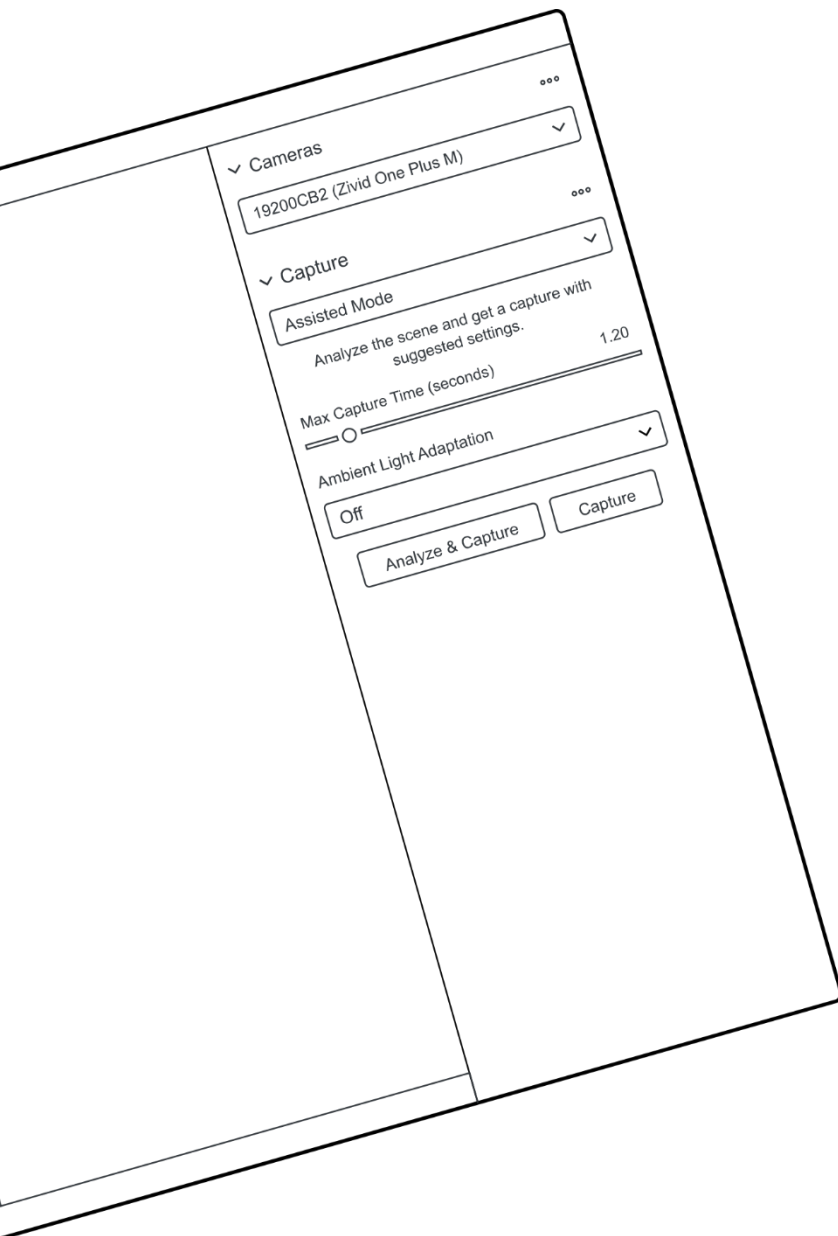




# Zivid Studio

## User Guide

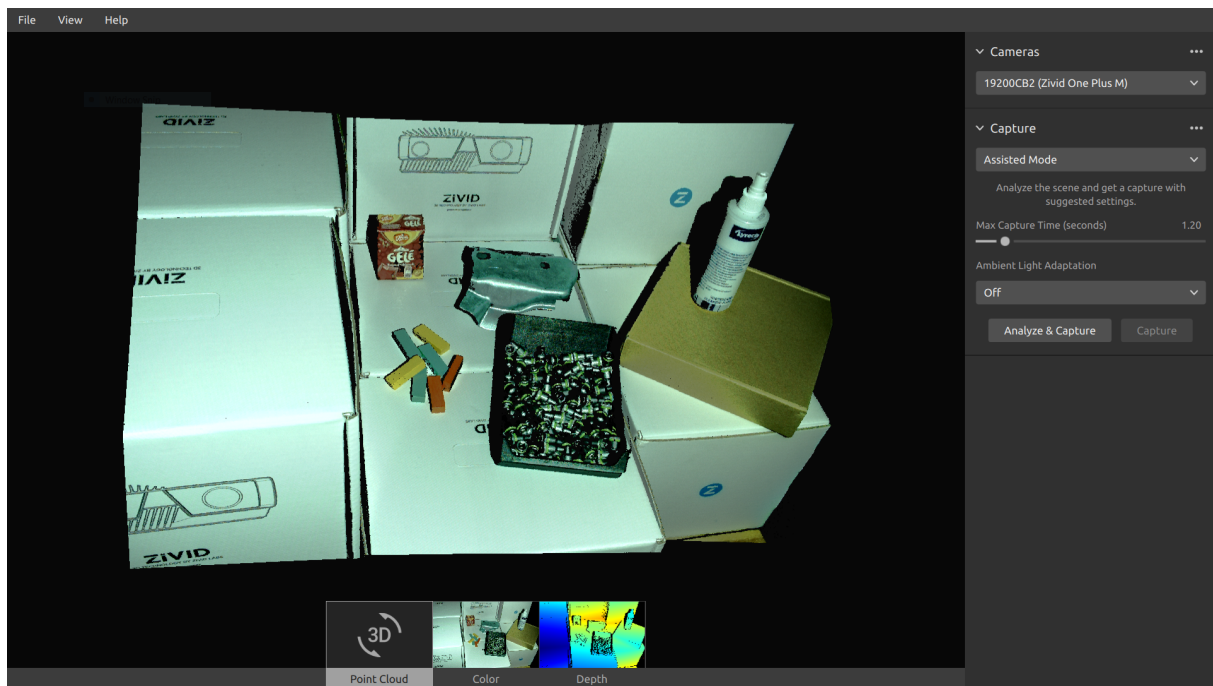


# Table of Contents

1. Introduction . . . . .	3
2. Toolbar . . . . .	4
3. Available Views . . . . .	6
3.1 Point Cloud . . . . .	6
3.2 Color . . . . .	7
3.3 Depth . . . . .	8
4. Control Panel . . . . .	9
4.1 Camera . . . . .	9
Firmware update . . . . .	9
4.2 Capture . . . . .	10
Assisted Mode . . . . .	10
Manual Mode . . . . .	12
Single and Live Captures . . . . .	14
HDR . . . . .	14
5. Quick Reference Index . . . . .	16
6. Support and Troubleshooting . . . . .	19
7. About Zivid . . . . .	20

# 1. Introduction

Zivid Studio is the graphical user interface (GUI) for the Zivid SDK. This allows the user to explore the functionality of the Zivid Cameras and the capturing of high definition 3D point clouds.

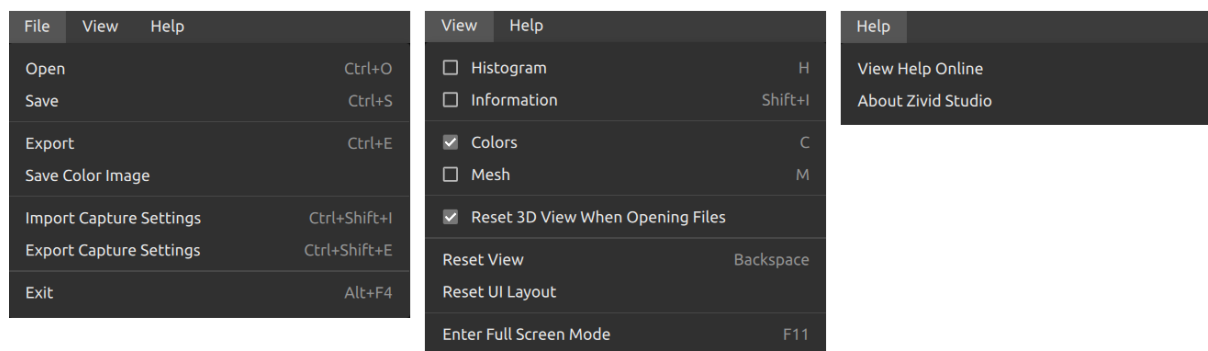


Use Zivid Studio to learn and understand how the majority of functions available in the Zivid SDK works. This is useful when developing your application. You can:

- Capture point clouds.
- Visualize point clouds, color images (2D), and depth maps (Z axis).
- Analyze and evaluate 3D data quality.
- Determine correct settings and filters for your target objects and scenes.
- Save point clouds and color images to disk.

## 2. Toolbar

The toolbar is located at the top of the Zivid Studio GUI. It consists of drop-down menus to handle files, control the GUI, and get information about the Zivid Software.



File	Shortcut	Function
Open	Ctrl+O	Load a ZDF file. .zdf is the native Zivid file format that includes point cloud, color image, and depth image data.
Save	Ctrl+S	Save a point cloud, color image, and depth image data to a ZDF file, the native Zivid file format.
Export	Ctrl+E	Export a point cloud data to a file in unordered or ordered Polygon (PLY), ASCII (XYZ), or Point Cloud Data (PCD) file format.
Save Color Image		Save a color image to a file in PNG, BMG, or JPG file format.
Import Capture Settings	Ctrl+Shift+I	Load saved capture settings from a file in YML into Zivid Studio.
Export Capture Settings	Ctrl+Shift+E	Save current capture settings from Zivid Studio into a file in YML.
Exit	Alt+F4	Exit Zivid Studio.
View	Shortcut	Function
Histogram	H	Open the Histogram, a tool for analyzing pixel intensity distribution on an image.
Information	Shif+I	Open the Information panel to display capture information such as camera model, capture time and settings used. Provides ability to apply or save settings from previous captured point cloud.
Reset View	Backspace	Reset the point cloud, color image, and depth image view back to the default view.
Reset 3D View when opening files		Enable/disable 3D view reset when opening files.
Color	C	Enable/disable point cloud colors.
Mesh	M	Generate surfaces in the point cloud. Creates a 3D mesh appearance.
Reset UI Layout		Reset the layout of the Zivid Studio window.

---

Enter / Exit Full Screen Mode	F11	Toggle between full and regular screen mode.
Help	Function	
View help online	URL to the Zivid Knowledge Base.	
Legal Notice	Detailed information on Zivid and third-party software licenses.	
System Info	Information on the system used by the Zivid software.	

---

## 3. Available Views

There are three available views to choose from at the bottom of the Zivid Studio GUI.

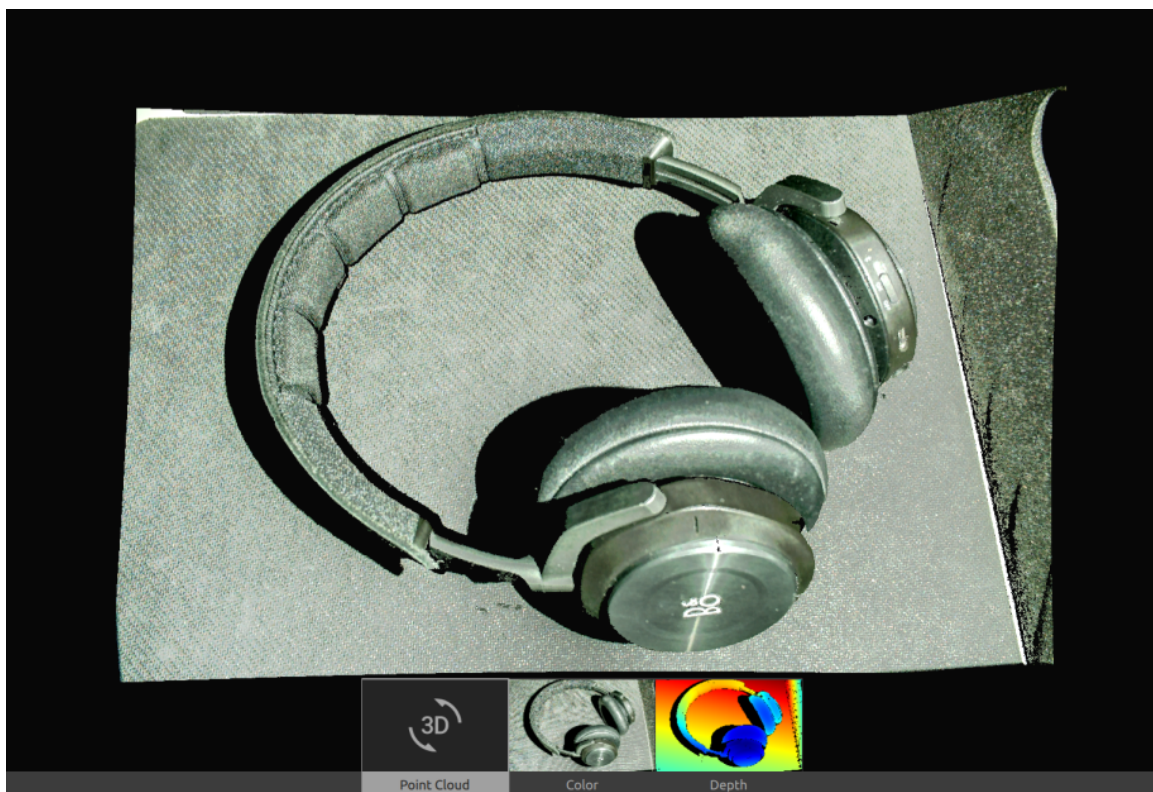


### 3.1 Point Cloud

This view displays the point cloud of the scene after a capture or after loading a ZDF file.

- Use the left mouse button to rotate the point cloud
- Use the right mouse button to pan.
- Zoom in or out by rolling the mouse wheel or, if available, by the middle mouse button followed by dragging the mouse.

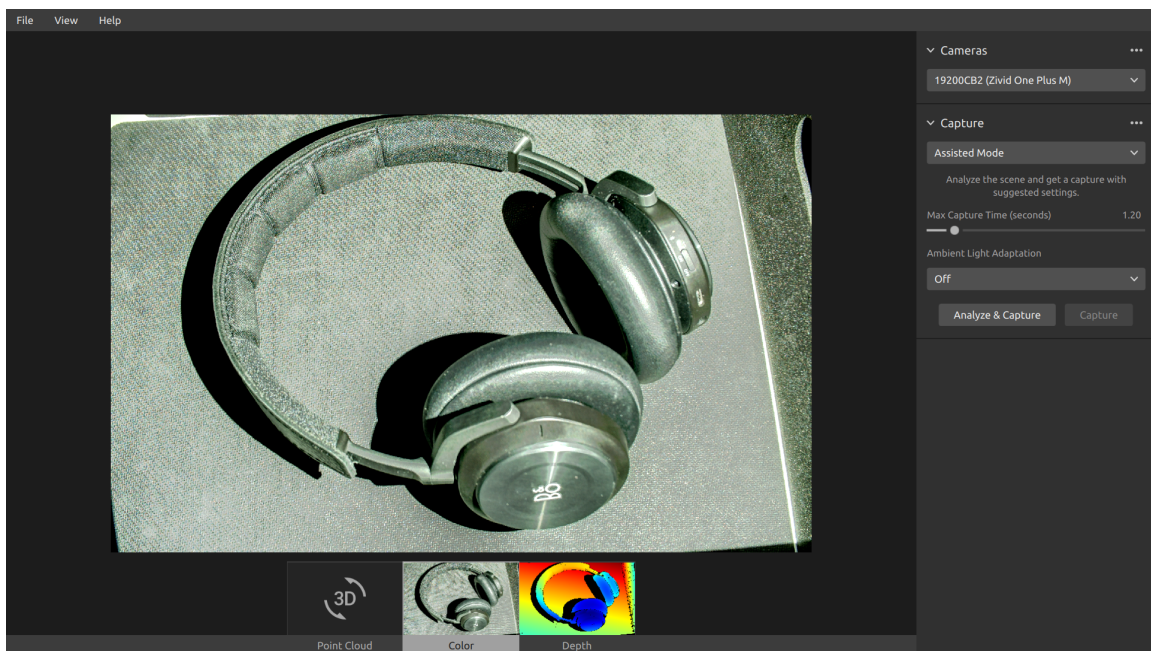
Turning color and mesh on and off in this view helps evaluate the point cloud quality.



## 3.2 Color

This view displays the color image of the scene after a capture or after loading a ZDF file.

- Position the mouse pointer over a pixel in the image to get image coordinates, RGB, and SNR values. The pixel values are displayed in the status bar in the bottom left corner of the window.
- Zoom in or out by rolling the mouse wheel or, if available, by the middle mouse button followed by dragging the mouse.
- Use the left mouse button to pan the view.

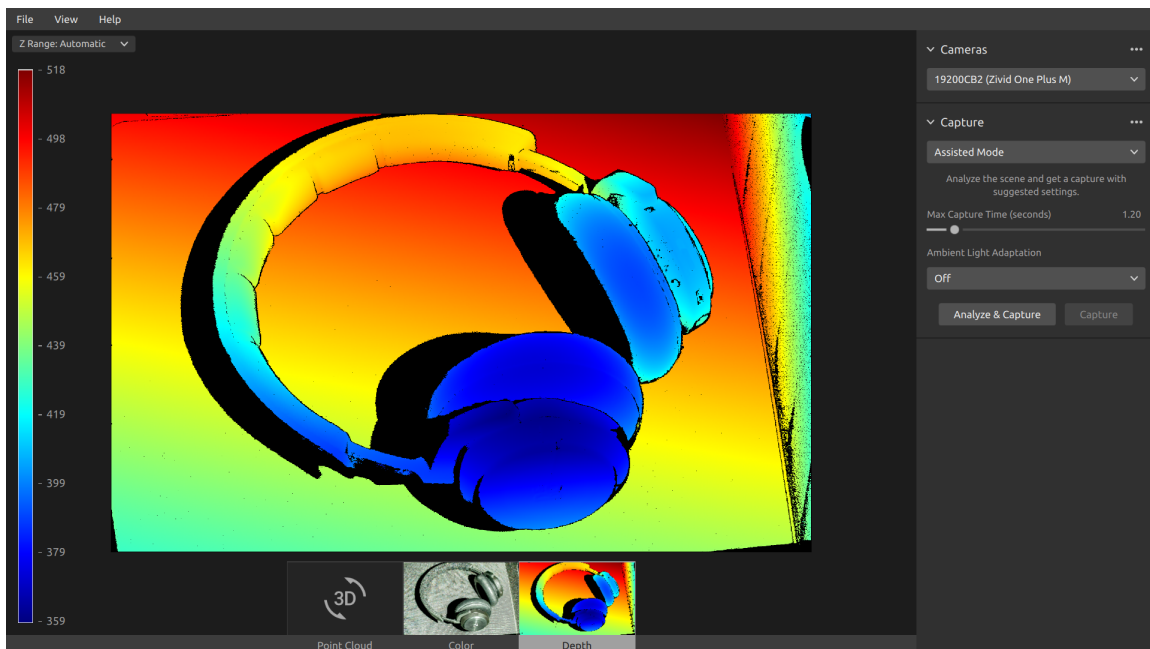


### 3.3 Depth

This view displays the depth image of the scene after a capture or after loading a ZDF file.

- Position the mouse pointer over a pixel in the image to get image coordinates, XYZ, and SNR values. The pixel values are displayed in the status bar in the bottom left corner of the window.
- Use the drop-down menu located at the top left corner of the view to modify the Z range.
- Use zoom and pan functionalities in the same way as described in the Color View.

The color scale represents the distance variation along the z-axis from the camera to the surfaces of the imaged objects.





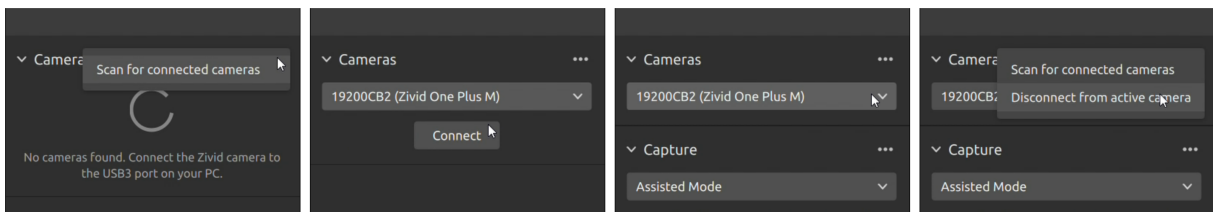
## 4. Control Panel

The control panel is located on the right side in the Zivid Studio GUI. It contains two sections:

- Camera
- Capture

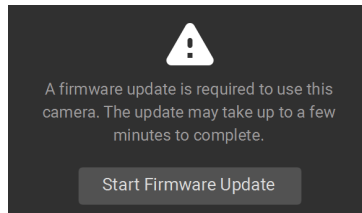
### 4.1 Camera

This section is used to scan for, connect to, and disconnect from available cameras.



### Firmware update

Each SDK version is matched with camera firmware, and the SDK will make sure that the camera runs compatible firmware. When Zivid Studio connects to a camera, it will check whether the camera has matching firmware. If the firmware does not match, you will get prompted to update firmware on your camera.



Camera	Function
Scan for connected cameras	Show all cameras plugged into the PC and list them by model and serial number.
Connect	Connect to the camera selected in the drop-down menu. Zivid Studio can connect to a single camera at a time.
Disconnect from active camera	Disconnect from the active camera.

## 4.2 Capture

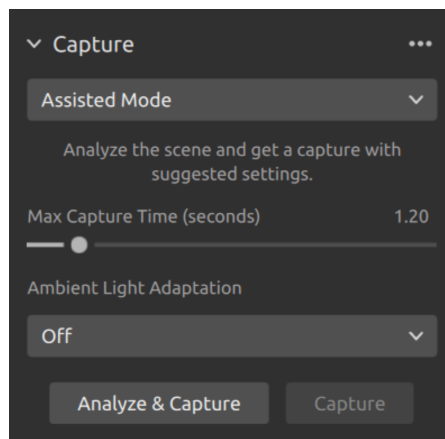
This section is used to capture 3D images. Here you can control and configure the camera settings. This section has two modes:

- Assisted Mode
- Manual Mode

### Assisted Mode

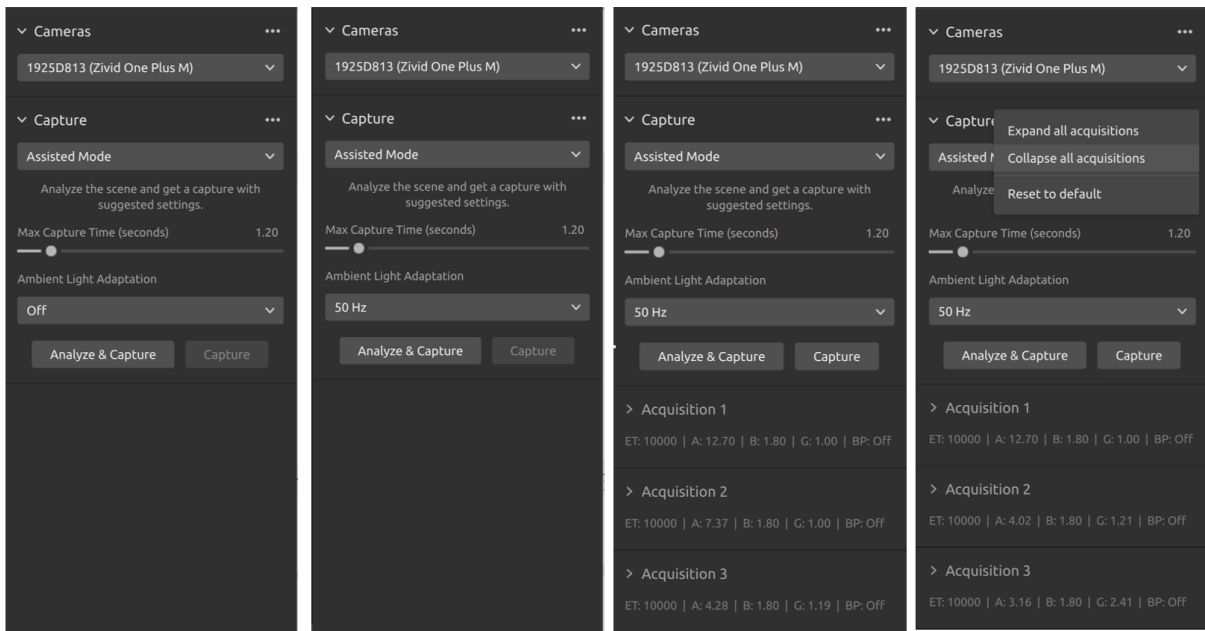
This mode is the easiest to use.

- Specify the maximum capture time
- Click “Analyze & Capture”



This triggers the camera to analyze the scene and output the camera settings required to cover as much of the dynamic range in the scene as possible. Immediately after this, the camera performs a second capture using these settings.

- The “Capture” button performs a capture with the settings suggested by the assisted capture, without additional scene analysis.

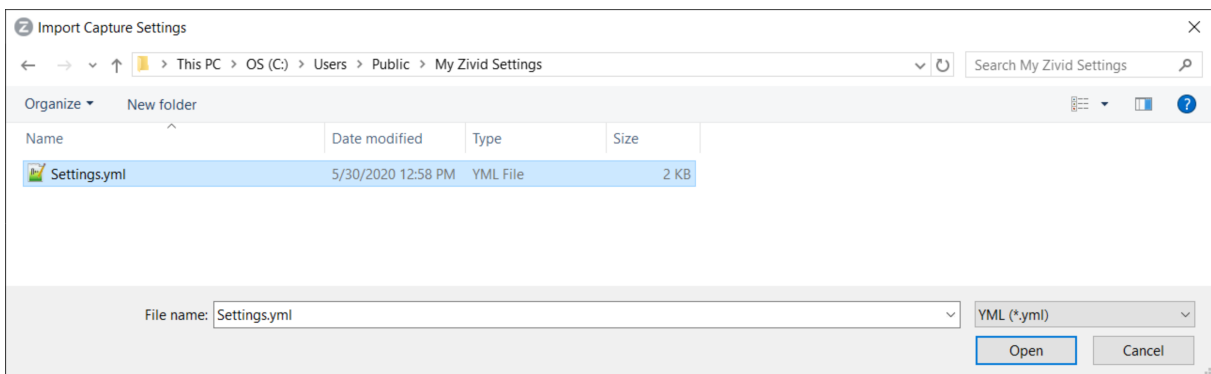


“Ambient Light Adaptation” is used when ambient light (AC powered) is mixed with the camera’s projector.

- Select your power grid frequency from the drop-down menu. 60 Hz is typically used in Japan, Americas, Taiwan, South Korea, and the Philippines. 50 Hz is the normal in the rest of the world.

Acquisition and filter settings appear at the bottom right corner of the “Capture” section after camera captures. It is possible to save all settings to disk.

- Click File → Export Capture Settings
- Navigate to the location where you want to save the settings
- Write down the file name
- Click Save



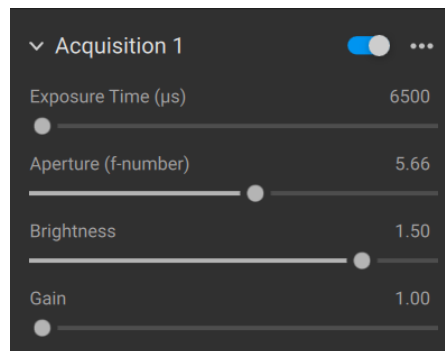
Settings can be loaded using the Zivid SDK.

## Manual Mode

In the manual mode, users must configure all settings and filters manually.

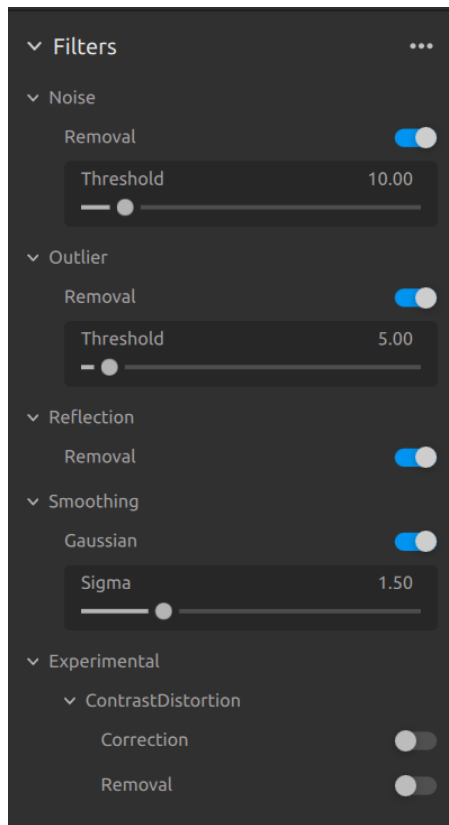
### Exposure settings

Setting	Function
Exposure Time	The duration a single camera image is exposed to light.
Aperture	The opening that controls the amount of light to the camera sensor through the lens.
Brightness	The output power (the amount of light) emitted by the LED projector.
Gain	The amplification of the signal from the camera sensor.



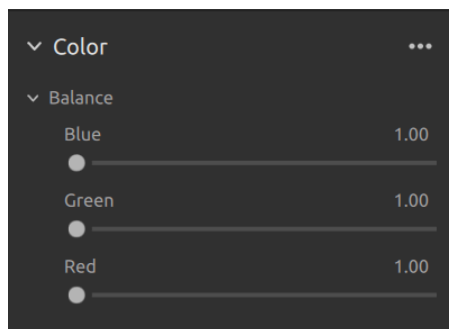
### Filters

Setting	Function
Noise Filter	Remove points where the projected pattern signal-to-noise-ratio is below the specified threshold.
Outlier Filter	Remove points if the distance to their neighboring pixels within the small local region is larger than the threshold specified in mm.
Reflection Filter	Remove points impacted by reflections and thus erroneous.
Gaussian Smoothing	Perform Gaussian smoothing on the point cloud.
Contrast Distortion	Corrects and/ or removes points affected by blurring in the camera lens.



## Color

The color temperature of ambient light affects the appearance of the color image. Set the white balance by adjusting blue, green and red color balance to make color images look natural.

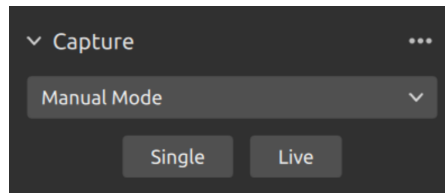


## Gamma

The output color image can appear too dark. Set the Gamma to adjust the brightness of the color image.

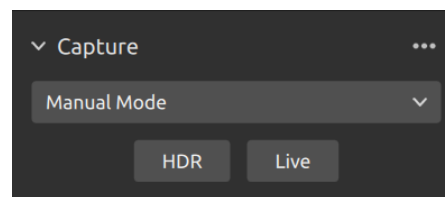
## Single and Live Captures

- The “Single” button captures a single acquisition with the specified settings, which is then displayed.
- The “Live” button triggers continuous captures, which enable you to view the scene in real-time.



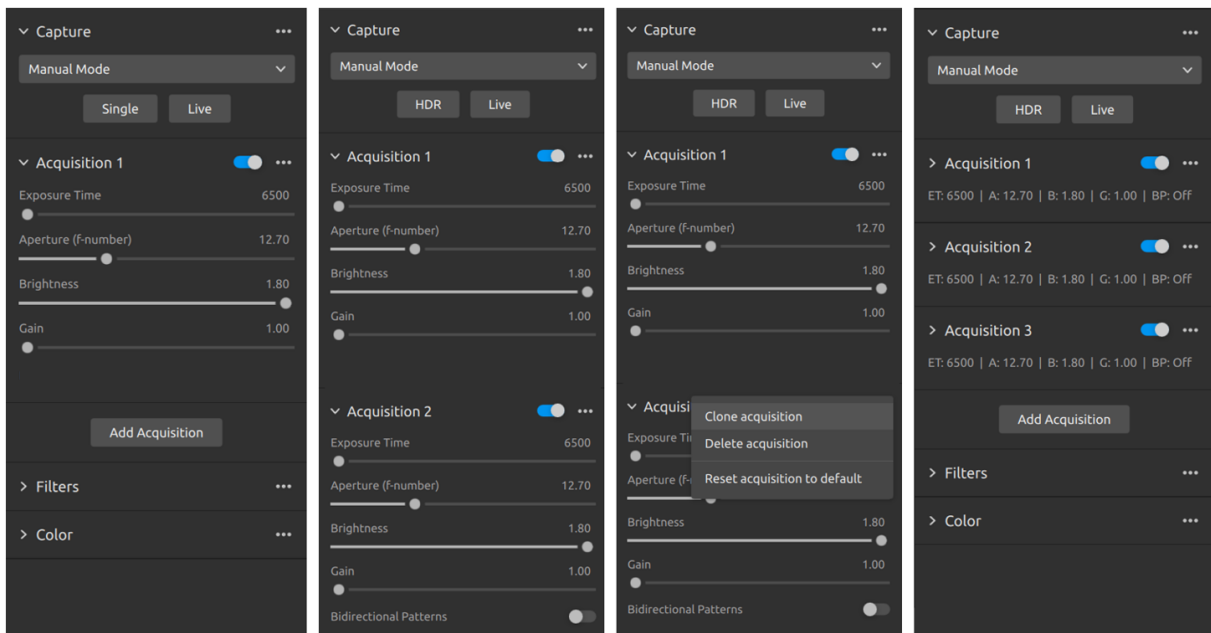
## HDR

For high dynamic range scenes, it is necessary to use multi-acquisition HDR. In this mode, the camera captures one image per acquisition. Each image captured uses the settings configured for the specific acquisition. These images are then automatically merged into a single, high-quality HDR frame.



Once you select the manual mode, you can click the “Add Acquisition” button to add additional acquisitions. By default, each new acquisition added uses the settings of the previous acquisition. You can clone a specific acquisition by clicking on the three dots next to that acquisition and then on the “Clone” acquisition option. Use the same menu to reset acquisition settings or delete individual acquisitions. Disable or enable acquisitions with the checkbox.

Click the “HDR” button to capture an image with the acquisition settings specified; unchecked acquisitions are ignored by the capture.



You can also use the Assisted mode to get suggested settings, and then switch to the Manual mode to fine tune these settings manually.

## 5. Quick Reference Index

File	Shortcut	Function
Open	Ctrl+O	Load a ZDF file. .zdf is the native Zivid file format that includes point cloud, color image, and depth image data.
Save	Ctrl+S	Save a point cloud, color image, and depth image data to a ZDF file, the native Zivid file format.
Export	Ctrl+E	Export a point cloud data to a file in unordered or ordered Polygon (PLY), ASCII (XYZ), or Point Cloud Data (PCD) file format.
Save Color Image		Save a color image to a file in PNG, BMG, or JPG file format.
Import Capture Settings	Ctrl+Shift+I	Load saved capture settings from a file in YML into Zivid Studio.
Export Capture Settings	Ctrl+Shift+E	Save current capture settings from Zivid Studio into a file in YML.
Exit	Alt+F4	Exit Zivid Studio.
View	Shortcut	Function
Histogram	H	Open the Histogram, a tool for analyzing pixel intensity distribution on an image.
Information	Shif+I	Open the Information panel to display capture information such as camera model, capture time and settings used. Provides ability to apply or save settings from previous captured point cloud.
Reset View	Backspace	Reset the point cloud, color image, and depth image view back to the default view.
Reset 3D View when opening files		Enable/disable 3D view reset when opening files.
Color	C	Enable/disable point cloud colors.
Mesh	M	Generate surfaces in the point cloud. Creates a 3D mesh appearance.
Reset UI Layout		Reset the layout of the Zivid Studio window.
Enter / Exit Full Screen Mode	F11	Toggle between full and regular screen mode.
Help		Function
View help online		URL to the Zivid Knowledge Base.
Legal Notice		Detailed information on Zivid and third-party software licenses.
System Info		Information on the system used by the Zivid software.
Camera		Function
Scan for connected cameras		Show all cameras plugged into the PC and list them by model and serial number.
Connect		Connect to the camera selected in the drop-down menu. Zivid Studio can connect to a single camera at a time.



Disconnect	Disconnect from the active camera.
<b>Capture</b>	<b>Function</b>
Assisted Mode	Switch to assisted capture mode.
Max Capture Time (seconds)	Maximum capture time in seconds for assisted capture.
Ambient Light Adaptation	Specify if and to what ambient light frequency the assisted capture is to adapt.
Analyze & Capture	Trigger assisted capture to analyze the scene, then another capture, with the settings suggested by assisted capture.
Capture	Trigger capture with the settings that have already been suggested by the assisted capture.
<b>Manual Mode</b>	<b>Switch to manual capture mode.</b>
Single	Trigger a single acquisition with the settings specified in the checked frame.
Live	Trigger a continuous capture that allows viewing the scene in real-time.
HDR	Trigger a multi-acquisition HDR capture with the settings specified in the checked acquisitions; unchecked acquisitions are ignored.
Expand all acquisitions	Expand the settings on all acquisitions.
Collapse all acquisitions	Collapse the settings on all acquisitions.
Reset to default	Reset the control panel to the default state.
<b>Acquisition</b>	<b>Function</b>
Exposure Time	The duration a single camera image is exposed to light.
Aperture	The opening that controls the amount of light to the camera sensor through the lens.
Brightness	The output power (the amount of light) emitted by the LED projector.
Gain	The amplification of the signal from the camera sensor.
Toggle switch	Enable/disable the selected acquisition.
Clone acquisition	Add a new acquisition resembling the setting of the selected acquisition.
Delete acquisition	Delete the selected acquisition.
Add acquisition	Add a new acquisition resembling the setting of the last acquisition.
Reset acquisition to default	Reset the selected acquisition settings to default values.
<b>Filters</b>	<b>Function</b>
Noise Filter	Remove points where the projected pattern signal-to-noise-ratio is below the specified threshold.
Outlier Filter	Remove points if the distance to their neighboring pixels within the small local region is larger than the threshold specified in mm.
Reflection Filter	Remove points impacted by reflections and thus erroneous.
Gaussian Smoothing	Perform Gaussian smoothing on the point cloud.
Contrast Distortion	Corrects and/ or removes points affected by blurring in the camera lens.

Reset to default	Reset the filters to the default state.
Color	Function
Blue color balance	The color temperature of ambient light affects the appearance of the color image. Setting white balance by adjusting blue color balance makes the color image look natural.
Green color balance	The color temperature of ambient light affects the appearance of the color image. Setting white balance by adjusting green color balance makes the color image look natural.
Red color balance	The color temperature of ambient light affects the appearance of the color image. Setting white balance by adjusting red color balance makes the color image look natural.
Gamma	Adjust the brightness of the color image.
Reset to default	Reset the blue, green, and red color balance to the default state.

## 6. Support and Troubleshooting

For more information, visit:

[support.zivid.com](https://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.

## 7. 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 One<sup>+</sup> and Zivid Two 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](http://www.zivid.com)



### Email

Technical support: [customersuccess@zivid.com](mailto:customersuccess@zivid.com)

Sales: [sales@zivid.com](mailto:sales@zivid.com)

General: [info@zivid.com](mailto:info@zivid.com)

### Phone

Zivid HQ-Oslo, NO | +47 21 02 24 72

Zivid Sales-Austin, TX, US | +1 (847) 345-7691

Zivid Sales-Xiamen, CN | +86 139 5012 9074

Zivid Sales-Seoul, KR | +82 10 8984 5350

Zivid  
Gjerdrums vei 10A  
0484  
Oslo, Norway

©23/08/2021, Zivid. All rights reserved. Subject to change without notice.

**ZiVID**  
See more. Do more.