SHINING 3D

Einstar Vega

V1.2.1

User Manual

Table of Contents

Overview

About the User Manual

This user manual (hereinafter referred to as "the Manual") introduces the device appearance and operation procedure of Einstar Vega.

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** This symbol complies with the European Low Voltage Directive 2014/35/EU and EMC Directive 2014/30/EU.
	**WEEE Directive - 2012/19/EU** 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". 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. 940 nm
FC	Federal Communications Commission Certified.
RoHS	Restriction of Hazardous Substances Certified.
KC	Korea Certification Certified.

The Declaration of Intellectual Property and Disclaimer

Thank you for using the products of SHINING 3D TECH CO., LTD. (hereinafter referred to as the "SHINING 3D”). Before you use the products, please carefully read and understand this declaration. Once you use this product, it means that you fully accept this statement and promise to comply with the relevant regulations.

1. The contents of the Product Instruction and User Manual (hereinafter collectively referred to as the "Product Usage Documentation") are critical to your personal safety, legal rights, and liabilities. Before you use the products, Please ensure that you have carefully read the Product Usage Documentation, and use the product correctly in accordance with the requirements of the Product Usage Documentation. We also recommend that the products be operated by trained professional technicians.
2. Please inspect and/or maintain the product before use. If the product is damaged, deformed or in any other abnormal condition, stop using it immediately and contact the after-sales service personnel for maintenance. SHINING 3D will not be responsible for any problems caused by your failure to inspect or maintain the product in a timely manner.

3. SHINING 3D does not guarantee the applicability of the outcomes of your use of the products, and you are responsible for verifying the quality and functionality of the outcomes. You should check and verify thoroughly that any outcomes meet your requirements before using them, for which you bear full responsibility. If any damage arising from using the outcomes of any products, you shall bear the corresponding risk, and SHINING 3D shall not bear any responsibility.
4. SHINING 3D owns complete intellectual property rights for the contents of the for which you bear full responsibility. Without the written consent of SHINING 3D, it is not allowed to copy, transmit, publish, adapt, compile or translate any contents of the Product Usage Documentation in any form for any purpose.
5. The Product Usage Documentation is a guidance for installing, operating, and maintaining the product instead of serving as the quality guaranty for the products. SHINING 3D makes all efforts to ensure the applicability of the Product Usage Documentation, but reserves the right of final interpretation. Images and diagrams in the product documentation are presented to provide convenience to user understanding. In the event that any images or diagrams are inconsistent with the physical products, the later shall prevail. In addition to the mandatory provisions of laws and regulations, the contents of the Product Usage Documentation are subject to changes without further notice.
6. SHINING 3D shall not be held responsible for any damages and/or losses caused by human factors, environmental factors, improper storage and use, or any other factors other than due to the quality of the product. SHINING 3D also shall not be held responsible for any indirect anticipated profit loss, loss of reputation and other indirect economic losses. Except as otherwise expressly provided by laws and regulations, the total liability assumed by SHINING 3D (regardless of cause) shall not exceed the purchase price of the products you paid to SHINING 3D.
7. Disputes arising from this Declaration and the Product Usage Documentation thereof shall be governed by the laws of the People's Republic of China, excluding its conflict of law rules. In the event that certain provisions are in conflict with the applicable law, these provisions will be reinterpreted in full accordance with the law, while other valid provisions will remain in force.
8. All disputes between you and SHINING 3D that arise from, shall first be resolved amicably through negotiation. If a dispute cannot be resolved through friendly negotiation, any party may submit the dispute to the Court of Xiaoshan District, Hangzhou City, Zhejiang Province, People's Republic of China for litigation and settlement.
9. In the event of any questions about the contents of this Declaration and application of Product Usage Documentation, please contact us by the contact information provided in the User Manual. Thank you for your cooperation and support! We hope that our products can bring you a great experience of using.

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** wireless all-in-one 3D scanner, making it easy for you to find the corresponding instructions.

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

→ Introduction to 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?

Device Introduction

About the Device

Einstar Vega is a popular wireless all-in-one 3D scanner developed independently by SHINING 3D based on years of accumulated 3D vision technology and market demand. It is equipped with MEMS and 2 VCSEL infrared laser sensors, 4 stereo depth cameras, and 48mega pixels color camera. It is a wireless and standalone prosumer 3D scanner accessible to everyone for stellar all-in-one 3d scanning experience.

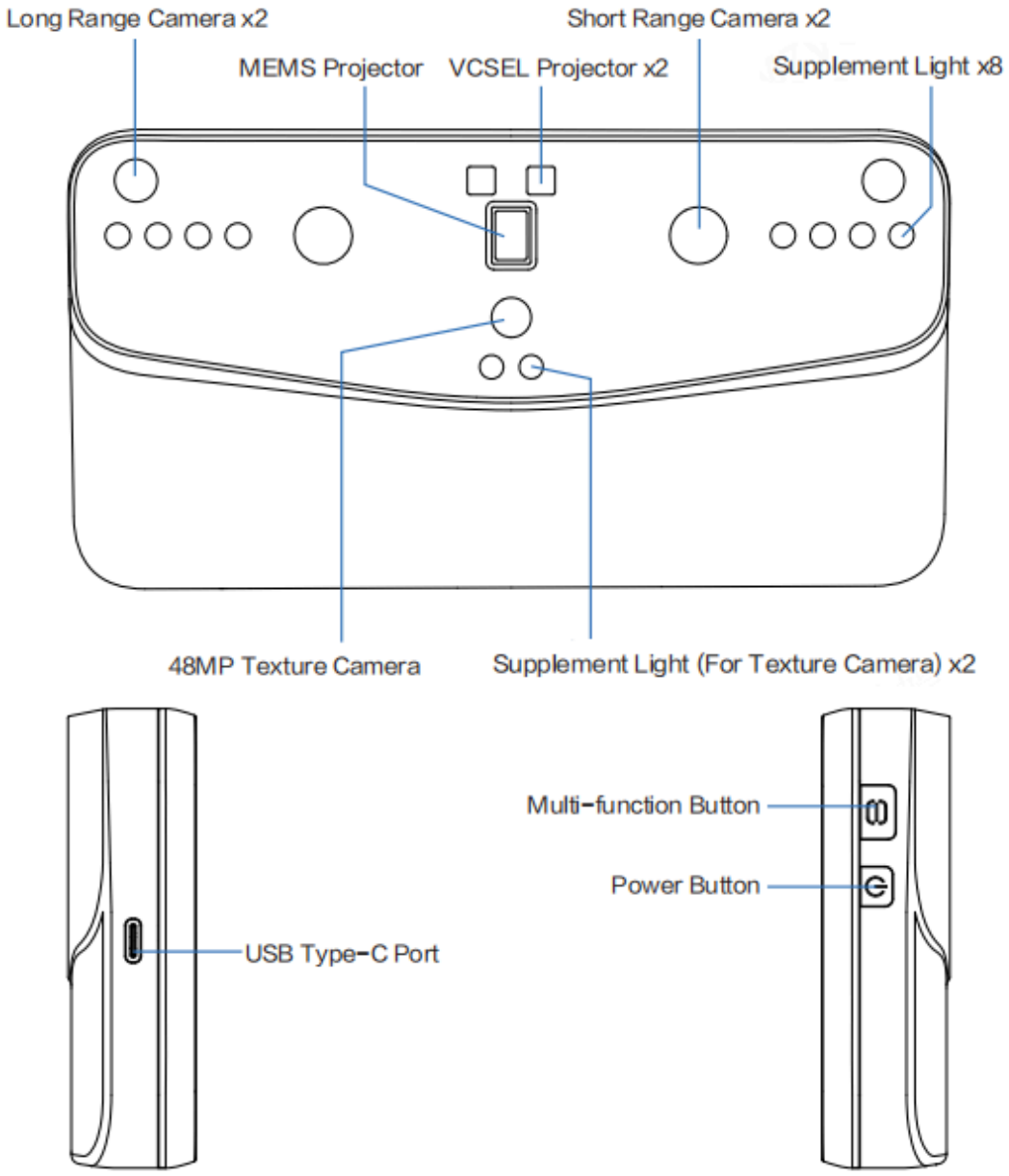
It offers a fast and smooth 3D scanning experience with a user-friendly and efficient workflow, and strikes a balance between detail and efficiency, making it suitable for various scanning scenarios such as art creation and cultural heritage preservation, thus truly achieving the digitalization of all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

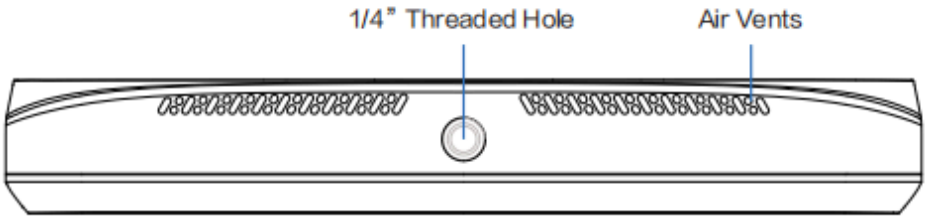
Besides, we also provide a desktop post-processing software StarVision, which supports file transfer and one-click data processing.

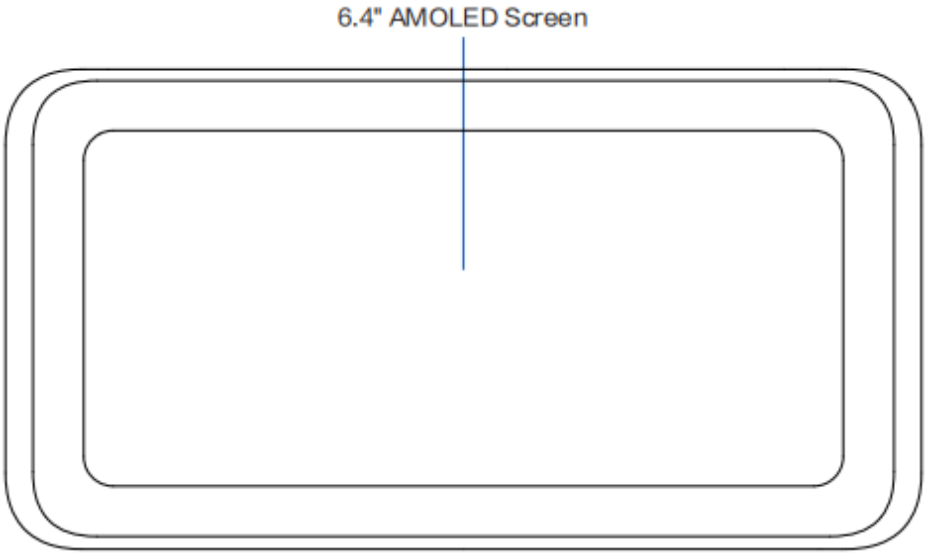
Structure and Component

Note

For the introduction to the device's specification, please refer to official website.


Long Range Camera x2
Short Range Camera x2
MEMS Projector
VCSEL Projector x2
Supplement Light x8
48MP Texture Camera
Supplement 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 (3 mm / 6 mm)
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 bottom of the scanner after the silicon case is removed or on the calibration board.
- It is recommended that you use a charging adapter that supports the PD 3.0 and PPS protocol for a better fast charging experience.

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 only be stored in device SSD, not able to use SHINING 3D Cloud storage.

Power On

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

Select the language first after startup, the default option is English, supports conversion to other languages in **Setting** > **Language**.

> **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 and selecting the language, please make sure to check the *End User License Agreement* first, or you will not be allowed to enter the **Next Step**.

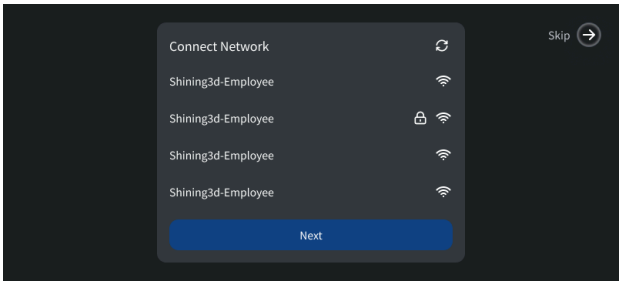
Power Off

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 Wi-Fi is encrypted.
- indicates the signal strength of the Wi-Fi.



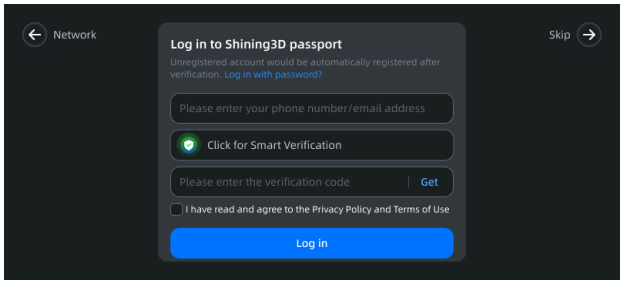
- Tap to manually search for nearby Wi-Fi.
- Tap or long press an unconnected Wi-Fi to enter the connection process.
- Long press a connected Wi-Fi to delete it from the list.
- Tap **Next** to register or log into SHINING 3D passport account.
- Tap **Skip** to directly enter the scan process.

> **Note**
>
> - When no network connected, you can not enter the **Next** step.
> - If it prompts that "Network connection error", please try again or change the network; if still can not be solved, please restart the device.
> - If you choose to **Skip** the network connection to directly enter the scan process, the scanned data can not be uploaded to SHINING 3D 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

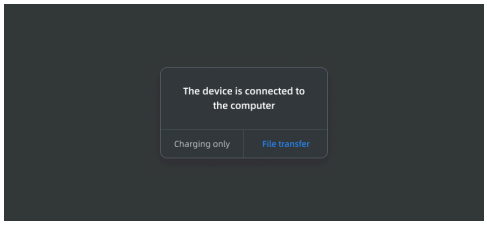
- If this is your first login, it is recommended that you choose to log in with a verification code. If your phone number or email is not registered, it will be automatically registered after verification.
- If you choose to **Skip** the network connection to directly enter the scan process, the scanned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



Note

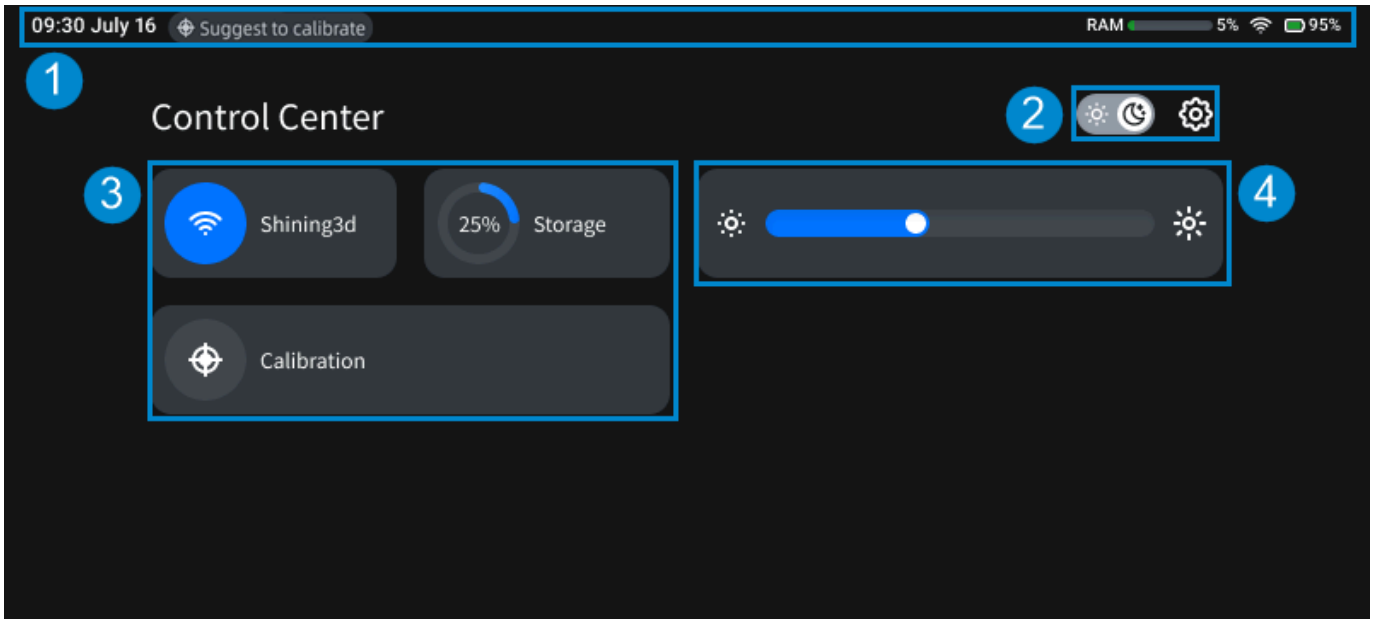
For Windows users, if the connection fails, please open the Firewall and Network Protection Notifications on your computer, and click **Allow** if a notification from Windows Security Center appears.

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.	Suggest to calibrate : It has been 7 days since the last calibration. Suggest to calibrate : It has been 14 days since the last calibration.
RAM	It indicates the device's used memory space.	: Used memory ≤ 50%. : 50% < used memory ≤ 70%. : 70% < used memory ≤ 100%.
Wi-Fi	It indicates the current status of network connection.	: The network connection is disabled. : The network connection is enabled but there is no network connection. : The network connection is good. : The network connection is not bad. : The network connection is not good. : The network connection is poor.
Battery	It indicates the current battery level.	: 50% < battery level ≤ 100%. : 10% < battery level ≤ 50%. : 0% < battery level ≤ 10%. : The battery level is 0%. : 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:
	  ◦ Tap **Log in** to enter the interface of **Log in to SHINING 3D passport**.
	  ◦ 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.
	• Logged in:
	  ◦ The account and name will be displayed after login.
	  ◦ 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.
	  ◦ Tap **Switch account** to enter the interface of **Log in to SHINING 3D passport**.
	  ◦ Tap **Log out** and a second confirmation window will pop up.
	
	Note
	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. 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. 2. After the download is completed, tap **Install Now** will proceed with the software installation. 3. Once the update (download and installation) is completed, the device will automatically restart. **Note** • 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. • If you receive a "download update interrupted" prompt, please follow the instructions provided. • If you receive a "the remaining battery power is insufficient" prompt, please charge the device to 30% or above 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. Tap **Start calibration** to enter the calibration process; if this is your first calibration, you will be directed to the **Help** interface.

Setting	Description
Wi-Fi	Enabled by default, and the switched status will remain after the next boot. When connected to the network, you can tap **Network Diagnosis** to open the pop-up window and automatically start diagnosing the network connection and SHINING 3D Cloud services. In the diagnosis results, ✓ indicates normal status, and ✗ indicates an abnormality. For the use of **Available Wi-Fi**, please see connect network.
Date and Time	• Automatically set time: Enabled by default, and you can manually set **Time zone** (🔍 search is supported). **Note** Please ensure the network is connected. • 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, Simplified Chinese, Traditional Chinese or Japanese.
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 basic information, including device name, serial number, warranty status, RAM, privacy policy, contact us, etc., as well as the certification information and the entrance into **Factory Reset**. **Note** • You can modify the device name, and view the warranty status and privacy policy. • Tap **Factory Reset** and a second-confirmation window will pop up; tap **Confirm** again to enter the reset process (can not be cancelled) and the device will automatically restart.

③ Function Panel

Function	Description	Icons
Wireless network	The entrance to wireless network settings. Tap the icon area to quickly enable or disable the wireless network connection.	: The wireless network connection is enabled. : The wireless network connection is disabled.
Storage	Display the percentage of device's used memory space. Tap to enter **Setting** > **Storage**.	: The used memory is no more than 75%. : 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. : 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

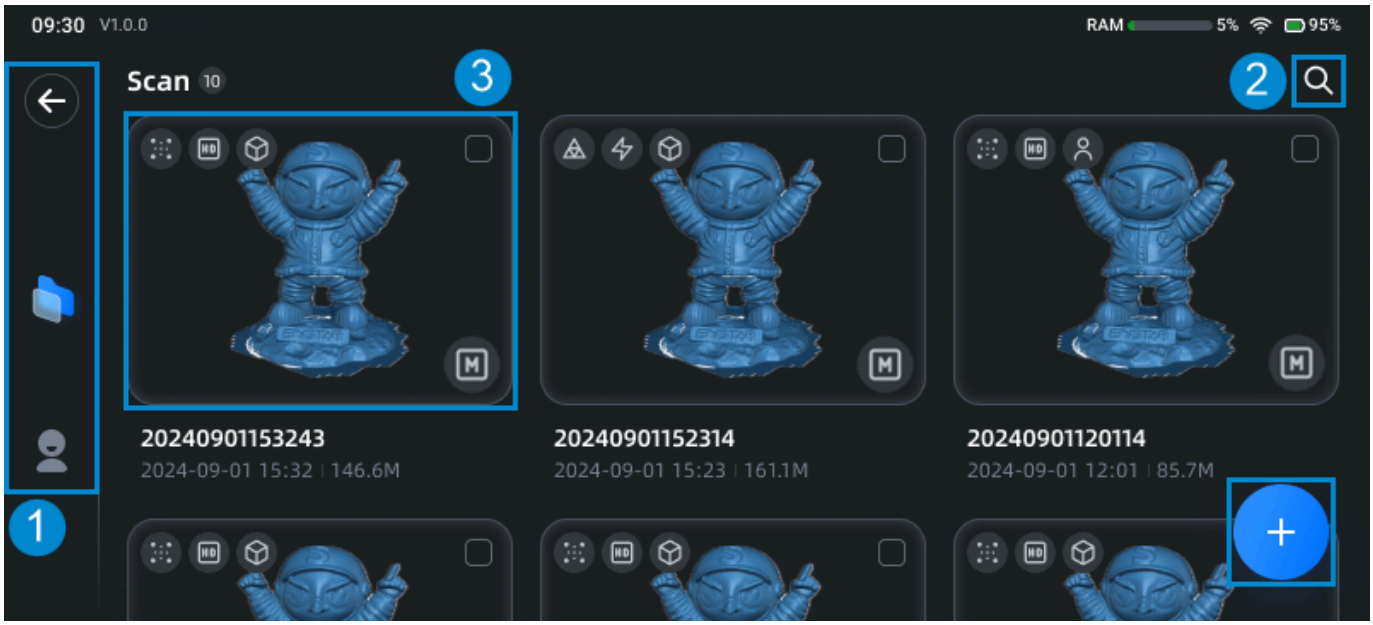
Drag the slider to adjust the screen brightness of the device:

← : 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**.

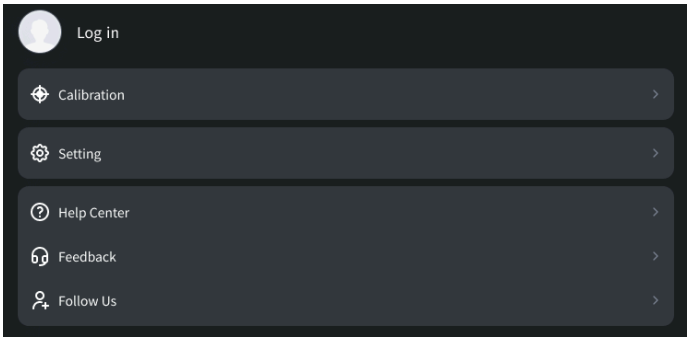
: Tap to enter **Settings** > **Calibration** interface.

: 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 and quick guide 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

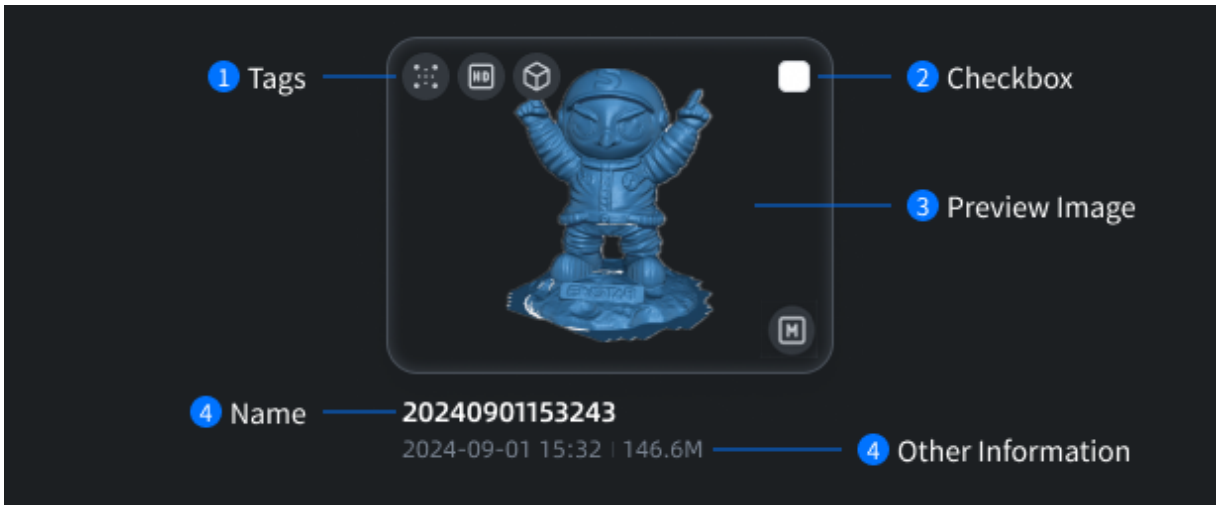
- If there is no file in the file list, button is not visible.
- If it is in the status of file selection, button is not visible.

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.
- Tap the card of corrupted file, and a pop-up window for deleting it will appear.
- 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.
- : Indicates that the model is scanned using the **Low** resolution.
- : Indicates that the model is scanned using the **Medium** resolution.
- : Indicates that the model is scanned using the **High** resolution.

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.

> **Note**
>
> If the file is corrupted, it will be shown as  .

④ Name & Other Information

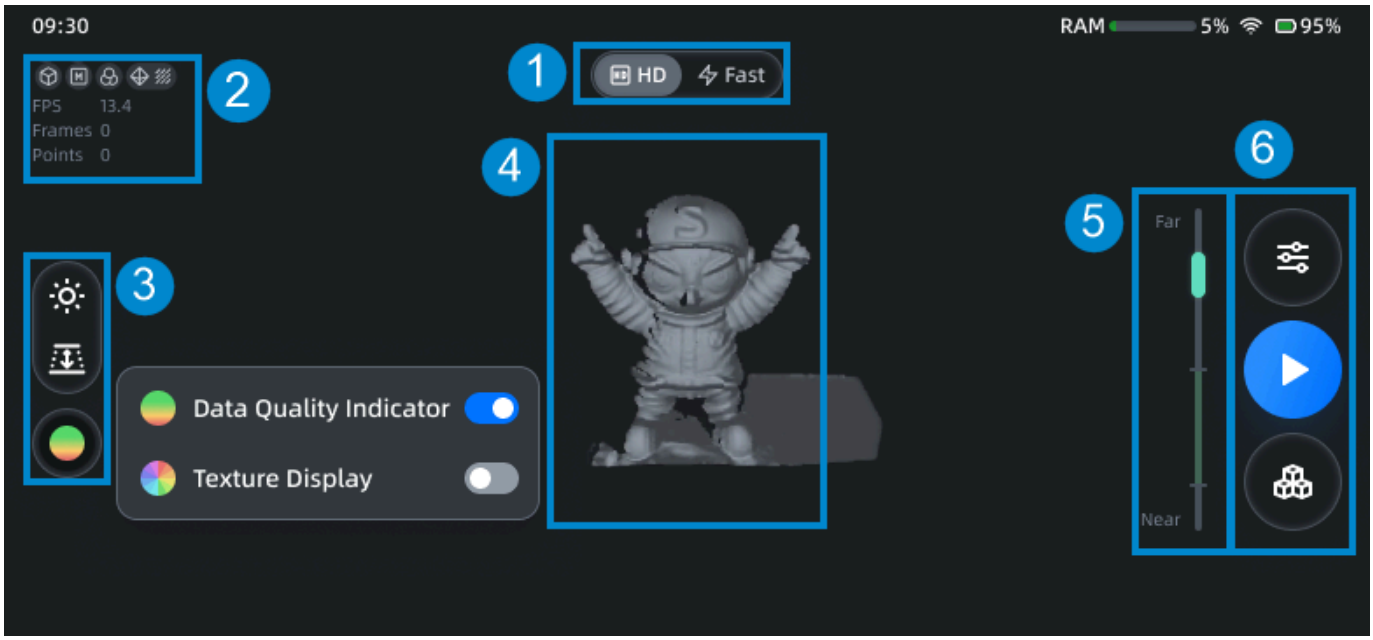
Display the name, latest update time and size of the model file.

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 can also tap **Skip** to quit 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: **HD** scan (default), which is used for small objects or objects with fine geometric details.
- ⚡: **Fast** scan, which is used for **medium to large objects** and offers a higher scanning efficiency.

  Especially, to scan medium to large objects:

Type	Settings
Lack of geometric and texture features	• Marker alignment • Scanning distance: 350 mm ~ 800 mm
With rich irregular geometric features	• Feature alignment • Scanning distance: 350 mm ~ 1000 mm
With irregular texture features, such as painting or drawing	• Texture alignment • Scanning distance: 350 mm ~ 1000 mm
The scene with rich irregular geometric features and existing in both near and far range, such as environment filled with many objects	• Feature alignment • Scanning distance: 350 mm ~ 1500 mm

② Project Information

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

> **Note**
>
> You can tap **Advanced Settings** button in the right-side function bar to adjust parameter settings of the project.

- / : Object / Portrait scan mode.
- / / : Low / Medium / High resolution.
- : Acquire texture enabled.
- : Feature alignment mode.
- : Texture alignment mode.
- : Marker alignment mode.

③ Scan Settings

Set camera view, scanning distance (also called DOF), data quality indicator and texture display. For more, see scan settings.

④ Model Preview

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

> **Note**
>
> In the scan preview state, operations such as panning, rotating or scaling 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 when following issues happened:

- The scanner was severely shaken or shocked, such as shocked during transportation.
- Severe accuracy reduction, such as frequent errors in alignment or unrecognized markers.
- Insufficient 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, Recalibrate will appear in the status bar at the top of the screen; if it has not been calibrated for more than 14 days, Recalibrate 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

- For the fist calibration or when the calibration board is replaced, 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.

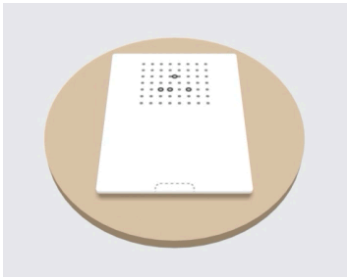
Specifically, calibration includes HD **HD** scan calibration and **Fast** scan calibration.

Note

The calibration process for two scan modes is the same, and **for each calibration**, you need to follow the calibration sequence: **HD** scan calibration > **Fast** scan calibration.

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

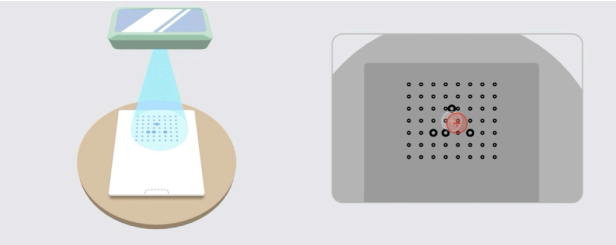
1. Place the calibration board on a flat surface as shown in the figure, and take out the bracket.



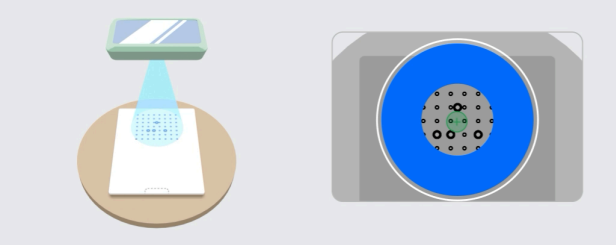
Note

Please use the correct side of the calibration board according to the prompt.

2. Keep the scanner horizontally and aim at the center of calibration markers. When the center of scanner's camera view matches with that of the calibration board, 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** 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.

After a successful calibration, a pop-up window will appear indicating the successful calibration. If the calibration fails for several times, please contact technical support and provide the error code.

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

> **Note**
>
> For portrait scan, please scan the face first and only scan the face once to avoid misalignment caused by facial muscle twitching or blinking.

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 reflective clothing; 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 objects (especially objects with black reflective surface)	Use washable or vanishing scanning spray.	Scan as normal after spraying.
Objects with less features or repetitive features	Place markers on the object.	Choose marker alignment for scanning.
	Attach some rich geometric features randomly on or around the object.	Choose feature alignment for scanning.
	Mark / draw on the surface to add features.	Choose texture alignment for scanning.

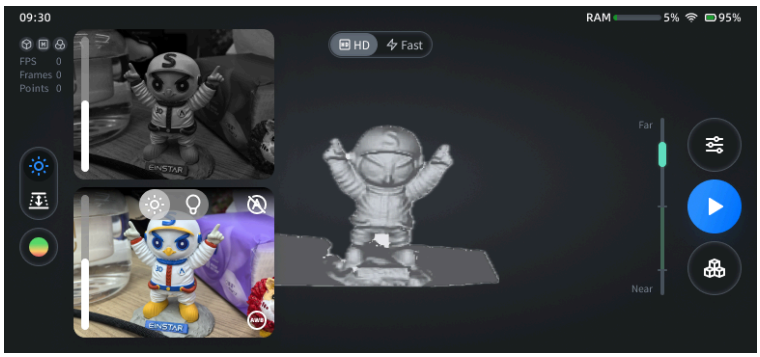
Pre-Scan Settings

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

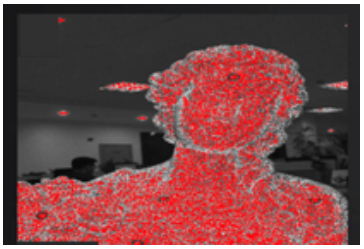
> **Note**
>
> After start scanning, you can adjust the camera view or switch between data quality indicator and texture display, but you could not readjust the advanced settings.

Camera View

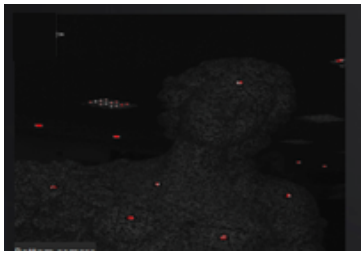
Tap to enable camera view, it will show the black-and-white camera view and texture camera view (only shown when **Acquire Texture** is enabled).



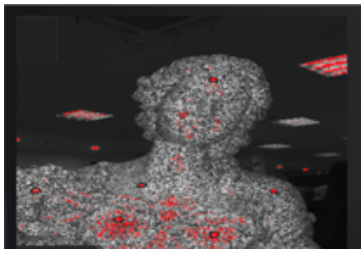
- Black-and-white camera:
  - **Auto-brightness** is enabled by default (only supported for the fast scan mode), and you can tap the button in the upper right corner to switch to manual mode, then you can slide up the slider on the left side of the window to increase the brightness (up to 8), or slide down the slider to decrease the brightness (down to 1).
  - The red points in the camera view indicate over-exposure points. To improve scan quality, it is recommended that you lower down the camera brightness when there are large areas of red over-exposure points, or increase the camera brightness when the camera view is too dark, until the brightness is proper, as shown in the figures below.



Brightness is too high



Brightness is too low



Brightness is proper

If you are not satisfied with the scanned texture, you can adjust settings as follows:

- Texture camera:
  a. For adjusting the white balance: It is recommended that you first point the camera towards a white paper, a white wall or a white area on the calibration board before performing white balance calculation, then tap AWB to automatically calibrate the white balance; please hold the scanner still when it counts down from 3 to 1.
  b. When the environment light is too bright, you can use **Auto-brightness** (enabled by default); you can tap this button to switch the status to , when you can use Camera light adjustment (enabled by default) to manually adjust the texture camera light, when you can slide down the slider on the left side of the window to decrease the brightness (down to 1), or slide up the slider to increase the brightness (up to 10).
  c. When the environment light is too dark, you can tap to switch to the LED supplement light adjustment (set as off by default), then you can use the slider to manually adjust the brightness (0 ~ 5, 0 indicates the LED light is off), and when the brightness is above 0, the button status will be shown as .

Note

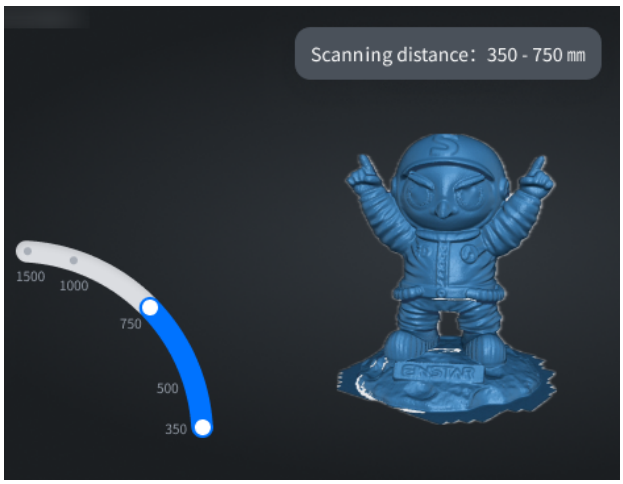
- Please perform AWB white balance calculation before the scan if needed; this function is not supported after entering the scanning process.
- If it prompts that "Unable to collect data", please adjust the distance of the scanner and the camera exposure status.

Scanning Distance (DOF)

Tap to enable the function for adjusting the scanning distance, and an arc slider and scan distance numerical prompt will appear:

● Drag the slider to adjust the scanning distance; the image outside the DOF range will not be generated into 3D data.

● Tap on the left side to exit this adjusting.



Data Display Mode

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

- : Data Quality Indicator; enabled by default for non-texture scanning objects.
- : Texture Display; enabled by default when you choose **Acquire Texture** in **Advanced Settings**.

> **Note**
>
> 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**:

The introduction to different align modes:

- Feature alignment: It is suitable for objects that cannot place markers and have rich surface features. It automatically completes the alignment by the surface geometric features of the object to be scanned.
- Texture alignment: It is suitable for objects with rich texture patterns on the surface but lacking rich intricate geometric features. It utilizes the surface texture features of the scanned object to automatically complete the alignment and merging process.
- Marker alignment: It is suitable for objects with limited geometric features or for scenarios that require high accuracy. It automatically completes the alignment by using markers attached randomly to the flat surface of the scanned object; for the HD scan mode, markers of 3 mm and 6 mm can be recognized at the same time; for the fast scan mode, markers of 6 mm **or** 12 mm can be recognized.

Object

- **Scan Configuration**:
  - **Resolution**: Set the scanning resolution range (point distance) as low / medium (default) / high; the higher the resolution, the slower the Data Quality Indicator turns green, and the mesh data will be more precise.
    Fast Mode:

Resolution	Scanning Distance (DOF)	Point Distance
Low	350 mm ~ 1500 mm	≥ 3.0 mm
Medium	350 mm ~ 1000 mm	1.0 mm ~ 3.0 mm
High	350 mm ~ 750 mm	0.5 mm ~ 1.0 mm

    HD Mode:

Resolution	Scanning Distance (DOF)	Point Distance
Low	100 mm ~ 300 mm	≥ 0.5 mm
Medium	100 mm ~ 260 mm	0.25 mm ~ 0.5 mm
High	100 mm ~ 220 mm	0.1 mm ~ 0.25 mm

  - **Acquire Texture**: Disabled by default; 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**:
  - **Feature alignment**: Enabled by default; if enabled, will appear in the project information area in the upper left corner.
  - **Texture alignment**: Disabled by default; if enabled, will appear in the project information area in the upper left corner.
  - **Marker alignment**: Disabled by default; if enabled, will appear in the project information area in the upper left corner; for the fast scan mode, you need to select the marker's size as 6 mm (supported for **Medium** / **High** Resolution) **or** 12 mm (supported for **Low** / **Medium** Resolution).

> **Note**
>
> For scanning large-scale objects with few geometric features, you can use 12mm markers to increase the scanning efficiency by placing less markers in the larger field of view.

> **Note**
>
> - At least one alignment mode should be chosen.
> - It is NOT recommended that you enable the feature alignment mode and the texture alignment mode simultaneously, otherwise it may impact the FPS.
> - For scanning large-scale objects with both rich irregular geometric features and plain less geometric areas, you can enable the marker alignment mode and the feature alignment mode simultaneously.
> - For scanning objects with rich repetitive regular geometric features (like car wheel) or pure plain areas with few geometric features, it is recommended that you only enable the marker alignment mode.
> - For the fast scan mode, when the marker alignment mode is enabled:
>   - The texture alignment mode can not be enabled simultaneously.
>   - Only one size markers can be recognized in each scanning project.
>   - The brightness for the black-and-white camera can only be adjusted manually, and camera exposure function can not be used.
>   - Please ensure that the scanner has sufficient power (above 30%) during the scanning process, otherwise the scan can not be performed.

Portrait

- **Scan Configuration**:
  - **Resolution**: Set the scanning resolution range (point distance) as low / medium (default) / high; the higher the resolution, the slower the Data Quality Indicator turns green, and the mesh data will be more precise.
    Fast Mode:

Resolution	Scanning Distance (DOF)	Point Distance
Low	350 mm ~ 1500 mm	≥ 3.0 mm
Medium	350 mm ~ 1000 mm	1.0 mm ~ 3.0 mm
High	350 mm ~ 750 mm	0.5 mm ~ 1.0 mm

HD Mode:

Resolution	Scanning Distance (DOF)	Point Distance
Low	100 mm ~ 300 mm	≥ 0.5 mm
Medium	100 mm ~ 260 mm	0.25 mm ~ 0.5 mm
High	100 mm ~ 220 mm	0.1 mm ~ 0.25 mm

  - **Acquire Texture**: Enabled by default, and **Texture alignment** mode can be enabled, and Texture overlay mode as well as texture mapping are also available.

- **Align Mode**:
  - **Feature alignment**: Enabled by default; if enabled, will appear in the project information area in the upper left corner.
  - **Texture alignment**: Disabled by default; if enabled, will appear in the project information area in the upper left corner.

Note

- At lease one alignment mode should be chosen.
- It is recommended that you only choose the feature alignment mode when scanning the face or body, and not choose the texture alignment mode at the same time.
- If you switch the object scan mode with marker alignment to portrait scan mode, the feature alignment mode will be enabled automatically.

Scanning

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

Please hold the scanner stably for a while and move the scanner steadily for continuous scan and better data quality:

- For objects with rich features, it is recommended that you use feature alignment, and target the camera to the area with rich geometric features.
- For objects with less geometric features but with rich irregular texture, it is recommended that you use texture alignment, and target the camera to the area with rich texture.
- For objects without enough features or texture, it it recommended that you place markers on the object randomly and use marker alignment, and target the camera to the area where at least 4 markers can be identified in each view.

Note

- If it prompts "Tracking lost", please move the scanner back to the scanned area with rich irregular features.
- For the fast scan mode, when the marker alignment mode is enabled, a "Low Battery" notification may appear if the remaining power is low, please ensure to charge the device before scanning or prepare a power bank.

In-Scan Settings

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

Note

If you need to change the scanned model or readjust other advanced settings, please set them in the scan preview status in advance.

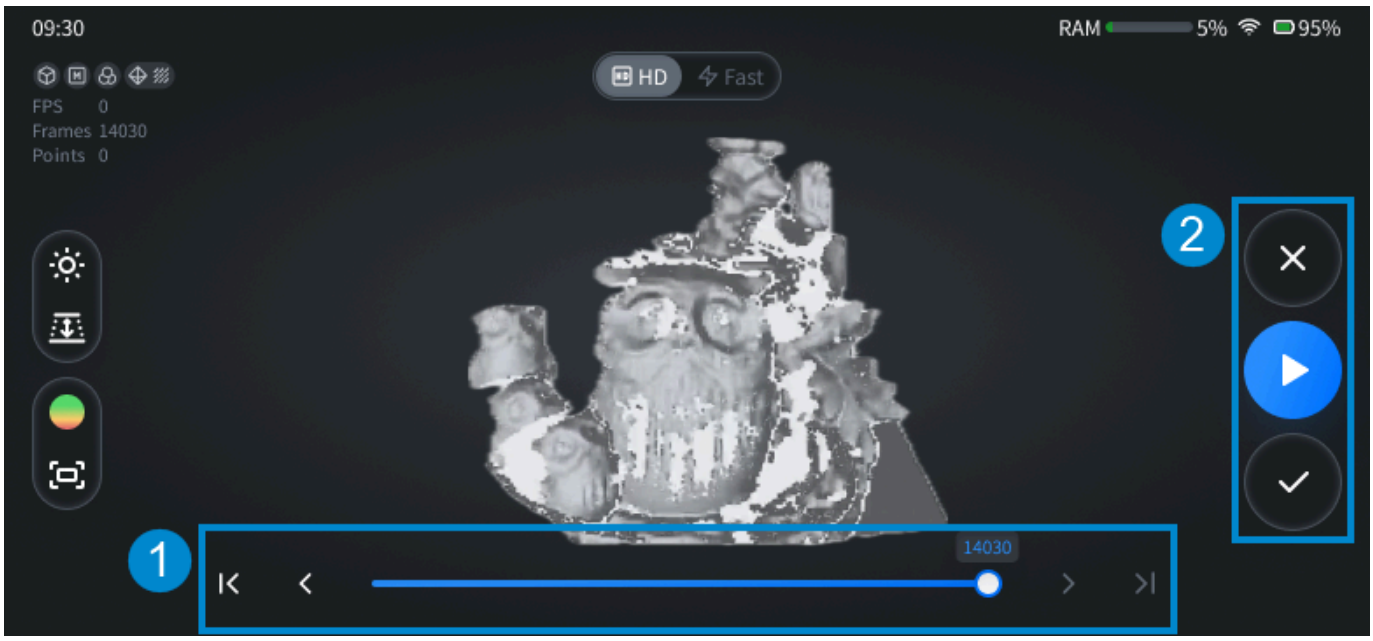
Icon	Function	Description
	Camera View	For more, see scan settings.
	Scanning Distance (DOF)	For more, see scan settings.
	Model Overlay	For more, see scan settings.
	Reset View	Reset the model to its original position. If it prompts that "View reset", it indicates all operations (including translation, 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, rotated or scaled (**Reset View** function to reset the model to its original position):
  - Scaling: Using pinch or spread gestures.
  - Translation: Swipe with two fingers.
  - Rotation: Swipe with one finger.
- During the scanning process, when the current frame count has reached 10000, the scan will pause automatically, and please tap **Complete Scan** in the pop-up window to save the project into the file list.
- During the scanning process, for the fast scan mode and when the marker alignment mode is enabled, if it prompts "Low Battery" or "Low Voltage", the scan will be automatically paused, please charge the device to the specified minimum battery level, and ensure that there is enough power remaining or the device is connected to a power bank.
- During the scanning process, 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.


09:30
RAM 5% 95%
HD Fast
FPS 0
Frames 14030
Points 0
2
1
14030

Index	Function	Description
①	Scanning Rewind	You can drag the slider on the progress bar to rewind to a desired position, so as to delete or renew the scan from the scanned area. You can also tap / to move backward or forward one frame each time, or tap / to move to **the 50th frame** or the last frame. **Note** • The last frame is displayed by default; when you drag the frame, the point cloud model as well as markers on it will change in real time. • If the total frame of the current project is not more than 50, this function is not supported, and it will prompt that "Keep at least 50 frames". • For the fast scan mode, if the marker alignment mode is enabled, please ensure that the device has sufficient power (above 30%), or the frame range selector can not be used.
②	Function Buttons	• : Clear data. Clear all scanned data and return to the interface of scan preview. • : Continue scan. **Note** If you continue scanning after dragging the frame, it will overwrite the selected frame data and all subsequent data. • : Complete scan. **Note** If the current frame is not the last frame, the current frame data and all subsequent data will be deleted.

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

- When you tap ← in the upper left corner to return, there will be a pop-up window for confirmation asking if you want to discard all modifications, including data clipping and the generated mesh.
- If Marker alignment has been enabled, the markers recognized by the camera will be displayed.
- The model can be panned, rotated or scaled (**Reset View** function can be used to reset the model to its original position).

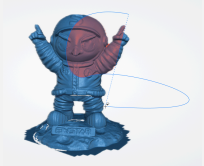
Index	Function	Description
①	Switch data	Tap to switch the displayed data of the model to **Points** or **Mesh** (if generated).
②	Project information	Tap to rename the current project; for more, see project information. Tap **Save** button to save the current project to file list and return to the interface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

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. **Note** 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. 
	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 all the rest parts connected to the selected area.
 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. After deleting, you can undo or redo the last operation. **Note** Only operations in the current data clipping can be undone or redone.

> **Note**
>
> If all scanned data is deleted, you will not be allowed to operate one-click processing or other functions, but you can undo the last operation.

Post-processing

Mesh

In the interface of point cloud edit, you can tap to perform one-click processing, including **Fast** (offer faster meshing) and **HD** modes, and mesh & texture map will be automatically generated using recommended parameters.

Besides, you can also tap  in the right-side function bar to enter the process of mesh generation and manually edit the mesh.

> **Note**
>
> - The mesh data can be subsequently used for rendering or 3D printing.
> - Only the project with texture acquired supports one-click texture mapping; if the **Acquire Texture** function is not enabled, then only mesh will be automatically generated.
> - If the current project uses the marker alignment mode, markers will be automatically filled for one-click processing.
> - If the current project has already generated the mesh, it will be overwritten after one-click processing.

Mesh Settings

Setting	Description
Watertight	Choose whether to fill all holes and wrap up all open areas on the surface of the model.
Resolution	Closer point distance indicates higher resolution and more geometric details shown in 3D mesh model. You can manually drag the slider to adjust the resolution, and you also can check on **Use recommend value** to use the default resolution. Besides, you can tap to enter the high-detail mode, where you can tap − / + to adjust the resolution. **Note** Please use StarVision software on a computer with > 32 GB of RAM for higher resolution.
Mesh Smoothness	Smooth noises on the surface of the model. Four adjustable levels are provided: none, low, middle and high.
Texture Mapping	Apply colors and textures to the surface of the model. Disabled by default, and can be enabled manually. **Note** This setting will not be displayed for the project without **acquired texture**.
Fill Markers	Automatically fill all the area covered by markers. Enabled by default, and can not be disabled when the **Watertight** function is enabled. **Note** If **Marker alignment** mode is not enabled, this setting will be invisible.

Tap the **Apply** button, the mesh will be automatically generated according to the mesh settings, and the generated mesh can be edited; if the generated mesh does not meet your expectation, you can tap to return to the scan interface.

> **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 re-overwrite it with the new mesh.

Mesh Edit

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

Interface Overview

> **Note**
>
> - For mesh clipping, **Select Through** can be enabled (by default), and only visible data can be selected when disabled; for more introduction to the clipping function, please see data clipping.
> - 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	• : Mesh edit. Tap this button and the window of **Mesh Processing** will appear in the right, where you can use **Texture Adjustment**: Drag the slider to adjust the brightness, contrast, color temperature and saturation (the default value is 0 and the range is -100 ~ 100); the texture adjustment effect can be previewed in real time, and you can tap **Complete** to save the settings. **Note** • Only models with **Texture Mapping** enabled support texture adjustment, or it will prompt that "Cannot adjust, the model doesn't have texture". • When adjusting the texture, **Texture Display** is always enabled and can not be disabled. • When you enter this function settings again, the new texture adjustment effects will be layered on top of the effects applied last time. • : Texture mapping. **Note** • 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". • After tapping this button, you will prompted with a second-confirmation window. • : Measure.
④	Share	Share the mesh model to SHINING 3D Cloud; for more, see save and share.

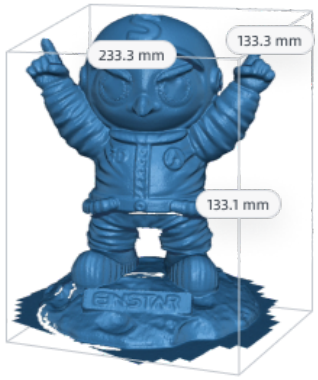
Measure

After generating the mesh, in the interface of **Mesh**, you can tap the button in the right-side function bar to enter the **Measure** interface, where you can measure the surrounding box (default) and distance.

> **Note**
>
> When **Texture Mapping** is enabled, **Texture Display** is enabled by default and can be disabled manually.

Measure Bounding Box

In the **Measure** interface, tap button in the right-side function bar to show the bounding box, whose length (mm), width (mm) and height (mm) will also be shown.



> **Note**
>
> The model can be panned, rotated or scaled (**Reset View** function can be used to reset the model to its original position).

Measure Distance

In the **Measure** interface, tap button in the right-side function bar to enable the function for measuring the distance.

The steps for measuring the distance are as follows:

1. Use point mode (default) and tap any position on the model to add 2 points.

   Note

   You can switch to rotation mode, when the model can be panned, rotated or scaled (**Reset View** function can be used to reset the model to its original position).

2. After 2 points are added, 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.

3. (Optional) When there are existing lines, the **Geodesic** function can be enabled to calculate geodesics.

Note

- You can drag the points to adjust their position, and the distance value will be updated in real time; you can drag the points to activate the magnifying glass function, which can be used to zoom in and display a specific part of the model, which can help you define the measurement point more precisely.

- If the added two points are not on the same surface, the **Geodesic** function can not be enabled.

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 Cloud (designated node), 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.
- The node for SHINING 3D Cloud is allocated automatically, and please log into the designated node to view the shared model.
- 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.

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