the device.

Operating Conditions

HS-DK1PL is intended for experimental and laboratory use only. Ambient temperatures should not exceed room temperature (30°C). Avoid humid or dusty environments!

Use only under continuous observation. The operator is responsible for any damages caused to third parties and shall maintain liability insurance coverage at their own expense.

Thermal Performance

HS-DK1PL incorporates the NVIDIA Jetson TX2 embedded processor in order to allow integrated depth processing and to enable the user to run customer-specific software within the sensor device. Despite the thermal efficiency of the NVIDIA Tegra platform, the thermal output under synthetic load (100% CPU@2GHz, 100% GPU@1.3GHz) can reach around **22 W**. Therefore, HS-DK1PL uses an integrated active thermal solution.

Make sure to allow sufficient airflow to both the intake vents on the back and the exhaust vents on the side below the IO panel. In hot environments or when airflow is restricted, monitor the reported temperatures continuously. GPU and CPU temperatures should not exceed 85°C as the plastic housing might me damaged.

Specifications

Technology

— HemiStereo® Passive Trinocular Stereo Vision Technology

— Integrated AI Processing powered by NVIDIA Jetson TX2 (4+2-core CPU @ 2 GHz, 256-core Pascal GPU @ 1300 MHz, 8GB RAM)

External Interfaces

— Gigabit Ethernet, RJ-45

— 802.11ac WLAN, Bluetooth

— HDMI Display Connector

— USB 3.0 Type-A

Vision Performance

— 3x High-Resolution Fisheye Lenses

— 3x Sony Exmor™ 2.38MP High-Sensitivity Image Sensors, 3.75µm x 3.75µm Pixel Size

Depth Sensing Performance

— Lateral RGB-D Resolution: 1200 x 1200 (H x V), ~10 µsr

— Axial Depth Resolution: 0.05m@1m, 0.25m@5m

— (Accuracy depends on calibration, scene, and lighting conditions)

— Minimum Depth Distance: 0.4m

— FOV: 180° x 180° (H x V)

— Frame Rate: 10 FPS (at native resolution, fast mode)

Mechanical

— Integrated Cooling System

— 1/4-20 UNC Tripod Mount

— Plastic top cover with integrated WLAN and Bluetooth antennas

Environmental requirements:

– Indoor and outdoor, not suitable for wet or dusty environments

– Some form of external illumination is required

Software

– Pre-Installed Firmware / OS (Ubuntu 16.04)

– Stereo-Vision-Core/Daemon

– C++ API (Local or Remote Network Access)

– Simple Viewer Tool

– Extrinsic Calibration Utility

– Sample Code

Box Contents

– HS-DK1PL Sensor-Prototype

– Universal Ceiling Mounting Kit

– Industrial Desktop Adaptor, Output 19V DC @ 4.74A, Input 110/230VAC, EU-Plug

– DC Extension Cable

– Ethernet Cable

– Waterproof, Shock-Resistant Case

– Factory Calibration Report

– Drilling Pattern

– This Quick Start Guide