# Einstar Vega

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# Overview

## About the User Manual

This user manual (hereinafter referred to as "the Manual") introduces the device appearance and operation procedure of Einstar Vega, and the usage process of the desktop post-processing software StarVision.

### Symbol Convention

| Symbol | Description |
| --- | --- |
|  | **Note**: This symbol is used to inform you of the additional information of the product. |
|  | **Caution**: This symbol is used to inform you of incorrect operations that may damage the device or result in data loss. Any damages resulting from misuse are not covered by the warranty. |
|  | **Warning**: This symbol is used to inform you of the potential risks that may result in serious personal injury and other safety incidents. |

### Compliance

| Symbol | Description |
| --- | --- |
| CE | **LVD / EMC Directive**<br>This symbol complies with the European Low Voltage Directive 2014/35/EU and EMC Directive 2014/30/EU. |
|  | **WEEE Directive - 2012/19/EU**<br>The product this manual refers to is covered by the Waste Electrical & Electronic Equipment (WEEEE) Directive and must be disposed of in a responsible manner. |
|  | This device complies with "IEC 60825-1:2014 Safety of laser products".<br>This device also complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.<br>940 nm |
| FC | Federal Communications Commission Certified. |
| RoHS | Restriction of Hazardous Substances Certified. |
| KC | Korea Certification Certified. |

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## FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the Federal Communications Commission (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. Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference;
- This device must accept any interference received, including interference that may cause undesired operation. Privacy of communications may not be ensured when using this device.

This Class B digital apparatus complies with Canadian ICES-003.CAN ICES-3(B)/NMB-3(B).

## IC Statement

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

- This device may not cause interference;
- This device must accept any interference, including interference that may cause undesired operation of the device.

**French version**

Le present appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisee aux deux conditions suivantes:

- L'appareil ne doit pas produire de brouillage;
- L'utilisateur de l'appareil doit accepter tout brouillage radioelectrique subi, meme si le brouillage est susceptible d'en comprome-re le fonctionnement.

## Restrictions in the 5 GHZ Band

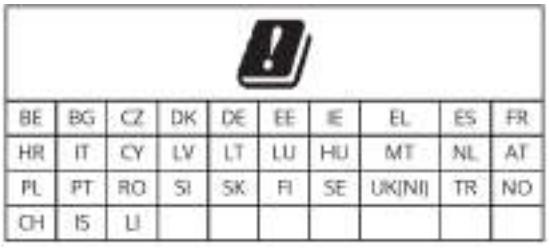
Within the 5.15 to 5.25 GHz band, UNII devices will be restricted to indoor operations to reduce any potential for harmful interference to co-channel Mobile Satellite System (MSS) operations.

**Canadian version**

Restrictions dans la bande de 5 GHZ Dans la bande de 5,15 à 5,25 GHz, les appareils UNII seront restreints aux opérations intérieures pour réduire toute possibilité d'interférence pouvant nuire aux opérations du Système satellite mobile dans le même canal (MSS).

## EU Statement

This device is restricted to indoor use when operating in the 5150-5250MHz frequency range.



| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR |
| HR | IT | CY | LV | LT | LU | HU | MT | NL | AT |
| PL | PT | RO | SI | SK | FI | SE | UK(NI) | TR | NO |
| CH | IS | LI | | | | | | | |

## RF Exposure Information and Statement

The SAR limit of USA is 1.6 W/kg averaged over one gram of tissue, this device has also been tested against this SAR limit. To maintain compliance with RF exposure requirements, use accessories that maintain at least 5mm separation distance between the user's body. The use of belt clips, holsters and similar accessories should not contain metallic components in its assembly. The use of accessories that do not satisfy these requirements may not comply with RF exposure requirements, and should be avoided.

**French version**

La limite de das des États-Unis est de 1,6 W/kg en moyenne sur un gramme de tissu, ce dispositif a également été testé par rapport à cette limite de das.Pour maintenir la conformité aux exigences d'exposition aux RF, utilisez des accessoires qui maintiennent une distance de séparation d'au moins 5mm entre le corps de l'utilisateur.L'utilisation de clips de ceinture, de étuis et d'accessoires similaires ne doit pas contenir de composants métalliques dans son assemblage.L'utilisation d'accessoires qui ne satisfont pas à ces exigences peut ne pas être conforme aux exigences d'exposition aux RF et devrait être évitée.

# Getting Started

This chapter provides an overview guide for **Einstar Vega** handheld 3D scanner and its accompanying desktop post-processing software **StarVision**, making it easy for you to find the corresponding instructions.

## About Einstar Vega

You can learn about the scanner here, including the appearance & specification of the scanner and its activation process.

→ Introduction to the scanner

→ Specification of the scanner

→ How to activate the scanner?

→ Introduction to the interface

**After activation, follow the steps below to use the scanner.**

### 1 Calibrate the Scanner

Calibration ensures the accuracy of the scanner and improves the scanning quality.

→ How to prepare for calibration?

→ How to operate calibration?

### 2 Prepare for the Scan

You can do some preparation before scanning to enhance your scanning.

→ How to prepare for the scan?

### 3 Pre-set for the Scan

After the necessary preparation for the scan is done, you can adjust relevant scanning settings to get a better scan result.
Some of those settings can also be adjusted during the scan.

→ How to adjust scanning settings?

### 4 Scan and Generate a Point Cloud

After you set scanning parameters, scan the object and generate a point cloud.

→ How to scan a model?

### 5 Edit the Point Cloud

You can edit the scanned data after completing the scan to clip the redundant data.

→ How to edit the point cloud?

### 6 Post-process

You can mesh the model and share it.

→ How to generate and optimize a mesh?

→ How to edit the mesh data?

→ How to share the model?

## About StarVision

You can learn about the desktop software here, including its function list and interface overview.

→ Introduction to the software

→ Introduction to the interface

**After installation, follow the steps below to use the software.**

### 1 Create a Workspace

### 2 Edit the Point Cloud

Before performing data or mesh edits, you need to create a workspace and import the model into it.

→ How to create a workspace?

→ Introduction to the interface

You can choose a point cloud project and clip the redundant data.

→ How to edit the point cloud?

### 3 Post-process and Measure

You can mesh the model and measure it.

→ How to generate a mesh?

→ How to edit the mesh data?

→ How to measure the model?

### 4 Export and Share

You can export the project or upload the model to SHINING 3D Digital Cloud.

→ How to export or share a model?

# Device Introduction

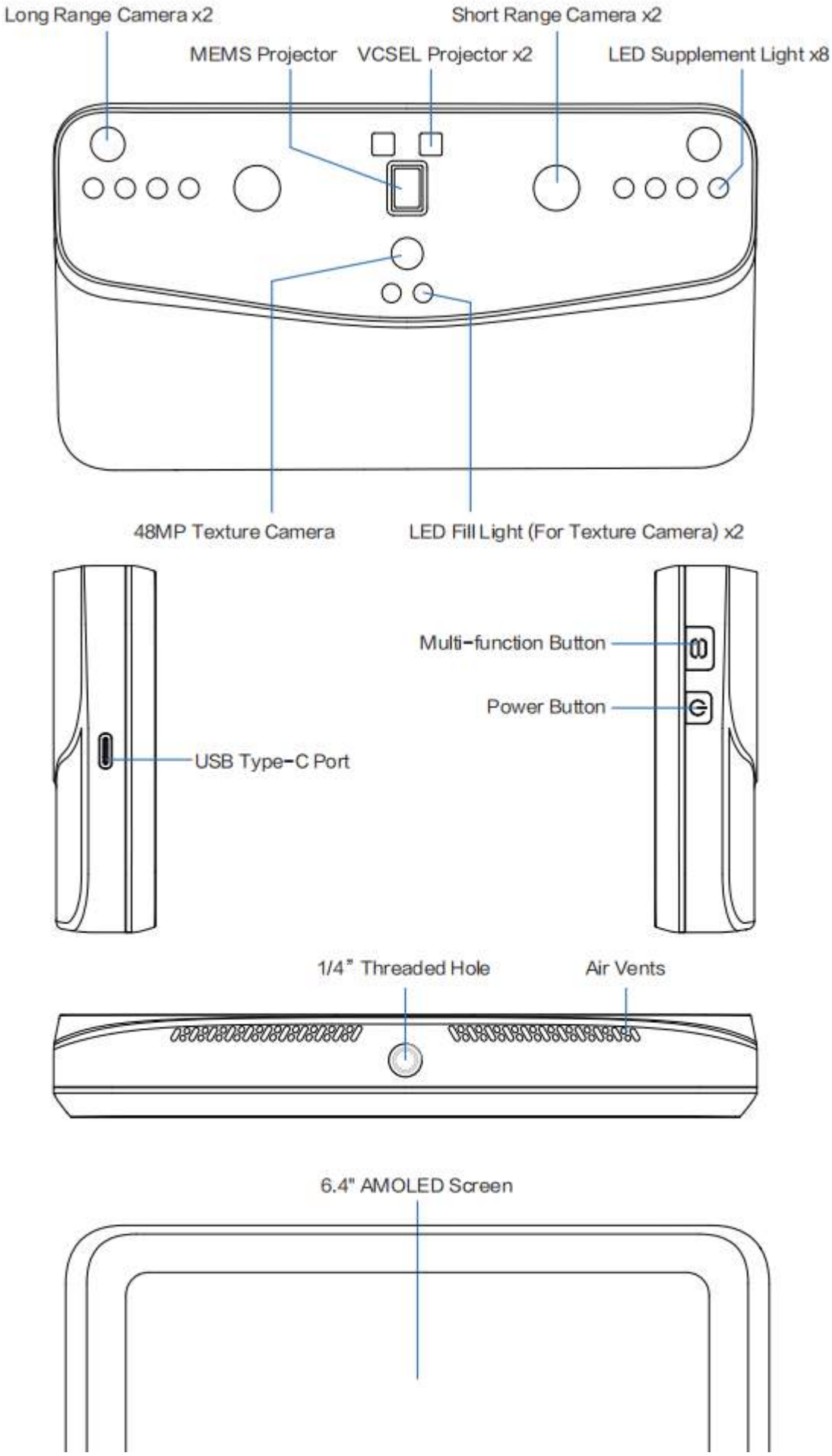
## About the Device

Einstar Vega is a popular handheld wireless 3D scanner developed independently by SHINING 3D based on years of accumulated 3D visual technology and market demand. It features a high-definition 3D imaging camera and a 48-megapixel texture camera, along with multiple white light and infrared LED lights, ensuring excellent data quality and accurate color reproduction.

It offers a fast and smooth 3D scanning experience with a user-friendly and efficient workflow, and strikes a balance between detail and efficiency, making it suitable for various scanning scenarios such as art creation and cultural heritage preservation, thus truly achieving the digitalization of all things.

Besides, we also provide a desktop post-processing software StarVision, which supports file transfer and one-click data processing.

### Appearance


Long Range Camera x2
Short Range Camera x2
MEMS Projector
VCSEL Projector x2
LED Supplement Light x8
48MP Texture Camera
LED Fill Light (For Texture Camera) x2
Multi-function Button
Power Button
USB Type-C Port
1/4" Threaded Hole
Air Vents
6.4" AMOLED Screen

## Package List

| Index | Description |
| --- | --- |
| A | Einstar Vega Scanner (with Silicone Case) |
| B | USB Type-C to C cable |
| C | Wrist Strap & Ring Screw |
| D | Calibration Board |
| E | Markers |
| F | Packing List |
| G | Carrying Case |
| H | Figure for scan |
| I | Power adapter |
| J | Calibration Board Holder |

**Note**

- Serial number can be found on the back of the scanner after the silicon case is removed or on the back of the calibration board.
- It is recommended that you use a charging adapter that supports the PD 3.0 PPS protocol for a better fast charging experience.

# Specification

## Hardware Parameters

| Parameter | Description |
| --- | --- |
| Device dimensions | 180 mm x 95 mm x 26.5 mm |
| Device weight | 643 g |
| Working temperature | -10 ℃ ~ 40 ℃ |
| Working humidity | 0 % ~ 90 % RH (no coagulation) |
| Screen | 6.4-inch 2K OLED screen |
| Light source | Class I |
| RGB fill light | White flash LED * 2 |
| Markers fill light | Infrared fill light * 8 |
| 3D camera resolution | • HD: 2 mega-pixel<br>• Fast: 1.3 mega-pixel |
| Texture camera resolution | 8064 px x 6048 px (48 mega-pixel) |
| Battery type | Lithium polymer battery (5000 mAh) |
| Data format | OBJ / STL / PLY / ASC |
| Interface | USB 2.0 or 3.0; BT; Wi-Fi 6 |
| RAM | 32 GB |
| ROM | 32 GB eMMC+ 512 GB SSD |
| Compatible system (for StarVision) | Windows 10 or Windows 11 (64-bit); macOS (recommended: macOS 11.0 or above with Apple Silicon) |

## Scanning Parameters

| Parameter | Description |
| --- | --- |
| Working distance | • HD scan mode: 100 mm ~ 250 mm<br>• Fast scan mode: 350 mm ~ 1500 mm |
| Scan area | • HD scan mode (100 mm): 26 mm (H[1]) * 29 mm (V[2])<br>• Fast scan mode (1000 mm): 1028 mm (H) x 997 mm (V) |
| Scan speed | • HD scan mode: 13 fps ~ 14 fps<br>• Fast scan mode: 15 fps |
| Resolution | Accurate to the minimum of 0.05 mm |
| Minimum scan dimensions | 10 mm * 10 mm * 10 mm |
| Supported alignment modes | Features alignment / Markers alignment / Texture alignment / Hybrid alignment |

## Frequency Range (RF)

- BT: 2400 - 2483.5 MHz (TX / RX)
- Wi-Fi (2.4G): 2400 - 2483.5 MHz (TX / RX)
- Wi-Fi (5G):
  - Band 1: 5150 - 5250 MHz (TX / RX)
  - Band 4: 5725 - 5850 MHz (TX / RX)
- BT: < 10 dBm (max.e.i.r.p)
- 2.4G Wi-Fi: < 20 dBm (max.e.i.r.p)
- 5G Wi-Fi: < 23 dBm (max.e.i.r.p)

Dual antenna, Type: Built-in ipex antenna.

---

1. The size or range of the image or data in the left-right direction. ↩
2. The size or range of the image or data in the vertical direction. ↩

# Activation

Before using the device, please activate it by logging into your SHINING 3D passport account first: **power on** > **connect to the network** > **register / login**.

> **Note**
>
> The device which has not been connected to the Internet or logged in can still be used to scan, but the scanned data can not be uploaded to SHINING 3D Digital Cloud.

## Power On

To power on the device successfully, press and hold the power button for 2 seconds until the screen displays the startup animation.

> **Note**
>
> - If the device remains black screen or displays a charging prompt , please promptly charge the device until it reaches the minimum battery level:
>   - : Charging.
>   - : Charging completes.
> - After powering on, please make sure to check the *End User License Agreement* first, or you will not be allowed to enter the **Next Step**.

### Power Off

Press and hold the power button for 6 seconds to power the device off.

## Connect Network

After entering the **Connect Network** interface, the device will automatically search for available wireless networks nearby every 10 seconds.

- indicates that the W-LAN is encrypted.
- indicates the signal strength of the W-LAN.

- Tap to manually search for nearby W-LANs.
- Tap or long press an unconnected W-LAN to enter the connection process.
- Long press a connected W-LAN to delete it from the list.
- Tap **Next** to register or log into SHINING 3D passport account.

- Tap **Skip** to directly enter the scan process.

> **Note**
>
> - When no network connected, you are not allowed to enter the **Next** step.
> - If you choose to **Skip** the network connection to directly enter the scan process, the scanned data can not be uploaded to SHINING 3D Digital Cloud or transferred to your computer.

## Register / Login

After entering the **Log in to SHINING 3D passport** interface,
you can choose to log in with **verification code** or **password**.

● Tap **Log in** and you will be prompted with " Login successful", then you will be directed to the scan interface.

● Tap to return to the **Connect Network** interface.

● Tap **Skip** to directly enter the scan process.

> **Note**
>
> - If this is your first login, it is recommended that you choose to log in with a verification code. If your phone number or email is not registered, it will be automatically registered after verification.
> - If you choose to **Skip** the network connection to directly enter the scan process, the scanned data can not be uploaded to SHINING 3D Digital Cloud or transferred to your computer.

## Device Connection

> **Note**
>
> - Before activating the device, it can not be connected to your computer to transfer files.
> - If the device is connected to your computer through a cable, but the StarVision software is not started, the device will be charged only.

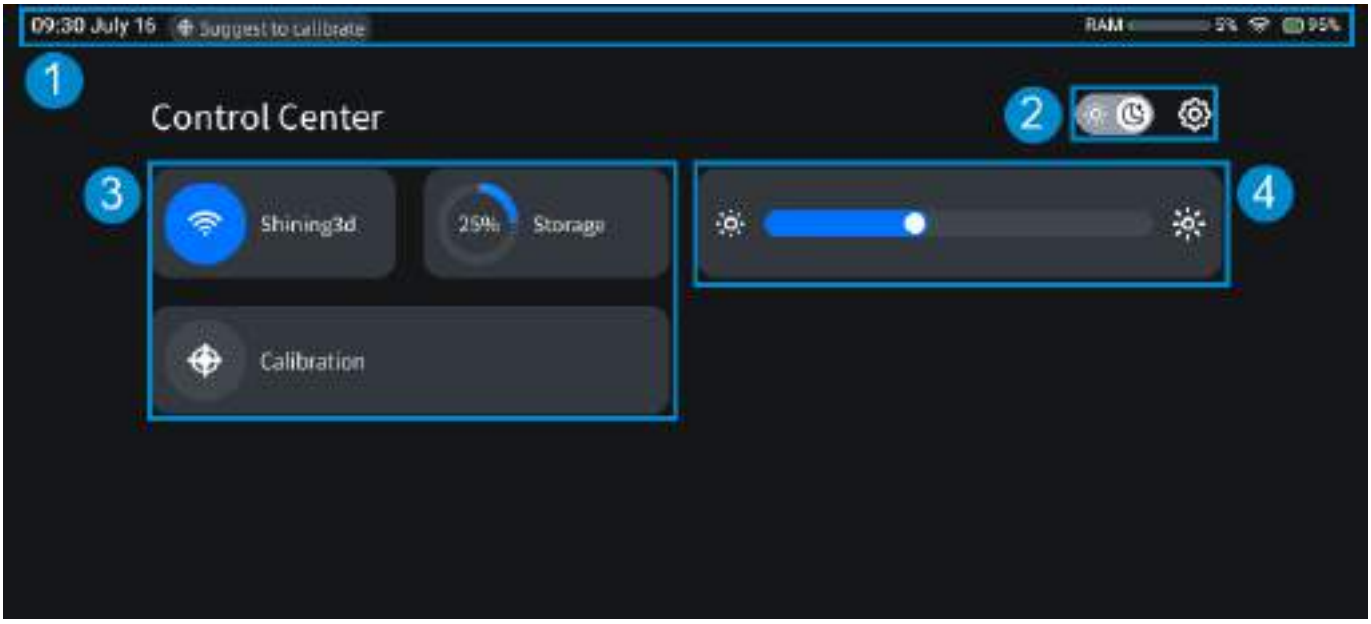
Use a cable to connect the device to your computer, and a pop-up window will appear (as shown in the right figure); if you choose **File transfer**, you can check device files on StarVision.

# Interface

## Control Center

To invoke the Control Center module, simply swipe down from the top of the screen.

### Interface Overview




**Note**

- To close the Control Center, you can either tap on the empty space in the Control Center or use the upward swipe gesture.
- If you invoke the Control Center during the scan or calibration process, you will not be allowed to use the navigation buttons for jumping to different functions.

### ① Status Bar

| Status | Description | Icons |
| --- | --- | --- |
| Time | The format is hh:mm, and it is displayed in the 12-hour format by default. You can enable the 24-hour format in the **Setting** > **Date and Time**. | / |
| Version number | Display the current software version of the device (hided when the control center is invoked). | / |
| Calibration prompt | Tap to enter the calibration process; if this is your first calibration, you will be directed to the **Help** interface. |  : It has been 7 days since the last calibration.<br>: It has been 14 days since the last calibration. |
| RAM | It indicates the device's used memory space. | : Used memory ≤ 50%.<br>: 50% < used memory ≤ 70%.<br>: 70% < used memory ≤ 100%. |
| Wi-Fi | It indicates the current status of network connection. |  : The network connection is disabled.<br>: The network connection is enabled but there is no network connection.<br>  : The network connection is good.<br>  : The network connection is not bad.<br>: The network connection is not good.<br>: The network connection is poor. |
| Battery | It indicates the current battery level. |  : 50% < battery level ≤ 100%.<br>  : 10% < battery level ≤ 50%.<br>  : 0% < battery level ≤ 10%.<br>  : The battery level is 0%.<br>  : Charging. |

> **Note**
>
> If the battery level is below 20%, 10%, and 5%, a low battery notification will appear in the interface to remind you to charge the device.

## ② Widget Bar

: Light mode.
: Dark mode (default).

> **Note**
>
> - After switching the mode, the device will continue to use the selected mode after the next boot.
> - You can also short press the scan button on the right side of the device to quickly switch the mode.

: The entrance to **Setting**.

> **Note**
>
> This entrance is not available during the process of scan or calibration.

### Setting

Tap button in the ② widget bar to enter the **Setting** interface.

| Setting | Description |
| --- | --- |
| Account | • Not logged in:<br>  ◦ Tap **Log in** to enter the interface of **Log in to SHINING 3D passport**.<br>  ◦ Tap **Device name** to modify the device name in the pop-up window; when using USB connection, you will see this name in the **Connect Scanner** list in StarVision.<br>• Logged in:<br>  ◦ The account and name will be displayed after login.<br>  ◦ Tap **Device name** to modify the device name in the pop-up window; when using USB connection, you will see this name in the **Connect Scanner** list in StarVision.<br>  ◦ Tap **Switch account** to enter the interface of **Log in to SHINING 3D passport**.<br>  ◦ Tap **Log out** and a second confirmation window will pop up.<br><br>**Note**<br>Account switch does not affect the files already in the device. |
| Software Update | Tap **Check for Update** to automatically check if the current software is the latest version.<br>1. If an update is detected, tap **Download the update file** will initiate the download process; you can tap button on the right side of the process bar to cancel the download.<br>2. After the download is completed, tap **Install Now** will proceed with the software installation.<br>3. Once the update (download and installation) is completed, the device will automatically restart.<br><br>**Note**<br>• During the download process, you can leave the current interface, and the process will continue in the background. The update progress will be displayed at the top of the interface as progress bar; but please do not operate the device during the installation process.<br>• If you receive a "download update interrupted" prompt, please follow the instructions provided.<br>• If you receive a "the remaining battery power is insufficient" prompt, please charge the device before proceeding with the installation. |
| Calibration | Display the serial number of the calibration board; or please tap **Scan to recognize the calibration board** to bind the calibration board.<br>Tap **Start calibration** to enter the calibration process; if this is your first calibration, you will be directed to the **Help** interface. |
| WLAN | Enabled by default, and the switched status will remain after the next boot. For the use of **Available WLAN**, please see connect network. |

| | |
|---|---|
| Date and Time | • Automatically set time: Enabled by default, and you can manually set **Date**, **Time** and **Time zone** (search is supported).<br>• 24-house system: Disabled by default (time is displayed in the 12-hour format), and can be enabled to switch to 24-hour system, and the time status will be updated in the status bar. |
| Language | The software language can be set as English (default) or simplified Chinese. |
| Display | Support adjusting **Screen brightness** and switching **Theme** to dark mode (default) or light mode. |
| Storage | Display the usage of device disk space, including the amount used, total storage capacity and the percentage occupied. |
| About | Display the device name, serial number, RAM, storage, software version and privacy policy.<br>**Note**<br>You can modify the device name and view the privacy policy. |

## ③ Function Panel

| Function | Description | Icons |
|---|---|---|
| Wireless network | The entrance to wireless network settings.<br>Tap the icon area to quickly enable or disable the wireless network connection. | : The wireless network connection is enabled.<br>: The wireless network connection is disabled. |
| Storage | Display the percentage of device's used memory space.<br>Tap to enter **Setting** > **Storage**. | : The used memory is no more than 75%.<br>: The used memory is more than 75%. |
| Calibration | The entrance to calibration. | : Tap to enter the calibration process; if this is your first calibration, you will be directed to the **Help** interface.<br>: Indicates that the entrance to calibration is not available, and it is probably because the device is in the process of scan or calibration. |

## ④ Screen Brightness

Drag the slider to adjust the screen brightness of the device:

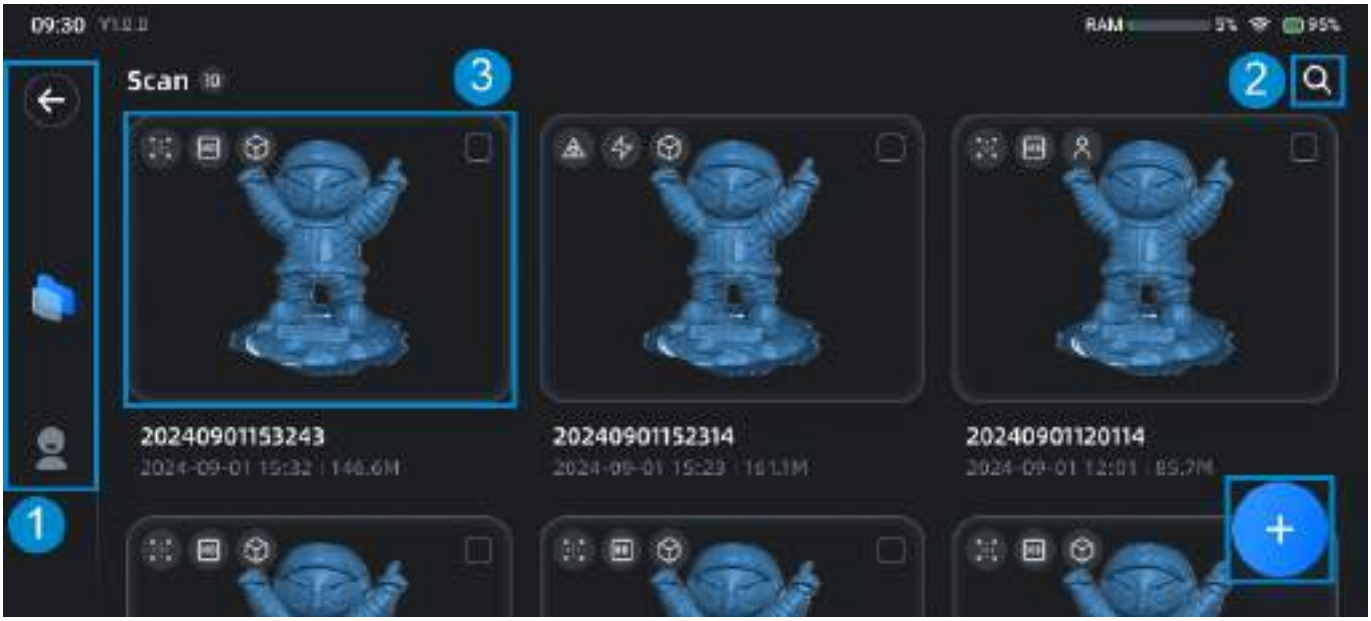
← : Brighten down.

→ : Brighten up.

# All Files

In the scan interface, tap in the right-side function bar, you can enter the interface to view all model files on the device.

## Interface Overview




## ① Left Navigation Bar

: Tap this button to return to the scan preview interface.

: Tap this button to return to the main interface.

: Tap this button to enter the personal center interface.

### Personal Center

: Tap to enter the interface of **Log in to SHINING 3D passport**.

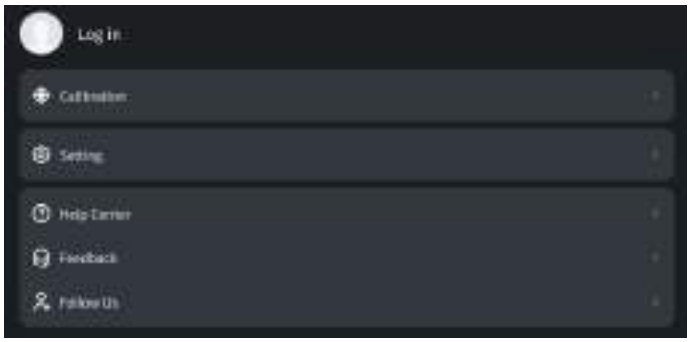
: Tap to enter **Settings** > **Calibration** interface.

: Tap to enter the **Setting** interface.

: Tap to enter the **Help Center** interface, where you can view beginner's tutorial, and you can view the user manual by scanning the displayed QR codes.

: Tap to enter the **Support** interface, where you can check our official email address and website.

: Tap to view related QR codes, and you can follow us.




## ② Interface Buttons

- : Search button, and a search window will pop up after tapping this button.
- : The button for creating a new project, and you can tap this button to enter the scan interface.

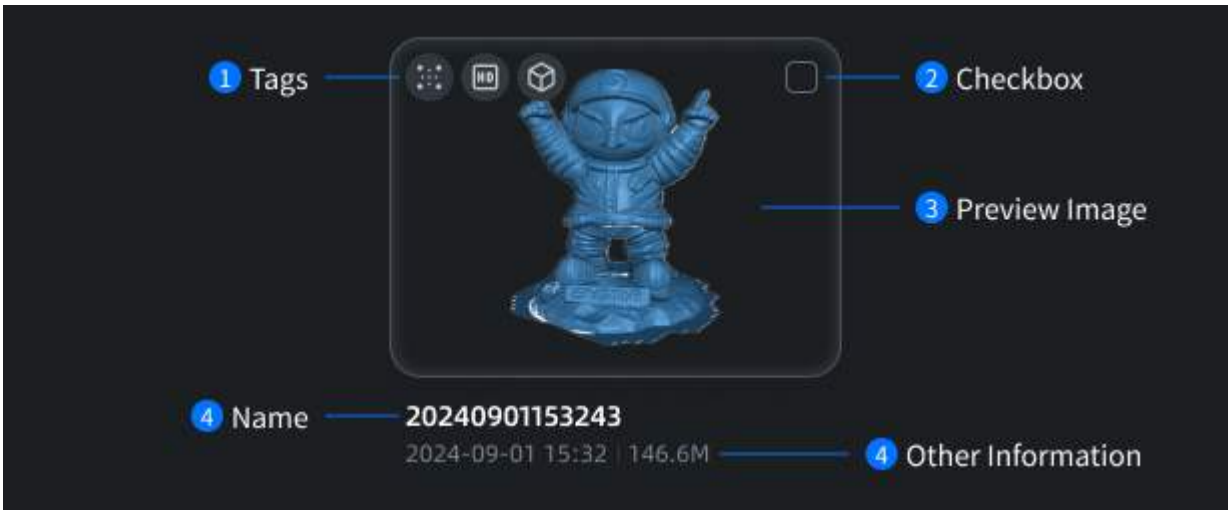
> **Note**
>
> - If there is no file in the file list, button is not visible.
> - If it is in the status of file selection, button is not visible.

## ③ File List

All saved model files are displayed in the format of file card, which are sorted by file update time in descending order.

**Note**

- Tap one file card to enter the post-processing process of that project.
- After swiping down, you can tap button in the right to return to the top of the interface.




① Tags

- : Indicates that the model file is the point cloud data.
- : Indicates that the model file is the mesh data.
- : Indicates that the model is scanned using the **HD** scan mode.
- : Indicates that the model is scanned using the **Fast** scan mode.
- : Indicates that the model is scanned using the **Object** mode.
- : Indicates that the model is scanned using the **Portrait** mode.

② Checkbox

Check to select the card and enter the file selection mode, where you can delete some or all files, and rename files.

**Note**

Cards can also be selected by long pressing them.

③ Preview Image

The model files that display colored thumbnails include point cloud models with textures and mesh models with mapped textures. The rest of the model files will be displayed in blue.

④ **Name & Other Information**

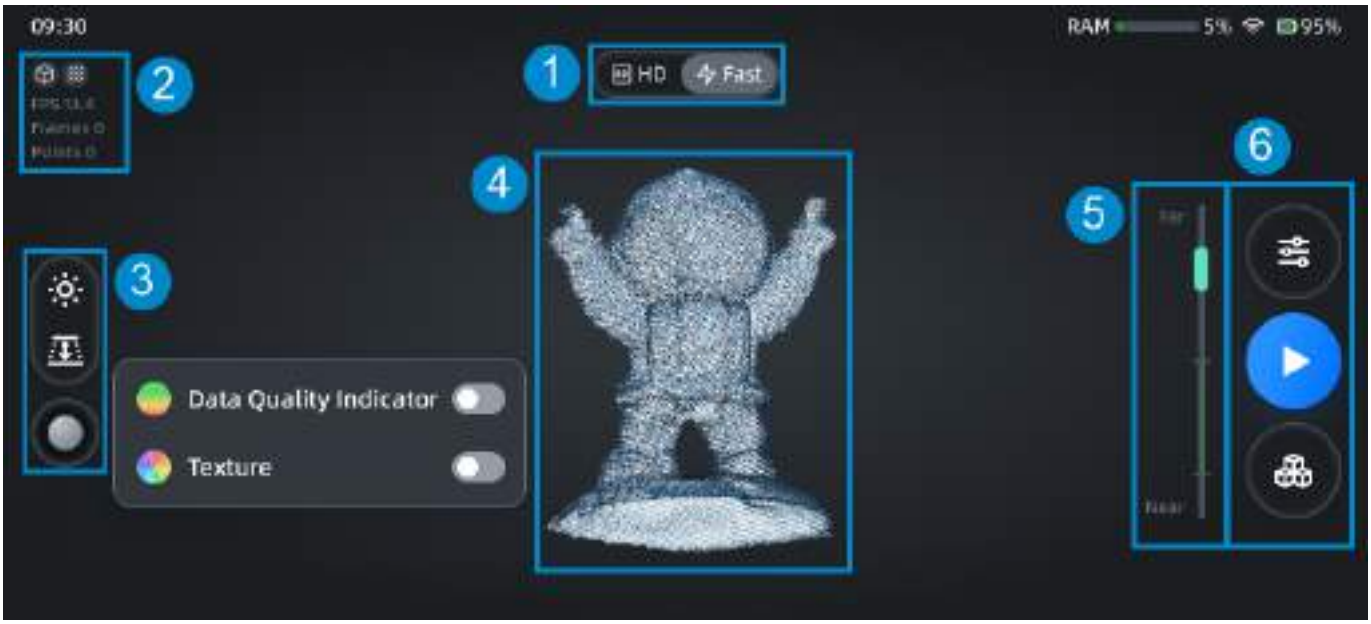
Display the name, latest update time and size of the model file.

# Scan Preview

After powering on the device, you can enter the interface of scan preview.

> **Note**
>
> If this is your first time to enter the interface of scan preview, you will be automatically directed to the **User Tutorial** interface:
> Tap button to enter the next step of the tutorial, tap button to return to the previous step of the tutorial; in the final step, tap **Start calibration** to enter the actual calibration process. You also tap **Skip** to skip the tutorial, which can be checked again through **Personal Center** > **Help Center**.

## Interface Overview




> **Note**
>
> For the introduction to the top status bar, see status bar.

## ① Scan Mode

Tap buttons to switch the scan mode of the current project:

- : **HD** scan (default).
- : **Fast** scan.

## ② Project Information

Display the data information (fps, frames and points) and parameter settings of the current project:

- / : Object / Portrait scan mode.
- : Markers alignment mode.
- : Texture alignment mode.

Tap  **Advanced Settings** button in the right-side function bar to adjust parameter settings of the project.

## ③ Scan Settings

Set camera view, scanning distance, data quality indicator and texture display. For more, see scan settings.

## ④ Model Preview

Display the model's pre-scanning effect; if **Markers alignment** mode is enabled, the identified markers will appear on the model.

> **Note**
>
> In the scan preview state, operations such as scaling, translating, and rotating the model are not supported.

## ⑤ Distance Indication

Green indicates that the distance is appropriate, red indicates that the distance is too near, blue indicates that the distance is too far.

> **Note**
>
> If it prompts that "The distance is too close / too far" or "Unable to collect data", please adjust the distance.

## ⑥ Function Buttons

 : The entrance to **Advanced Settings**.

 : The button to start scanning.

 : The entrance to file list.

# Calibration

## Calibration Notice

With **calibration**, the scanner parameters are recalculated, which not only ensures the accuracy of the scanner, but also improves the quality of scanning.

**Calibration is required under the following conditions:**

- The scanner was severely shaken or shocked, such as shocked during transportation.
- Severe accuracy reduction, such as frequent errors in alignment or unrecognized markers.
- Incomplete data is acquired during the scanning or serious deterioration of the quality of scanned data.

> **Note**
>
> If the current device has not been calibrated for more than 7 days,  will appear in the status bar at the top of the screen; if it has not been calibrated for more than 14 days,  will appear.

**Warning**

- The calibration board is matched to the device. Doing the calibration with an incorrect calibration board will fail to generate good scan data or optimum accuracy.
- Always make sure that both sides of the calibration board are clean and free of scratches.
- Do not place heavy objects or sundries on the calibration board.
- Keep the calibration board away from corrosives, metals and sharp objects to avoid corrosion or damage.
- It is not recommended that you wipe the calibration board. When cleaning the board becomes very necessary, gently wipe it with a piece of a clean damp cloth. Do not use a cloth with chemicals or alcohols to wipe the calibration board.
- After using the calibration board, put it safely in a box or flannel bag.

# Calibration Process

Two ways to enter the calibration process are introduced as follows.

- Tap **Calibration** in the control center module to enter the **Setting** > **Calibration** interface, where you can tap **Start calibration** to enter the calibration process.
- In the status bar on the top of the interface, tap the calibration prompt (if there is) to enter the **Setting** > **Calibration** interface, where you can tap **Start calibration** to enter the calibration process.

**Note**

- Before calibration, please tap **Scan to recognize the calibration board** in the **Setting** > **Calibration** interface, to bind the calibration board.
- If this is your first calibration, you will be automatically directed to the calibration **Help** interface: Tap button to enter the next step of the guide, tap button to return to the previous step of the guide; in the final step, tap **Start calibration** to enter the actual calibration process.
- During the calibration process, tap button to re-enter the calibration **Help** interface; tap button to exit the calibration process.

During the calibration process, you need to change the position of the calibration board for 5 times to complete the entire calibration process.

Specifically, calibration includes **HD** scan calibration and **Fast** scan calibration.

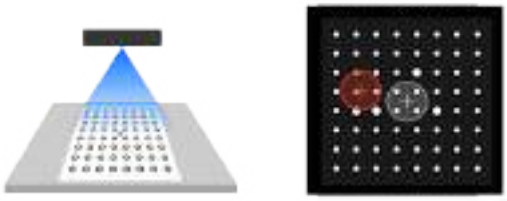
**Note**

The calibration process for two scan modes is the same, and **for each calibration**, you need to do the **HD** scan calibration.

Take **HD** scan calibration as an example, **the operation steps for device calibration are as follows:**

1. Please place the calibration board on a flat surface as shown in the figure, and get the bracket.

2. Align the board to make the board match with the figure; when matched, the area will turn green.



3. Move the scanner vertically to remove all blue areas.

**Caution**

- When moving the scanner up and down, please make sure:
  - The center of the scanner is aligned with the center of the calibration board.
  - The scanner remains parallel to the plane where the calibration board is placed.

  Otherwise, you will be prompted with "Keep the scanner level and align the center" and you will need to redo the step 2 to reposition.
- When moving the scanner up and down, if it prompts that "Please move closer to the board" or "Please move away from the board", please adjust the distance between the device and the calibration board accordingly.

4. Adjust the position of the bracket and the calibration board according to the illustration, and repeat the step 2 and step 3 for a total of 4 times.

5.After completing the HD **HD** scan calibration, you will be automatically directed to the **Fast** scan calibration; and a calibration file will be generated after all calibration steps are completed.

> **Note**
>
> - After a successful calibration, there will be a pop-up window indicating the successful calibration.
> - If calibration fails for several times, please contact technical supports.

# Scan

## Preparation

If the object to be scanned has rich geometric or textural features, the scanning speed and quality can be better guaranteed;
On the contrary, if the object to be scanned has fewer geometric or textural features or a high degree of feature repetition, you need to do some preparation work before scanning to enhance your scanning experience.

### For Portrait Scan

**Wrong example**

**Correct example**

**Specific requirements:**

1. Hairstyle: Please keep it as neat as possible and avoid hairstyles with loose strands or bangs.
2. Clothing: Avoid wearing dark or reflective clothing (such as black leather shoes); do not wear accessories or glasses that may cause reflections.
3. Posture: Since the scanned object should remain as still as possible during the scanning process, a comfortable and easy-to-maintain posture is suggested before the scan begins.

## For Object Scan

> **Note**
>
> **Not recommend** to scan following objects:
>
> - Soft material object that cannot be hung.
> - Lattice structures with many small deep holes.
> - Moving or shaking objects. Frequent coordinate changes will lead to a poor scanning quality.

| Object | Preparation | Notes while scanning |
| --- | --- | --- |
| Transparent, shiny, reflective or black objects | Use washable or vanishing scanning spray. | Scan as normal after spraying. |
| Objects with less features or repetitive features | • Place markers on the object and enable **Markers alignment** (only supported for HD scan mode) in the **Advanced Settings**.<br>• Mark/draw on the surface to add features and enable **Acquire Texture**. | Scan as normal after preparations. |

# Pre-Scan Settings

After entering the scan preview interface, you can adjust scanning settings for the current project.

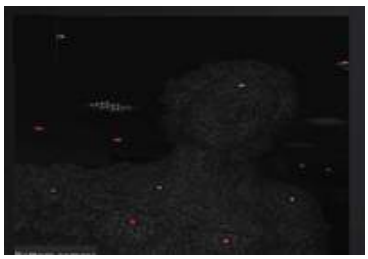
> **Note**
>
> After start scanning, you can adjust the camera view or the switch for data quality indicator & texture display, but you will not be allowed to readjust the scanning distance or advanced settings.

## Camera View

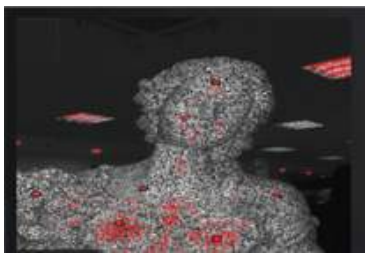
Tap to enable camera view, it will show the black-and-white camera view and texture camera view (only shown when **Acquire Texture** is enabled).

- Black-and-white camera:
  - **Auto-brightness** is enabled by default (only supported for the fast scan mode), and you can tap that button in the upper right corner to switch to manual mode, when you can drag the slider on the left side of the camera view to manually adjust the camera brightness (1 ~ 8).
  - The red points in the camera view indicate over-exposure points; it is recommended that you adjust the camera brightness according to the display of over-exposure points to improve scan quality.

**Brightness is too high**



**Brightness is too low**



**Brightness is normal**

- Texture camera:
  - Camera light adjustment is enabled by default, and you can drag the slider on the left side of the camera view to manually adjust the brightness (1 ~ 10); you can tap to switch to the LED light adjustment (set as off by default), then you can drag the slider on the left side of the camera view to manually adjust the brightness (0 ~ 5, 0 indicates the LED light is off), and when the brightness is not 0, the button status will change to .
  - Tap to enable auto white balance and enter the calibration process automatically; it is recommended that you first point the camera towards a white wall or a white area on the calibration board before performing white balance calculation.

> **Note**
>
> If it prompts that "Unable to collect data", please adjust the height of the camera.

## Scanning Distance

> **Note**
>
> Only Fast scan mode supports adjusting the scanning distance.

Tap to enable the function for adjusting the scanning distance, and a fan-shaped slider and scan distance numerical prompt will appear:

- Drag the slider to adjust the scanning distance.
- Tap on the left side to exit this function.


## Data Display Mode

Tap to expand the list on the right, and you can choose a data display mode:

- : Data Quality Indicator; enabled by default for non-texture projects.
- : Texture Display; only the project with acquired texture supports this switch, and is enabled by default.

> **Note**
>
> - Go to **Advanced Settings** > **Acquire Texture** to set the project in the texture-alignment mode.
> - You can enable only one of these two display modes; indicates that both modes are disabled.

## Advanced Settings

Tap  in the right-side function bar to open the **Advanced Settings** window, where you can preset the scanned model as **Object** or **Portrait**, and the corresponding **Scan Configuration** and **Align Mode**:

Object

- **Scan Configuration** > **Acquire Texture**: Enabled by default, and **Texture alignment** mode will be automatically enabled; if disabled, the texture alignment mode can not be used, and Texture overlay mode as well as texture mapping are also not available.
- **Align Mode**:
  - **Texture alignment**[1]: Enabled by default when **Acquire Texture** function is enabled, and will appear in the project information area in the upper left corner.
  - **Markers alignment**[2]: Disabled by default; if enabled, will appear in the project information area in the upper left corner.

> **Note**
>
> Only HD scan mode supports markers alignment mode.

Portrait

- **Scan Configuration**
  - **Acquire Texture**: Enabled by default, and **Texture alignment** mode will be automatically enabled; if disabled, the texture alignment mode can not be used, and Texture overlay mode as well as texture mapping are also not available.
- **Align Mode** > **Texture alignment**[1]: Enabled by default when **Acquire Texture** function is enabled, and will appear in the project information area in the upper left corner.

---

1. Texture alignment is a technique that utilizes the surface texture features of the scanned object to automatically complete the alignment and merging process. It is suitable for objects with rich surface patterns but lacking intricate and varied geometric features. ↩ ↩
2. Automatic stitching can be achieved by using markers attached to the surface of the scanned object, suitable for objects with limited geometric features or for scenarios that require high accuracy. ↩

# Scanning

After entering the interface of scan preview, tap  in the right-side function bar to start scanning.

**Note**

- If it prompts "Tracking lost", please please move the scanner back to the scanned area.
- If it prompts "Insufficient storage space", any scan may result in data loss; it is recommended that you delete some unnecessary data or transfer the data to the computer to free up more space.

## In-Scan Settings

After start scanning, you can still adjust part of scanning parameters for the current project.

**Note**

- After start scanning, you can adjust the camera view or the switch for data quality indicator & texture display, but you will not be allowed to readjust the scanning distance or advanced settings.
- If you need to adjust scanning distance or change the scanned model, please set them in the scan preview status in advance.

| Icon | Function | Description |
| --- | --- | --- |
| | Camera View | For more, see scan settings. |
| | Model Overlay | For more, see scan settings. |
| | Reset View | Reset the model to its original position.<br>If it prompts that "View reset", it indicates all operations (including translation, rotation and scaling) have been reset. |

## Pause Scan

After start scanning, you can tap  in the right-side function bar to pause the scan.

> **Note**
>
> - After the scan is paused, the model can be panned or rotated (**Reset View** function to reset the model to its original position):
>   - Translation: Swipe with two fingers.
>   - Rotation: Swipe with one finger.
> - During the scanning process, when the current frame count has reached 5000, the scan will pause automatically, and please tap **Complete Scan** in the pop-up window to save the project into the file list.

After the scan is paused, you can tap to clear the scanned data, or tap to continue scanning.

## Complete Scan

After the scan is paused, tap in the right-side function bar to complete the scan, and enter the interface of editing point cloud edit.

# Data Edit

After completing scanning, you can edit the point cloud data.

## Interface Overview

**Note**

- Tap ← in the upper left corner to return, the mesh data will be cleared.
- The model can be panned or rotated (**Reset View** function can be used to reset the model to its original position).

| Index | Function | Description |
| --- | --- | --- |
| ① | Switch data | Tap to switch the displayed data of the model to **Points** or **Mesh** (if generated). |
| ② | Project information | Tap to rename the current project; for more, see project information. Tap **Save** button to save the current project to file list and return to the interface of scan preview. |
| ③ | Point cloud edit tools | • : Clipping.<br>• : Texture.<br>• : Reset view. |
| ④ | Function buttons | • : One-click processing.<br>• : Generate mesh. |

## Data Clipping

On the **Point** interface, tap in the left-side tool bar to enable the data clipping function.


**Note**

In the selection mode, you can hold down on any area but buttons to activate the magnifying glass function, and you can drag the magnifying glass to the model area to zoom in and display a specific part of the model.

| Icon | Function | Description |
| --- | --- | --- |
| | Selection mode (by default) | Use one-finger swipe to select the area.<br>**Note**<br>In this mode, the model can not be rotated. |
| | Rotation mode | Use one-finger swipe to rotate the model. |
| | Texture | For more, see scan settings. |
| | Reset view | For more, see scan settings. |
| | Rectangle lasso | In the selection mode, rectangle lasso is chosen by default, and you can drag with a single finger in the model area to draw a rectangular selection area.<br>  |
| | Free lasso | In the selection mode, tap this button to switch the selection tool to free lasso, and you can drag with a single finger in the model area to draw a selection area in irregular shape. |

**Note**

In the selection mode, using the rectangular / lasso tool, you can select common areas by making consecutive selections.

**For selected areas, you can use tools as follows:**

| Icon / Function | Description |
| --- | --- |
| Connected domain | After selecting the area, tap this button to automatically select connected areas. |
| Invert | After selecting the area, tap this button to select the invert area according to the selected area. |
| Unselect | After selecting the area, tap this button to deselect all selected areas. |
| Delete | After selecting the area, tap this button to delete all selected areas.<br>After deleting, you can undo or redo the last operation.<br>**Note**<br>Only operations in the current data clipping can be undone or redone. |

**Note**

If all scanned data is deleted, then you will not be allowed to operate one-click processing or other functions.

# Post-processing (EinstarVega)

## Mesh

In the interface of point cloud edit, tap  in the right-side function bar to enter the process of mesh generation.

You can tap  to perform one-click processing (including **Fast** and **High detail**), and mesh & texture map will be automatically generated using recommended parameters.

**Note**

- The mesh data can be subsequently used for rendering or 3D printing.
- Only the project with acquired data supports one-click texture mapping; if the **Acquire Texture** function is not enabled, then only mesh will be automatically generated.
- If the current project has already generated the mesh, it will be overwritten after one-click processing.
- Operations such as scaling, translating, and rotating the model are supported (**Reset View** function can be used to reset the model to its original position).

## Mesh Settings

| Setting | Description |
| --- | --- |
| Watertight | Disabled by default, and all holes will be retained. |
| Resolution | Provide 8 adjustable levels (including ultra-low resolution); after manually dragging the slider to adjust the resolution, you can check on **Use recommend value** to use the default resolution.<br>Besides, you can tap to enter the high-detail mode, where you can tap − / + to adjust the resolution.<br>**Note**<br>If you need to use lower resolution, it is recommended that you use StarVision to acquire higher resolution. |
| Mesh Smoothness | Provide 4 adjustable levels: none (default), low[1], middle[2] and high[3]. |
| Texture Mapping | Disabled by default, and can be enabled manually.<br>**Note**<br>This setting will not be displayed for the project without **acquired texture**. |

Tap the **Preview** button, the mesh will be automatically generated according to the mesh settings.

**Note**

- After generating the mesh, all settings can not be adjusted; you can tap to reset all settings.
- If it prompts that "A mesh already exists", you can tap **Replace** to regenerate the mesh.

1. Fast denoising. ↩

2. Standard denoising. ↩

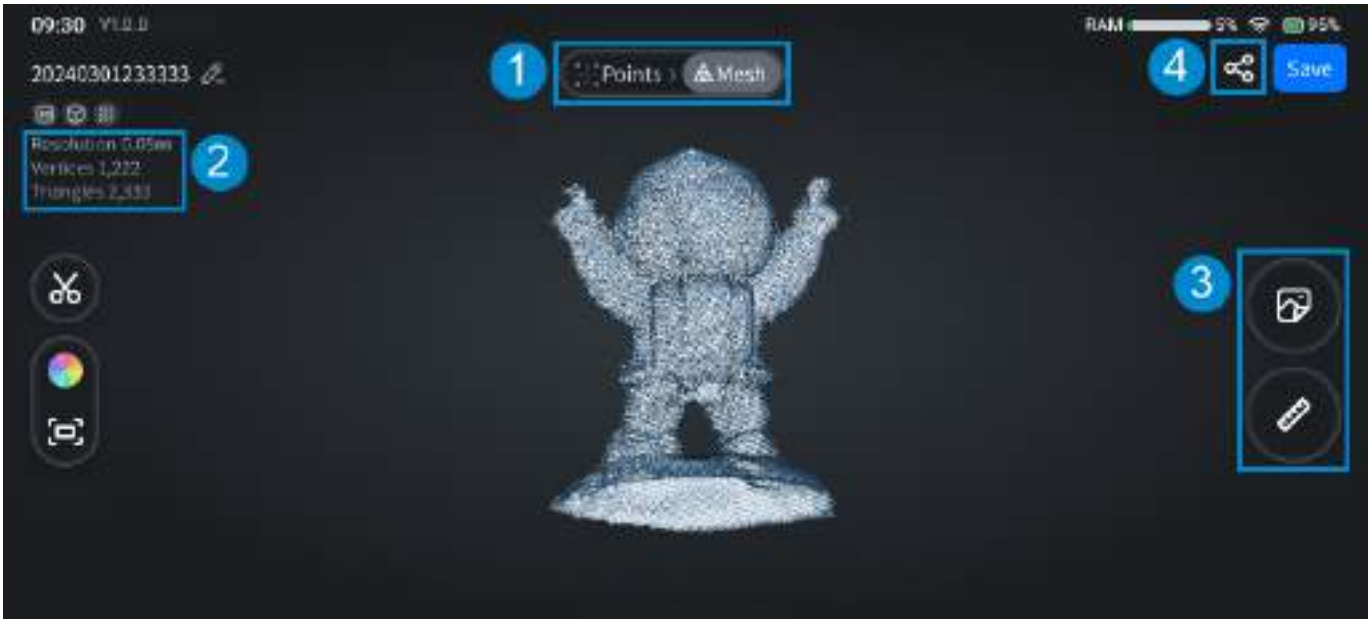
3. Strong denoising, but sharp features. ↩

# Mesh Edit

## Mesh Edit

After mesh, in the **Mesh** interface, you can clip the mesh and map the texture.

### Interface Overview




**Note**

For the introduction to other information in this interface, please see interface overview.

| Index | Function | Description |
| --- | --- | --- |
| ① | Switch data | Tap to switch the displayed data of the model to **Points** or **Mesh**. |
| ② | Project information | Display the data information (resolution, vertices and triangles) of the current project; for more, see project information. |
| ③ | Function buttons | •  : Texture mapping.<br>**Note**<br>• Only the project with acquired texture supports texture mapping; if the **Acquire Texture** function is not enabled, it will prompt that "Non-texture scan, can not generate texture map".<br>• After tapping this button, you will prompted with a second-confirmation window.<br>•  : Measure. If you tap this button, you will be prompted that "Please use StarVision on PC to measure". |
| ④ | Share | Share the mesh model to SHINING 3D Digital Cloud; for more, see save and share. |

# Save and Share

In the **Point** / **Mesh** interface, you can tap the **Save** button in the upper right corner to save or update the current project into the file list.

In the **Mesh** interface, you can tap in the upper right corner to share the mesh model to SHINING 3D Digital Cloud, and you can edit the name of the shared model and select a space to be upload into in the **Share** window.

**Note**

- If the SHINING 3D passport has not been logged in, a login window will pop up.
- If the selected space is less than 500 MB, it will prompt that "Mesh is too large", please simplify it before uploading.
- If the model file has already been uploaded, the corresponding QR code for downloading the model will be displayed.

# Post-processing (StarVision)

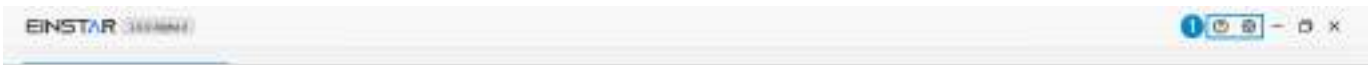
## Post-processing（StarVision）

To improve the flexibility and convenience of Einstar Vega Handheld Scanner, SHINING 3D has developed a desktop post-processing software **StarVision**, supporting importing model files in the device by one click and processing the imported models.

### Function List

| Function | Description |
| --- | --- |
| Device management | Connect / Disconnect the scanner. |
| File management | • Create / Import / Save / Share projects.<br>• Manage model files in the model library. |
| Post-processing | • Edit point cloud data.<br>• Align point cloud data.<br>• Generate and edit mesh.<br>  ◦ Process mesh.<br>  ◦ Map texture.<br>• Measure model. |

### Interface Overview



> **Note**
>
> This illustration is for the workspace; and for the introduction to the difference between the file card list in the workspace and that in the model library, please refer to file card.

## ① Help and Settings

### Feedback

Click to expand the drop-down list, which provides the entrance to **User Manual**, the entrance to **Open Log Directory** and the ways to **Contact Support**.

### Settings

- **Account**: Login / view account, switch account, and log out.
- **Preference**: Edit the data storage path (the default path is "C:/Program Files/TX3Editor/Project") and switch the language (Chinese / English) of the software.

> **Note**
>
> - MacOS system does not support editing the storage path.
> - If it prompts that "Insufficient storage space", it means that the storage space in the new path is not enough to accommodate the current model library file, and please change the path.

- **Software Update**: Manual check for update, download and install the update file.

> **Note**
>
> - Generally, after launching the software, it will automatically check for updates and display a pop-up window if available.
> - When installing the update file, the current software will automatically exit. Please ensure that any necessary data is saved.
> - If it prompts that "The current version is the latest", it means there is no need to update.
> - If it prompts that "Insufficient storage space", please clean the disk space and download again.

- **About**: Check the privacy policy and user license agreement.

> **Note**
>
> When logging in, the new privacy policy / user license agreement window will also pop up (if available).

## ② Account

- Not logged in: Click **Log in** and the **SHINING 3D passport** login window will pop up.
- Logged in: Display the information of the logged account, click to enter **Setting** > **Account**.

## ③ Switch Workspace / Model Library

- **Workspace**: Search, create, import / export projects, and perform post-processing on models.
- **Model Library**: Search, preview, import / export model files, and import model files into the workspace.

## ④ Connect Scanner

#### The Way of Connection

Please use the cable to connect the scanner to your computer, and select the **File Transfer** mode.

> **Caution**
>
> If it prompts that "Connection failed", please check the connection status of the cable.

**After Connection (including update the scanner)**

- All wire-connected devices and 有线设备和 wireless-connected devices are displayed in the left device list (arranged from far to near based on the order of connection):

  > **Note**
  >
  > When hovering the cursor over a device bar and it changes to , click button in the right side to display the device information, and you can click to update the device or export the log of the device, or click to disconnect.

- The right file card list displays all model files in the device, and supports searching, previewing models, as well as importing model files into the model library or the workspace.
- Update the device:
  - **Auto Update**: Auto-check for update > download the update file > install.
  - **Manual Update**: Select the local update package > confirm update.

  > **Note**
  >
  > - Only wire-connected devices can be updated.
  > - During the process of updating the device software, the top of the computer software interface will display the icon, indicating that the software is being downloaded. When hovering the cursor over a device bar and it changes to , it can provide information about the download progress.

  > **Caution**
  >
  > During the process of updating the device software, please ensure that the device remains connected and do not exit the computer software.

## ⑤ Entrance to SHINING 3D Digital Cloud

Click to open SHINING 3D Digital Cloud.

> **Note**
>
> The mesh model can be uploaded to SHINING 3D Digital Cloud.

### ⑥ Project Management

- Click the search box and enter keywords to view search results.
- Click the **Create** button to create a new workspace.
- Click the **Import local file** button to open the file selection window and import project files (.proj); in the model library, you can also click the **Import from scanner** button to select the scanner and open the scanner model file dialog to import model files.

### ⑦ File Card

Display the model's thumbnail, project information (point / mesh, object / portrait), the name, size and the latest update time for projects or model files.
Check in the upper right corner of the card to select the card; left-click on the card to open the workspace (for point cloud data edit and post-process or model preview); right-click on the card to open the menu, where you can rename / export / delete the file, as well as import the file into workspace or model library.

> **Note**
>
> - The supported operations on file cards may vary slightly between the workspace, model library, and device file list. Please refer to the actual interface for accurate information.
> - After scrolling down the file card list, you can click on the right side to return to the top of the list.

# Create / Import Files

The post-processing workflow on the computer is mainly done in the **Workspace**, where you can choose to create a new workspace or import existing project files for post-processing.

## Create a Workspace

- Open the file card list of **Workspace** in the main interface, click the **Create** button in the top right corner or the **Create workspace** button in the center of the interface (when the file card list is empty), you

can create a new workspace and enter it directly.

- After entering **Workspace**, click **File** > **Create workspace** in the top navigation bar, you can create a new workspace and enter it directly.

## Import a Workspace / Model File

- Open the file card list of **Workspace** in the main interface, click **Import local file** to open the file selection dialog, where you can import project files (.proj); click on the newly added project file card to enter the corresponding workspace.
- Open the file card list of **Model Library** in the main interface, select the model file that needs to be imported, click **Import workspace** in the pop-up window to create a new workspace and enter it.

> **Note**
>
> You can choose to add model files by clicking **Import local file** or **Import from scanner**; or you can open the device file list to import the model files on the device into the model library.

- After entering **Workspace**, click in the top right corner of the left-side model list, and you can choose **Import from scanner**, **Import from Model Library** or **Import local file**.

> **Note**
>
> - Model files imported from the scanner or locally imported files will be added to the model library automatically.
> - About how to connect the scanner, please refer to connect the scanner.

## Workspace Interface


- Click to return to the main interface.
- Click the **View** button to expand the drop-down list, where you can choose to hide / show texture or reset the view.
- Click on the right side of the workspace's name to expand the drop-down list, where you can rename or export the workspace.

> **Note**
>
> For the introduction to ? and ⚙ buttons in the right side of the navigation bar, please refer to help and settings.

#### ② Model List

Display all the model projects that have been imported into the current workspace in the order of creation, from the nearest to the farthest.

For the projects with generated mesh, you can click to expand the mesh sub-level column, click on which will take you to the interface of mesh editing.

> **Note**
>
> - For the introduction to ⋮⋮ and other icons about the project information, please refer to file card.
> - You can right-click on one column to rename / export / delete the project; besides, you can also double-click on one column to rename the project.

The bottom displays the properties of the currently selected project, including the scan mode, object type, merge method, etc.

#### ③ Tool Bar

Display the corresponding toolbar for point cloud / mesh editing tools based on the data display status of the current project.

#### ④ Model Preview

You can manipulate the model using the mouse or trackpad.

| Operation | Gestures on the mouse | Gestures on the trackpad |
| --- | --- | --- |
| Translation | Hold down the middle mouse button or right-click and drag | • Windows: Two-finger swipe<br>• macOS: `⌘ Cmd` + `left-button` |
| Rotation | Hold down the left mouse button and drag | Press and swipe with one finger |
| Scaling | Use the scroll wheel | • Windows: Pinch or spread with two fingers<br>• macOS: Swipe up and down with two fingers |

You can also use the ⑤view controller in the bottom right corner to quickly switch between different model perspectives.

> **Note**
>
> - indicates the texture is shown, indicates the texture is hidden.
> - Click to reset the view to the original status.

# Data Edit

After entering the workspace, select a point cloud project in the left-side model list to edit the point cloud. The supported tools include:

- : One-click processing.
- : Generate mesh.
- : Clipping.
- : Alignment.
- : Export the point cloud project.

## Clipping

Click in the left-side point cloud data editing toolbar to clip the point cloud data.

> **Note**
>
> When clipping the data, you can use mouse or trackpad to operate the model.

① Selection Tools

| Icon | Function | Description |
| --- | --- | --- |
| | Rectangle selection | In the model area, press `⇧ Shift` + `left-button` and drag to draw a rectangular selection area.  |
| | Polygon selection | In the model area, press `⇧ Shift` + `left-button` and click consecutively to select several points to draw a polygon area. |
| | Free selection | In the model area, press `⇧ Shift` + `left-button` and drag to draw a selection area by moving the cursor along a path. |
| | Straight line selection | In the model area, press `⇧ Shift` + `left-button` and drag to draw a line, and the area below will be selected. |
| | Brush selection | In the model area, press `⇧ Shift` + `left-button` and brush, and the brushed area will be selected; you can either drag the slider or press `⇧ Shift` and use the scroll wheel to adjust the size of the brush. |

**Note**

Press `^ Ctrl` + `left-button` or `⌘ Cmd` + `left-button`, you can drag to delete the selected area.

② Data Editing Toolbar

**For the selected areas, you can use tools as follows:**

**Note**

Support using the right-click menu to use the connected domain, invert, unselect and delete function.

| Icon / Function | Description |
| --- | --- |
| Select through | Enabled by default, and can be disabled after mesh, when only visible data can be selected. |
|  Connected domain | After selecting the area, click this button to automatically select connected areas.<br>**Note**<br>If there is no connected domain, it will prompt that The selected area has no connected domain". |
|  Invert | After selecting the area, click this button to select the invert area according to the selected area. |
|  Unselect | After selecting the area, click this button to deselect all selected areas. |
|  Delete | After selecting the area, click this button to delete all selected areas.<br>After deleting, you can undo or redo the last operation.<br>**Note**<br>Only operations in the current data clipping can be undone or redone. |
|  Undo | When there exists deletion, click this button to undo the last operation. |
|  Redo | When there exists deletion, click this button to redo the last operation. |
| Cancel | Cancel all edits and exit the clipping function.<br>**Note**<br>You can use the shortcut `Esc`. |
| Finish | Save all edits and exit the clipping function.<br>**Note**<br>You can use the shortcut `Del`. |

# Alignment

In the interface of point cloud editing, click in the left-side toolbar to enter the alignment process.

Click to select two point cloud projects in the left-side model list, select the alignment mode as **Feature** (default), and choose to enable **Auto** alignment or not (enabled by default).

> **Note**
>
> - Only the point cloud data of **two** models can be selected to be aligned.
> - After clicking to select models, you can click in the top right corner of that model area to deselect; after alignment, you can click in the top right corner to clear the alignment result.
> - Click the **Exit** button in the top right corner to exit the alignment function.

**The introduction to alignment modes is as follows:**

| Alignment mode | Description | Note |
| --- | --- | --- |
| Auto feature alignment | 1. Choose the **Feature** alignment mode and enable **Auto**.<br>2. Select two point cloud projects from the model list on the left side of the interface, to fill them into the respective model areas on the right side.<br>3. Click **Preview** and the software will align two models automatically based on their common features. | Please ensure there at least exist three pairs of common feature points. |
| Manual feature alignment | 1. Choose the **Feature** alignment mode and disable **Auto**.<br>2. Select two point cloud projects from the model list on the left side of the interface, to fill them into the respective model areas on the right side, and add at least three pairs of common features individually through pressing `⇧ Shift` + `left-button`.<br>3. Click **Preview** and the software will align two models based on the added feature points. | • Please ensure there are at least three pairs of common feature points, or it will prompt that "The number of feature points is not sufficient".<br>• The manual chosen feature points can not be in a line, or it will prompt that "Feature points can not be in a line". |

**Note**

- Manual alignment serves as an auxillary method of auto alignment. You can choose it when auto alignment fails.
- For the manual alignment mode, after adding feature points, you can click ↩ / ↪ in the bottom left corner of the model area, or click ↻ in the top right corner to perform corresponding operations.
- For the manual alignment mode, the number of added feature points can not exceed 9, or it will prompt that "! The number of feature points / markers has reached the maximum".

After alignment, click **Apply** to add the aligned project into the left-side model list, and the added aligned project will be automatically named as "Alignment result (X)".

# Mesh

In the interface of point cloud edit, click ⬡ in the left-side point cloud editing toolbar to enter the process of function bar to enter the process of mesh generation.

You can click  to perform one-click processing (including ⚡**Fast** and ◭**High detail** mode), and mesh & texture map will be automatically generated using recommended parameters.

**Note**

- The mesh data can be subsequently used for rendering, measurement or 3D printing.
- Only the project with acquired data supports one-click texture mapping, or only mesh will be automatically generated.
- If the current project has already generated the mesh, it will be overwritten after one-click processing.

## Mesh Settings

| Setting | Description |
| --- | --- |
| Watertight | Disabled by default, and all holes will be retained.<br>**Note**<br>If a watertight model needs to be generated, then the **Fill Markers** function can not be disabled. |
| Resolution | The recommended resolution is set by default; after dragging the slider to adjust the resolution manually, you can check **Use recommend value** to use the default resolution. |
| Mesh Smoothness | Provide 4 adjustable levels: none, low[1] (default), middle[2] and high[3]. |
| Fill Markers | Enabled by default, and can not be disabled when **Watertight** function is enabled.<br>**Note**<br>If **Markers alignment** mode is not enabled, this setting will be invisible. |
| Texture Mapping | Disabled by default, and can be enabled manually.<br>**Note**<br>This setting will not be displayed for the project without acquired texture. |

By clicking **Generate**, you can preview the mesh generated according to the mesh settings; and click **Finish**, you can enter the interface of mesh edit.

**Note**

- After generating the mesh, all settings can not be adjusted; you can tap to reset all settings.
- If it prompts that "A mesh already exists", you can tap **Replace** to regenerate the mesh.

1. Fast denoising. ↩
2. Standard denoising. ↩
3. Strong denoising, but sharp features. ↩

# Mesh Edit

## Mesh Edit

After generating the mesh, in the interface of mesh editing， you can use tools as follows:

- : Mesh Process.
- : Texture Mapping.
- : Clipping.
- : Measure.
- : Export.
- : Share.

> **Note**
>
> - In the left-side model list, you can select a project with generated mesh to edit the mesh.
> - Only the project with texture supports texture mapping, or it will prompt that "Non-texture scan, can not generate texture map".

# Mesh Process

In the interface of mesh editing, click in the left-side mesh editing toolbar to open the **Mesh Edit** panel, where you can click to edit all settings, including **Texture Adjustment**, **Simplification**, **Mesh Optimization**, **Remove Floating Parts** and **Fill Holes**.

| Setting | Description |
| --- | --- |
| Texture Adjustment | Drag the slider to adjust the brightness, contrast, color temperature and saturation of the model texture.<br>The default value is 0，and the range is -100 ~ 100.<br>**Note**<br>• Only the model with mapped texture supports texture adjustment.<br>• After enabling the settings for this function, texture is always shown and can not be hidden.<br>• Support preview the adjustment effect in real time; click **Apply** to save settings. |
| Simplification | Drag the slider to adjust the proportion of simplification: The default value is 0, and the range is 0 ~ 99.<br>**Note**<br>Click **Preview** to preview the simplification effect, and check the size change of the file in both STL and OBJ format as well as the change of triangle; click **Apply** to save settings. |
| Mesh Optimization | Perform denoising on the data to make the mesh data smoother and improve data quality.<br>Drag the slider to adjust the proportion of mesh optimization: The default value is 1, and the range is 0 ~ 100.<br>**Note**<br>Click **Preview** to preview the mesh optimization effect; click **Apply** to save settings. |
| Remove Floating Parts | Delete any small parts of data that are not connected to the main data.<br>Drag the slider to adjust the proportion of simplification: The default value is 0, and the range is 0 ~ 100.<br>**Note**<br>Support previewing the effect in real time; click **Apply** to save settings. |
| Fill Holes | Fill in the holes within the specified perimeter based on the set hole circumference.<br>Drag the slider to adjust the perimeter (mm).<br>Besides, it also supports setting **Hole filling type** as **Curvature** (by default), **Tangent** and **Plane**.<br>**Note**<br>• Only the model with holes supports hole filling function.<br>• The identified hole edges are marked in red, while the hole edges that meet the criteria are marked in green; the selected status of holes can be updated in real time.<br>• Click **Preview** to preview the hole filling effect; click **Apply** to save settings. |

**Note**

- Click to reset settings.
- Click to close the setting.
- After applying one setting, the project with mapped texture will prompt that "The mesh has changed", and you can click **Generate** to remap the texture.

# Measure

In the interface of mesh editing, click in the left-side mesh editing toolbar to open the **Measure** panel, where you can choose to measure **surrounding box** (default), **surface area** or **distance**.

## Measure Surrounding Box

Select **Measurement Data** as **Surrounding Box** to display the surrounding box as well as its length, width, height (mm) and volume ($mm^3$).

## Measure Surface Area

Select **Measurement Data** as **Surface Area** to enable the function for measuring the surface area, and after using the selection tools, the measurement result ($mm^2$) will be shown.

**For the selected areas, you can use tools as follows:**

| Icon / Function | Description |
| --- | --- |
| Select through | Enabled by default, and can be disabled, when only visible data can be selected. |
| Select all | Click to select the whole model area. |

**Note**

For the introduction to other data editing tools, please refer to data editing toolbar.

## Measure Distance

Select **Measurement Data** as **Distance** to enable the function for measuring the distance.

**The steps for measuring the distance is as follows:**

1. Tap any position on the model to add 2 points.
2. After adding 2 points, they will be automatically connected, and the straight line distance (mm) will be displayed; if you add another point, the previous connection will be removed, and a new line will start from the new point.

> **Note**
>
> You can drag the points to adjust their position, and the distance value will be updated in real time.

**The steps for measuring the distance is as follows:**
1. Click on any position on the model to add 2 points.
2. After adding 2 points, they will be automatically connected, and the straight line distance & geodesic distance (mm) will be displayed; if you add another point, the previous connection will be removed, and a new line will start from the new point.

> **Note**
>
> You can drag the points to adjust their position, and the distance value will be updated in real time.

# Export and Share

In the interface of **Point Cloud**:

Click in the left-side point cloud editing toolbar to open the **Export** window, where you can choose **Export project to Model Library** (default), or **Export to local** (PROJ / ASC).

In the interface of **Mesh**:

- Click in the left-side mesh editing toolbar to export the mesh project, and it supports exporting mesh objects in the format of OBJ, STL or PLY.
- Click in the left-side mesh editing toolbar to upload the model file to SHINING 3D Digital Cloud:
  a. Edit the model name in the **Share** panel and select space.
  b. Click **Upload** and the QR code for downloading the model will be automatically generated, which can be saved or duplicated.

**Note**

- If the SHINING 3D passport has not been logged in, a login window will pop up.
- If the remaining storage of the chosen space is less than 500 MB, it will prompt that "The mesh is too large", please simplify it before uploading.
- If the model file has already been uploaded, the corresponding QR code for downloading the model will be displayed.

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