Zivid 2+
User Guide

Revision: 1.1

Date: 01/07/2023

Ordering code:

M130 (ZVD2P-M130)
M60 (ZVD2P-M60)
L110 (ZVD2P-L110)
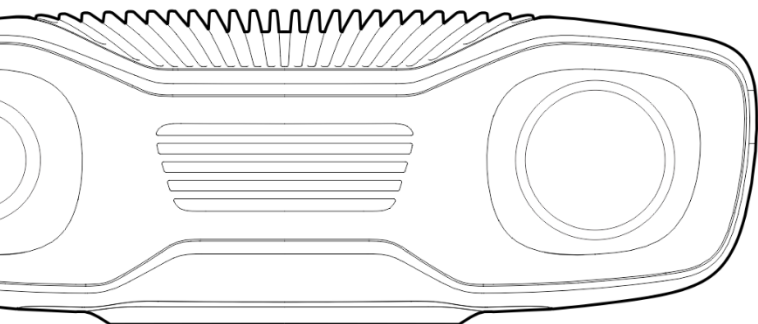
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1. Regulatory Information

1.1 Compliance

The Zivid 2$^+$ camera is compliant with EN 62368, FCC class B, Canada ICES-003 (B) / NMB-003 (B), KC, CE, and CB environmental standards.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

> **ⓘ Note**
>
> This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

Connections and assembly must be performed by competent technicians. Do not connect external I/O signals to the device while it is powered; this may damage the device.

1.2 Safety Precautions

Transport the device in its original packaging or make sure it is properly cushioned during transportation.

The Zivid 2+ camera is tested against IEC 62471-5:2015 and is classified as Risk Group 2. IEC 62471 classifies optical radiation sources based on the level of hazard to the skin and eye. As with any bright light source, do not stare into the beam.

CAUTION | Do not stare into the beam, RG2

2. Unboxing

In the Zivid box you will find:

- Zivid 2$^+$ 3D camera
- 24 V power supply

Optional/as ordered:

- Power cables (straight connector), available in 5 m, 10 m and 20 m
- Power extension cables (angled connector), available in 3 m
- Ethernet (CAT-6A) cables (straight connector), available in 5 m, 10 m and 25 m
- Ethernet (CAT-6A) extension cables (angled connector), available in 3 m

Included in Development Kit:

- 5 m Ethernet (CAT-6A) cable
- Calibration Board
- Mount of choice (Stationary Mount or On-Arm Mount)
- Tripod Adapter

Mounting accessories included in development kit or ordered separately.

3. System Requirements

OS	Windows 10 or Linux Ubuntu 18.04/20.04/22.04 [1]
GPU	Dedicated GPU
	A dedicated GPU gives the best performance with Zivid. It is also the best choice if the GPU will be used for more than Zivid's computations. A medium to high-end AMD or NVIDIA GPU with at least 3 GB of memory is required for optimal performance. This is the preferred solution for Zivid.
	Recommendations:
	• NVIDIA GeForce GTX 1060 or better • NVIDIA GeForce MX150 or better • AMD Radeon RX 550 or better [2] [3]
GPU	CPU with integrated GPU
	This is the most cost-efficient solution for Zivid. The benefit of an integrated GPU is that the data transfer from GPU to CPU is fast. A high-end integrated GPU with at least 3 GB of memory available is required for optimal performance.
	Recommendations:
	• AMD Ryzen 5 2400G or better [2] [4] • Intel i7 with HD630 or better
Ethernet	Full performance:
	10GBASE-T (10G Copper Ethernet) adapter connected via PCI Express or Thunderbolt 3.
	Reduced performance:
	1000BASE-T and NBASE-T (1G, 2.5G and 5G copper) connections

> **Tip**
> Use CPU with integrated GPU for applications that require low power consumption, e.g., battery powered mobile platforms with cameras.

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[1]Support for Ubuntu 16.04 is removed since SDK 2.7.

[2]Radeon no longer supports SPIR on some GPUs, please verify your GPU drivers support SPIR to be compatible with Zivid Software. Only relevant for SDK 2.6 and lower; SPIR is no longer required since SDK 2.7.
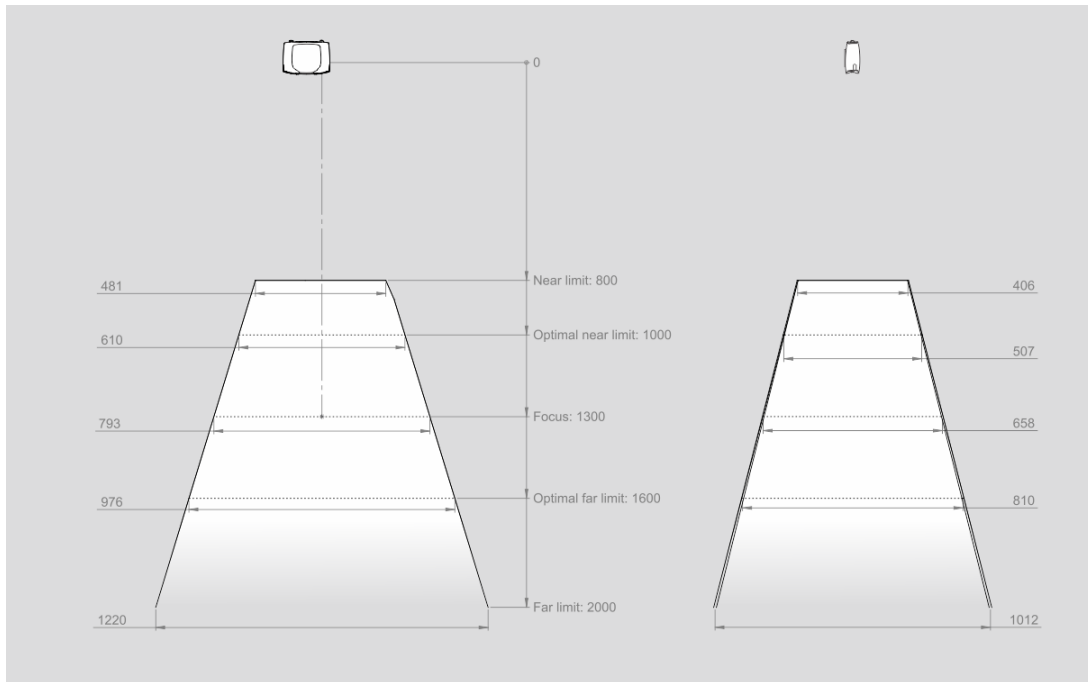
[3]AMD RDNA cards (such as RX 5500 and RX 5700) can be unstable on Ubuntu depending on the installed GPU driver version and OS version. We recommend to test stability carefully with your setup if you use these models.

[4]AMD integrated GPUs can be unstable on Ubuntu. We recommend to test stability carefully with your setup if you use these GPUs.

4. Mechanical Installation

4.1 Working Distance and Field-of-View

Zivid 2⁺ M130

481	Near limit: 800
610	Optimal near limit: 1000
793	Focus: 1300
976	Optimal far limit: 1600
1220	Far limit: 2000

Zivid 2⁺ M60

Zivid 2⁺ L110

694	Near limit: 700
797	Optimal near limit: 800
1096	Focus: 1100
1394	Optimal far limit: 1400
1692	Far limit: 1700

547	
625	
858	
1091	
1324	
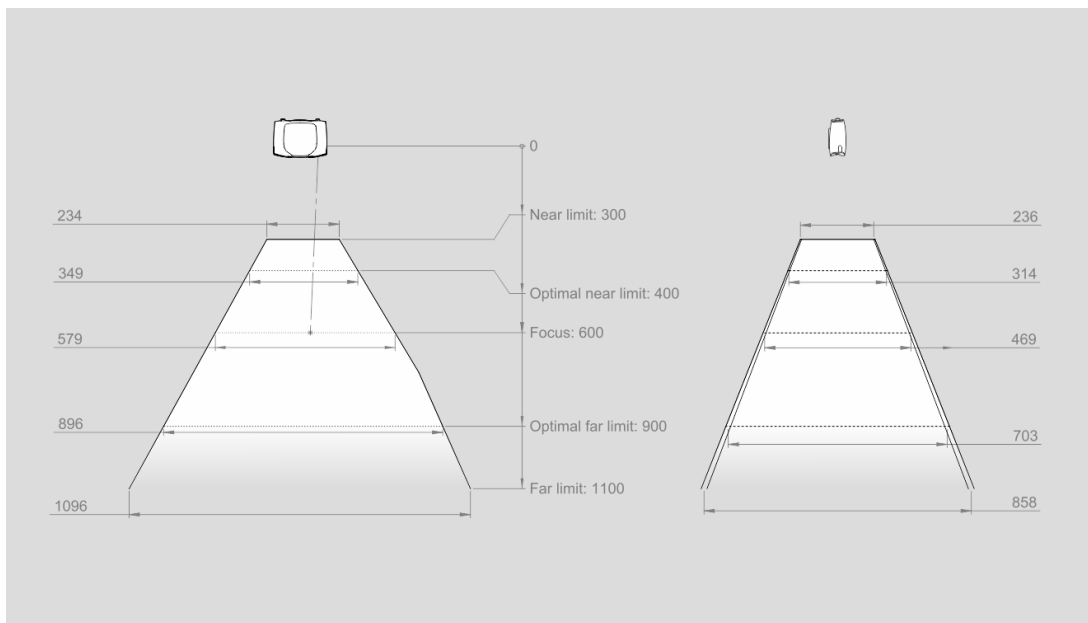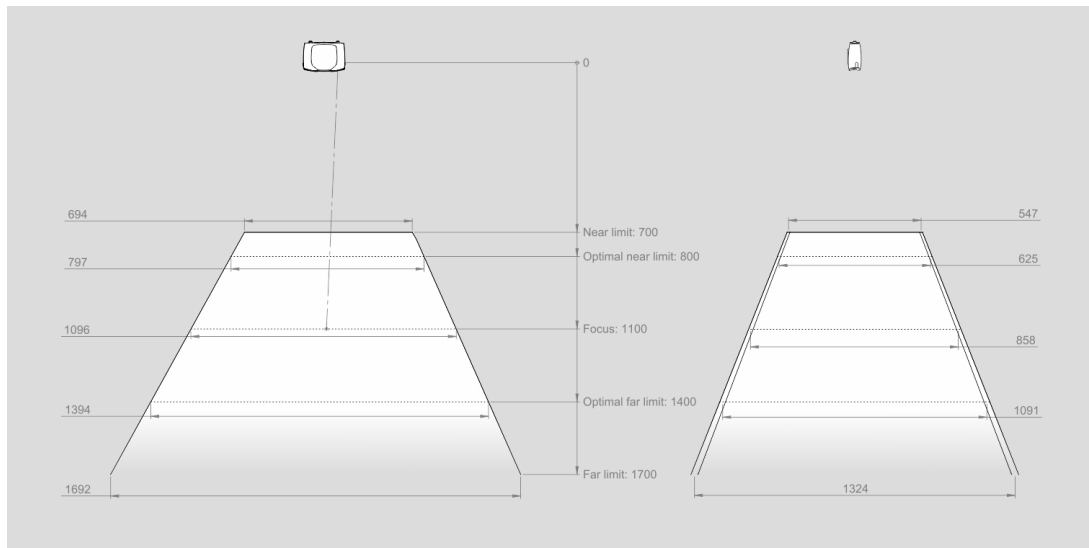
4.2   Mechanical Interface

The Zivid 2$^+$ camera has three M5 mounting holes, one Ø5 positioning hole, and one Ø5x1 obround alignment hole. We recommend using DIN 912 / ISO 4762 Hexagon or ISO 14579 Hexalobular socket head cap screws in stainless steel (A2 or A4). To ensure not to damage the threads, we recommend not exceeding the specified maximum torque value when fastening the screws.

Ø5 Positioning Hole

Depth: 4 mm
H11 (+0.08, -0)

3 x M5 Mounting holes

Depth: 7 mm
Max torque: 3 Nm

Ø5 x 1 Obround Alignment Hole

Depth: 4 mm
H11 (+0.08, -0)

> **ⓘ Note**
>
> The camera must be completely still during the acquisition to deliver the specified 3D image quality. Otherwise, it is completely safe to move it, e.g. when mounted on a robot or any other moving platform.

4.3 Flatness of Mounting Surface

For optimal performance we recommend a mounting surface flatness of ±0,05 mm or better. Mounting the camera to an uneven surface can in some cases affect the calibration.

We recommend using one of the Zivid Camera Mounts to ensure problem free installation of the camera.

4.4 Mounting Accessories

On-Arm Mount

Tripod Adapter

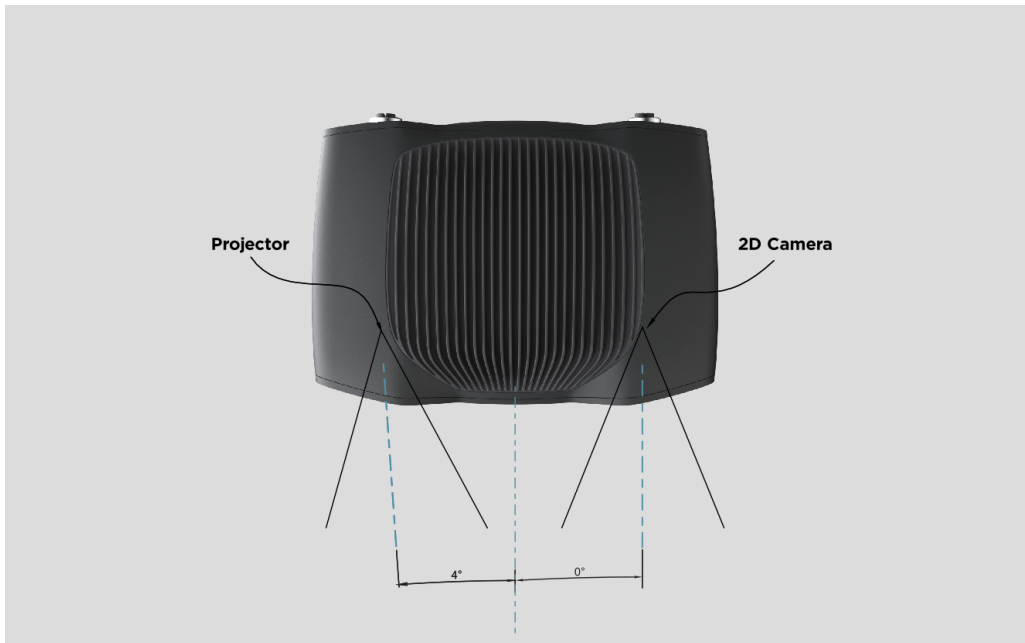Stationary mount

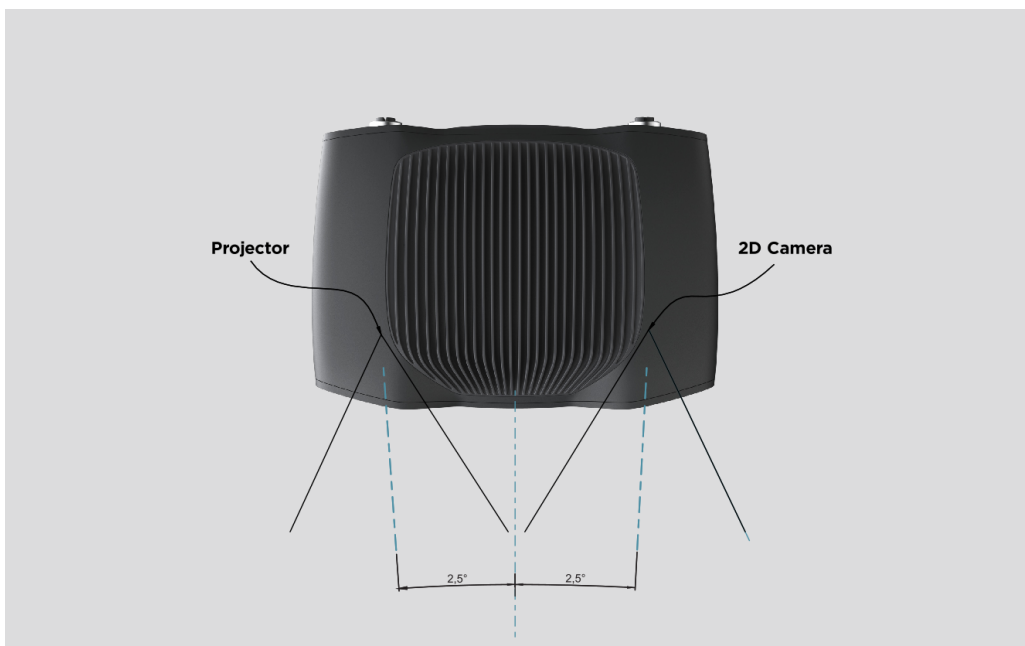Mounting accessories can be ordered at:

shop.zivid.com

4.5 Positioning Correctly

The 2D camera and the projector have an angle with respect to the center axis. This should be considered if it is desired to have the camera perpendicular to the scene.
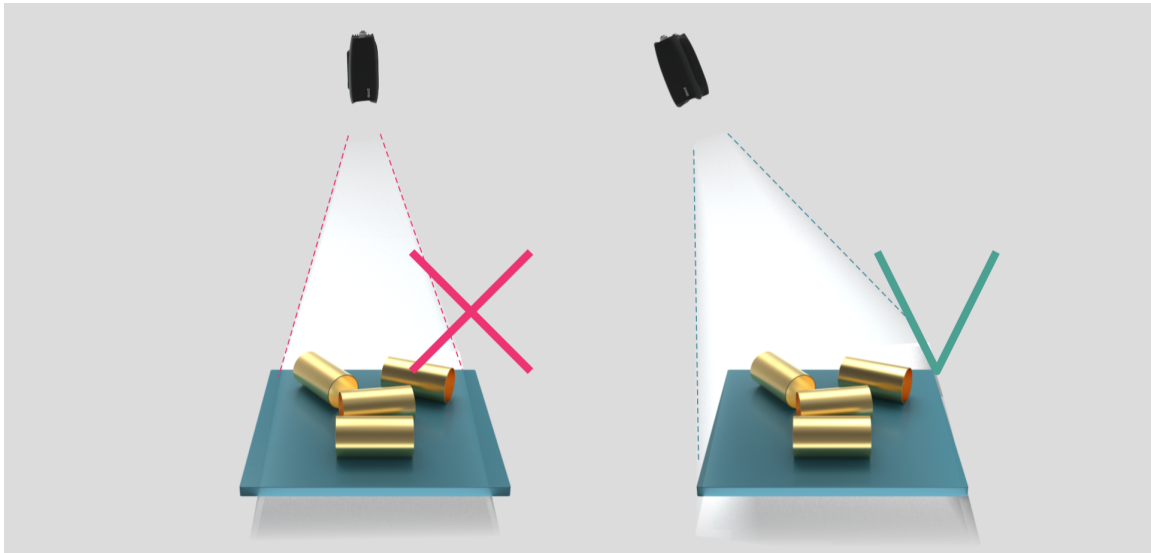
Zivid 2⁺ M130

Zivid 2⁺ M60 and L110

If possible, mount the camera at a slight tilt angle to avoid reflections and interference from the background. This also frees up space above the scene for easier access for tools and robots.


Ambient light might reduce performance. Consider blocking direct light affecting the scene.

ⓘ Note
Camera tilting is more important if the scene contains specular surfaces.

In bin-picking applications

For bin-picking applications, place the Zivid camera projector above the back edge or above the rear corner of the bin (see images below). Pan and tilt it so that the 2D camera is looking at the bin center. The projector rays should not fall on the inner surfaces of the two walls closest to the projector; they should almost be parallel to those two walls. Mounting the camera this way minimizes interreflections from the bin walls.
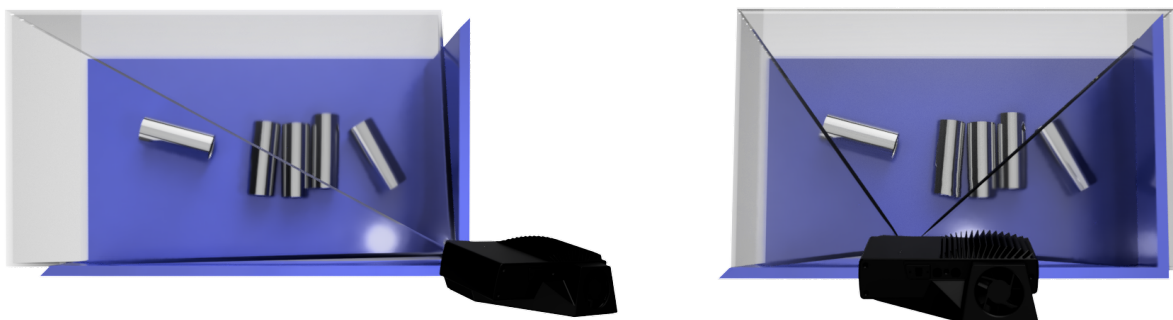
Cooling clearance

Zivid cameras use active and passive cooling, allow some space around the device for airflow, and do not block the air opening on its front and rear sides. Advise the technical specifications for the operating temperature range for your camera.

Signal protection

Do not install Zivid cameras and cables next to high voltage devices that can generate high levels of electromagnetic disturbance. Do not route camera cabling through the same trunks/conduits with AC power cables and cables emitting high levels of disturbance.

5. Connectivity and Power Supply

5.1 Connectors

Ethernet Connector: M12X CAT 6A

Pinout M12X-8	RJ45 (Color)
1	1 (WH/OG)
2	2 (OG)
3	3 (WH/GN)
4	6 (GN)
5	7 (WH/BN)
6	8 (BN)
7	5 (WH/BU)
8	4 (BU)

Power
- Power
- Error

Speed
- 10 Gigabit/s
- 5, 2.5 Gigabit/s
- 1 Gigabit/s
- Error

Ethernet Link
- Activity
- Error

Factory reset button

Power Connector: M12, 24V, 5A DC

Pinout M12-5	Purpose
1	24V DC +/- 20% (Max 5A)
2	24V DC +/- 20% (Max 5A)
3	GND
4	GND
5	Reserved, do not connect

Optional mating connector:
TE Connectivity AMP1838275-3
(Digikey:A97645-ND)

Tip: It is required to use both pins
for 24V and for GND

Factory reset button

- Reset (power cycle): Intermittent press or hold for less than 5 seconds.
- Reset to factory IP address: Hold for 5 to 10 seconds until the Power LED turns green.
- Revert to factory installed firmware: Hold for more than 10 seconds until the Power LED turns yellow.

5.2 Connecting to the Computer

1. Plug the power supply into the "24V" port and into a power outlet.

2. Plug the Ethernet cable into the camera and connect it to your computer.

ⓘ Note

> Ensure that all connections are screwed in tightly. The coupling nut of the M12 screw connectors can in some cases be hard do screw in. However, when installed correctly they provide a robust and reliable connection.

Use the AC/DC adapter supplied with the unit to ensure compliance with emission and immunity standards.

The Zivid unit is protected against reverse polarity and against overheating by a thermistor that physically removes the power.

The Zivid 2$^+$ camera uses Ethernet communication and needs 10 Gbps for best performance. Your computer may not have a port for 10 Gigabit Ethernet. In that case, you may can connect to it using an adaptor for 10GBASE-T (10 Gbps copper Ethernet) to Thunderbolt 3. At a reduced performance you can also use 1000BASE-T and NBASE-T (1 Gbps, 2.5 Gbps, and 5 Gbps over copper) to USB adapters.

ⓘ Caution

> USB-based network adapters have reduced and more variable capture speed, and can occasionally give errors when using the camera.
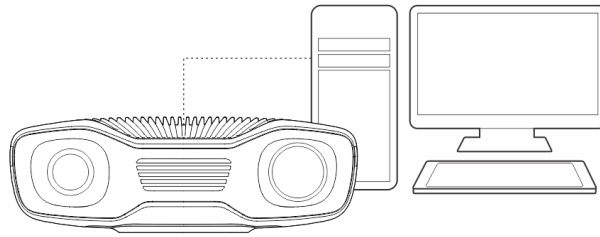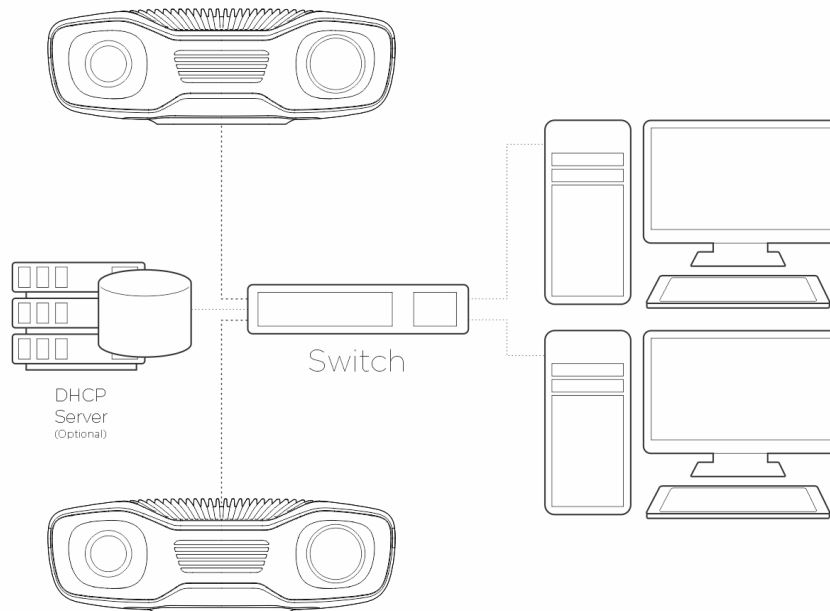
ⓘ Caution

> Use only Zivid approved Ethernet cables.

5.3 Network Topology

Zivid 2$^+$ supports the following network topologies:

Direct connection

Connection via switch

5.4   Network Configuration

The Zivid 2$^+$ camera uses Ethernet communication and needs 10 Gbps for best performance. Your computer may not have a port for 10 Gigabit Ethernet. In that case, you can connect to it using a Thunderbolt 3 to 10GbE Adapter. At a reduced performance you can also use USB to 5GbE, 2.5GbE, or 1GbE adapters.

Requirements

Performance	Network	Interface	Connection
Optimal (recommended)	10GbE (10Gbps)	PCIe card	Direct
Very good	10GbE	Thunderbolt Adapter	Direct
Reduced	5GbE or 2.5GbE	PCIe/USB/Thunderbolt Adapter	Direct/Switch
Minimum	1GbE (1Gbps)	PCIe/USB Adapter	Direct/Switch

🛈 Caution

USB-based network adapters have reduced and more variable capture speed, and can occasionally give errors when using the camera.

Default configuration

	IP	Subnet mask	Gateway	Hostname
Zivid 2$^+$	172.28.60.5	255.255.255.0	172.28.60.1	zivid-<serial number>
Possible PC	172.28.60.2 [1]	255.255.255.0	172.28.60.1	

In order to use the camera with the default IP address your PC's IP address must be in the same subnet, as listed in the table above.

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[1]Any IP address in the subnet range is valid, except the network address (172.28.60.0) and the broadcast address (172.28.60.255). We also choose to avoid the gateway IP (172.28.60.1), even though we don't currently require a gateway.
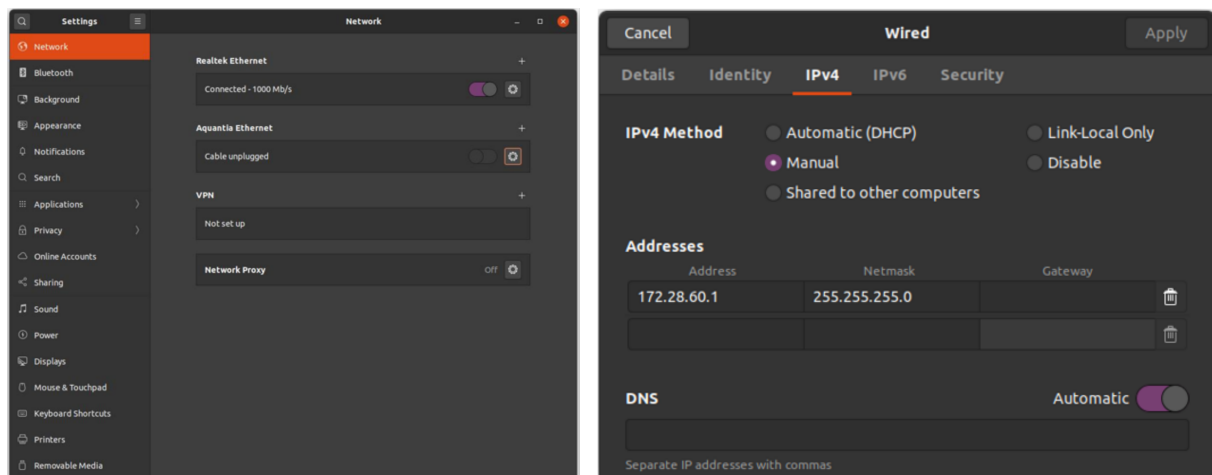
Windows

Right click on your network connection and chose Properties.
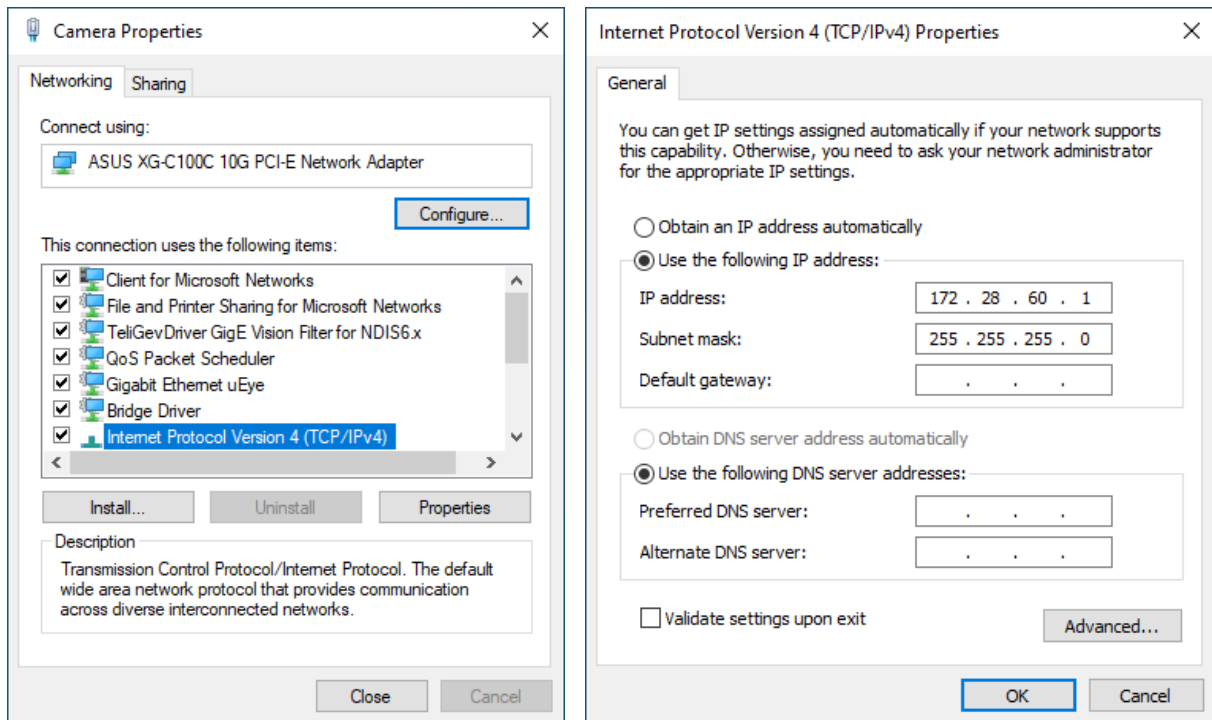
Ubuntu

Set up the network configuration in the IPv4 tab.

For complete Zivid 2⁺ network configuration instructions, navigate to:

support.zivid.com/getting-started/software-installation/zivid-two-network-configuration.html

6. Software

To download the latest software for your camera, navigate to:

www.zivid.com/download-software

Visit the Knowledge Base for the installation guide, and then navigate to the Zivid Studio user guide to learn how to capture your first point clouds:

support.zivid.com

7. Support and Troubleshooting

For more information, visit:

support.zivid.com

The Zivid Knowledge Base provides answers for commonly seen issues and questions related to Zivid products, for both software and hardware. You will also find in depth articles about our camera technology, best use practices, different types of 3D imaging methods and structured light, to get a better understanding for how to use this product.

8. Service and Maintenance

The device contains no user-serviceable parts inside. The product warranty will be void if opened.

Follow the below instructions to ensure that your Zivid camera is well maintained:

- Check screw connections and connectors at regular intervals.

- Do not block the air opening on the front and rear sides of the product.

- The unit uses active and passive cooling, allow some space around the device for airflow.

- Use a small vacuum cleaner or a small canister of compressed air to remove dust or other accumulated particles from the glasses or in between the ribs of the heat sink.

- Regularly clean optical glass parts of the device.

- Check and update the calibration on a yearly basis by performing Infield Correction (and Hand-Eye Calibration) when necessary.

9. About Zivid

Zivid is a market-leading provider of 3D machine vision cameras and software for next generation robotics and industrial automation systems. Its Zivid 2⁺, Zivid 2, and Zivid One⁺ products are regarded as the world's most accurate real-time 3D color cameras and bring human-like vision to the smart factories and warehouses of Industry 4.0.

To find out more about Zivid, visit:

www.zivid.com

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ZiVID

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