User Manual Of Einscan-Pro

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## 1、 Device list

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basic Version</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scan head</td>
<td>1</td>
<td>set</td>
</tr>
<tr>
<td>Adapter</td>
<td>1</td>
<td>pc</td>
</tr>
<tr>
<td>Power line</td>
<td>1</td>
<td>pc</td>
</tr>
<tr>
<td>Aviation plug</td>
<td>1</td>
<td>pc</td>
</tr>
<tr>
<td>Calibration board</td>
<td>1</td>
<td>pc</td>
</tr>
<tr>
<td>Mark points</td>
<td>1</td>
<td>set</td>
</tr>
<tr>
<td>Installation Guide</td>
<td>1</td>
<td>pc</td>
</tr>
<tr>
<td><strong>Industrial Pack</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turntable</td>
<td>1</td>
<td>pc</td>
</tr>
<tr>
<td>Tripod</td>
<td>1</td>
<td>pc</td>
</tr>
<tr>
<td>Scan head tray</td>
<td>1</td>
<td>pc</td>
</tr>
<tr>
<td>USB line</td>
<td>1</td>
<td>pc</td>
</tr>
<tr>
<td>Power adapter</td>
<td>1</td>
<td>set</td>
</tr>
<tr>
<td>Power line</td>
<td>1</td>
<td>pc</td>
</tr>
<tr>
<td><strong>Color pack</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Texture camera</td>
<td>1</td>
<td>pc</td>
</tr>
</tbody>
</table>

*Industrial Pack and Color pack are add-on modules.*
## 2. Specification parameter

<table>
<thead>
<tr>
<th>Model</th>
<th>EinScan-Pro</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scan Mode</strong></td>
<td></td>
</tr>
<tr>
<td>Handheld HD Scan</td>
<td>Handheld Rapid Scan</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td></td>
</tr>
<tr>
<td>0.1mm</td>
<td>0.3mm</td>
</tr>
<tr>
<td><strong>Scan speed</strong></td>
<td></td>
</tr>
<tr>
<td>15 frames/sec</td>
<td>10 frames/sec</td>
</tr>
<tr>
<td><strong>Point distance</strong></td>
<td></td>
</tr>
<tr>
<td>0.2mm~3.0mm</td>
<td>0.5mm~3.1mm</td>
</tr>
<tr>
<td><strong>Single Scan Range</strong></td>
<td>210*150mm</td>
</tr>
<tr>
<td><strong>Light source</strong></td>
<td>White light LED</td>
</tr>
<tr>
<td><strong>Part Size Range (Recommend)</strong></td>
<td>0.03m~4m</td>
</tr>
<tr>
<td><strong>Align Mode</strong></td>
<td>Mark Point Align</td>
</tr>
<tr>
<td><strong>Texture Scan</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Outdoor Operation</strong></td>
<td>No (affected by strong light)</td>
</tr>
<tr>
<td><strong>Special Scan Object</strong></td>
<td>--</td>
</tr>
<tr>
<td>For transparent, reflective and dark object, please spray powder first before scanning</td>
<td></td>
</tr>
<tr>
<td><strong>Printable Data Output</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Data Format</strong></td>
<td>OBJ, STL, ASC, PLY</td>
</tr>
<tr>
<td><strong>Scan Head Weight</strong></td>
<td>0.8KG</td>
</tr>
<tr>
<td><strong>System Support</strong></td>
<td>Win7/Win8/Win10 64bit</td>
</tr>
<tr>
<td><strong>Computer Requirements</strong></td>
<td>CPU: i5 or Higher; Display card: NVIDIA GTX660 or higher; Display memory: &gt;2G; Memory Storage: 8G or more</td>
</tr>
</tbody>
</table>
3、Installation Instructions

3.1 Hardware Installation

3.1.1 Basic Module

Connect one end of the line to the scanner, the other end to power line and USB on the computer as shown in the picture. Connect to USB2.0 or USB3.0. (This installation mode is suitable for Handheld Scan.)

3.1.2 Industrial module installation

Put the basic module on the tripod when the installation finishes. Connect the long-opening end of USB line to the computer, the square-opening end to the turntable. Then connect the power adapter to the turntable and adjust the position of scan head and turntable. (This installation mode is suitable for Fixed Scan.)
3.2 Software installation

3.2.1 Software installation

Double click installation package, Follow the instructions as the window pops up like the below pictures shown:
The acquire activated file window pop-ups, please confirm there is only one device connected. Choose device type and get activated file mode: Online activation and local activation. After activating a device, you can unplug the device and plug in other device to continue activating. When finishing click “Next”.

**Note:**

1. Only one type of device is activated, then the installer only support the use of that type. If you want use both S and Pro, you should activate the two device type separately. Or you can activate device after installation, refer to 4.3 Advanced options.
2. When activate the Pro, please unplug the texture module.
Users can either choose the default installation path or click the Browse button to select the installation path. Default installation is suggested. Click Next to install.
Select your software language, default is English.
Click 'Extract' to unpack version 2.10.00 of FTDI's Windows Driver Package and launch the installer.

www.ftdichip.com

Device Driver Installation Wizard

Welcome to the Device Driver Installation Wizard!

This wizard helps you install the software drivers that some computers devices need in order to work.

To continue, click Next.
When installation is finished, there will be a shortcut of the software on the desktop.

In the next step, we need to check whether the camera driver installation is successful, right
click “Computer”, choose “Computer Management”-“Device Management”-“Imaging devices” to check if the two cameras display normally (two cameras will be found when there is no color module).

When there is color module, check if there are three cameras, as shown below.
3.2.2 Software Uninstall

Open the start menu, choose Shining3d----Click “Uninstall or Modify Einscan”, as shown below.

Choose modify or remove, click “Next”:

4. Software Introduction

The software provides Free Scan, Turntable Auto Scan, Handheld HD Scan and Handheld Rapid Scan, and taking into account the portability and high-precision, the following is the mode selection suggestions:
4.1 Mode selection

4.1.1 Industrial Mode

(1) Auto Scan: This mode is recommended for objects within the size of 200*200*200mm. For example, small workpieces.

(2) Free Scan: This mode is recommended for objects over the size of 200*200*200mm, while high details and resolution, as well as a comparative stable environment (without obvious vibration) are required. For example, industrial parts which require high details and resolution.

4.1.2 Handheld Mode

(1) Handheld HD Mode: When the size of the object is over 30*30*30mm, environment is not stable or with vibration, sticking mark points on the object is allowed, high resolution and details are required, this mode is recommended. For example: Industrial part, sculpture, or art works with rich details.

(2) Handheld Rapid Scan: When the size of the object is over 150*150*150mm, environment is not stable or with vibration, surface is not with much detail pattern, this mode is recommended. For example: Human body (the whole body, face, chest, hand, foot and other parts), sculpture that doesn’t require high detail.

4.2 First Scan

First time open the software to enter the home page, there will be User Experience Program pop-up, click "Learn more" to view the details of the plan as shown, and determine whether to participate in the program, or not.

Enter the Select Device Type interface, select EinScan-Pro and click "Next", as shown below.
Enter the page of choose scan mode, you can choose Fixed Scan, Handheld HD Scan or Handheld Rapid Scan, as shown in Figure.

4.3 Advanced options

Open the start menu, choose Shining3d----Click “Advanced”, as shown below.
Advanced option window, you can do acquire activated file, set user experience program and open or close debug window.

➢ Acquire activated file

Please confirm there is only one device connected. Choose device type and get activated file mode: Online activation and local activation. After activating a device, you can unplug the device and plug in other device to continue activating. When finishing click “Close”.

Note:
1. Only one type of device is activated, then the installer only support the use of that type. If you want use both S and Pro, you should activate the two device type separately. Or you can activate device after installation, refer to 4.3 Advanced options.
2. When activate the Pro, please unplug the texture module.

➢ User Experience Program

The description of User Experience Program can refer to 4.2 First Scan. Check the box of User Experience Program mean enabled.
Debug Window

Check the box of Debug window. Start the software again, and the debug window will appear.

5. Calibration

Scanning cannot be entered if calibration is not done. There is a WARNING: No calibration data, please calibrate first.

![Warning: Calibration data unavailable. Please calibrate scanner]

Choose Scan Mode

- Fixed Scan
- Handheld HD Scan
- Handheld Rapid Scan

Calibrate  Next

Note: Scanning cannot be entered if calibration is not done. Please do the calibration first when there is a WARNING: “No calibration data, please calibrate first”.

Click ‘Calibrate’ to enter the interface of calibrate. It will show the below picture if the device only has two cameras. (Texture camera is not attached)
It will show the below picture if the device has three cameras. (With texture camera)

There are two calibration steps if the device without texture camera:
① camera calibrate ② High detail scan calibrate;
There are three calibration steps if the device with texture camera:
① camera calibrate ② High detail scan calibrate ③ Texture camera white balance.

Note:
1. High detail scan calibrate is not needed when Handheld HD scan mode is not required to be used. Both camera calibrate and texture camera white balance are needed when texture module is added for application.
2. Calibration board SN is under the camera viewport.

Take the scanner with texture camera as an example (without texture camera, it only takes the first two steps).
5.1 Camera Calibration

The calibration board should be placed in 5 different positions as the software operation guide shown, and each position will be taken 5 photos.

Firstly, adjust the distance between the projector and calibration board (450mm-350mm).

The first calibration board direction should be same as software operation guide shown below, and the cross from scanner should target at the blank position clearly.

Click “Snap” or , the photo will be captured. Move the scanner from top to bottom or from bottom to top, until the distance bar appears all green, so the photos are all captured in this position.

Note:
1. When the distance bar appears green, it means pictures of this position are collected. Blue means the current position.
2. Keep the cross in the white square area when moving the calibration.
When pictures of one position are well collected, the software will turn to the next position as below:

Put the calibration board on the support according to the instruction. The collection is same as above. When all five positions photos are captured, the software will calibrate the camera automatically. You will see the progress bar as below.
When the camera calibration is finished, you’ll see “Camera calibration success”. The software will enter HD calibration mode automatically.

5.2 HD Scan Calibration

The software will enter HD calibration mode automatically after camera calibration. (Click “Skip” to enter next step if HD scan is not needed).
Put the calibration board according to the indicating diagram, with the line plane facing the white smooth area at the back of the calibration board. Click “Snap” or , move the scanner up and down, the software will collect the pictures until the distance bar appears all green.

When the distance bar appears all green, the software starts to calibrate automatically. It will show “HD calibration success” when calibration is finished. If there is no color camera, click “Exit” to exit the calibration page, enter the scan mode selection page.
5.3 Color camera white balance

When the HD calibration is finished, the software will enter Color camera white balance mode automatically.

During the texture calibration, just place texture camera towards white area of the reverse side of calibration board, click “Snap” or on the hardware, and move the scanner up and down, until the green area turns blue, and the white balance test is completed. The picture below will show up when the calibration is successful.
When calibration is finished, the software will close the calibration window automatically and enter the scan mode selection page.

5.4 Calibration Precautions

You must finish all the calibration steps according to the instruction when you calibrate at the first time. If resolution is lost under HD Mode, or environment light changes and influences the scanning, you can do line calibration or white balance calibration solely.

Situations as below need do calibration again:

① When the scanner is used for the first time or after long time without using.
② When there is strong vibration during the transportation.
③ When alignment mistake or failure frequent appear during the scanning.
④ When environment light changes under Color Scan, white balance calibration is needed.
⑤ When scanning data is incomplete and quality is much worse during the scanning.

Note: Make sure to keep the calibration board still and then click “Snap” to collect during calibration.

6.  Fixed Scan

Fix scan has two scan modes:  Free Scan and Auto Scan. Choose Fix Scan, as shown below:
Click ‘Next’ to enter the interface of two scan modes selection.

6.1 Free Scan

Choose “Free Scan”, as shown below, then click “next”.
Enter the interface of New Project and Open Project, as shown below:

Click “New Project”, it will pop-up a dialog as shown below. The default project save location is the desktop, then it will remember where the user last created a new project. Refer to 8.1 New Project and 8.2 Open Project.
Enter the project name, then click ‘Save’ to enter the interface of Non-texture Scan and Texture Scan selection. Texture scan is only active when the scanner is with texture camera. Refer to 8.1.1 Select Texture and 8.3 Open global mark point.

Enter the interface of scan.
Adjust the distance between the object and device (suitable working distance is 350 ~ 450mm), until the cross is clearly to be seen on the object. Click to start scanning.

Adjust brightness, HDR refer to 8. Common Functions, Scan precautions, Manual align, Delete current scan, Mess, Save, Share and Main Menu, the right toolbar can refer to 8.10 Right Toolbar.

6.2 Turntable Auto Scan

Choose Auto Scan, as shown below, click “Next”.
Enter the page of New Project.

Refer to 8.1 New Project, 8.1.1 Select Texture and 8.3 Open global mark point.
After building new project, enter the interface of scan.

Align mode selection and turntable steps refer to 8.10.3.1 Fixed mode scan precautions Auto Scan.

Adjust brightness and HDR can refer to 8. Common Functions, Manual align, Delete current scan, Mesh, Save, Share and Main Menu. The right toolbar can refer to 8.10 Right Toolbar.
7、 Handheld Scan

7.1 Scan head key function

- **“-” “+”**: During the scanning, zoom in and out in view of data under exposure window. “-” “+” can adjust the brightness.
- **Scan/pause button**: click the button to pause or start scanning. Double click to activate exposure adjustment window.

7.2 Handheld HD Scan

Choose Handheld HD Scan as shown below:

Choose Scan Mode

- Fixed Scan
- Handheld HD Scan
- Handheld Rapid Scan

Calibrate Next
Click Next to enter the page as below:

Click “New Project”, it will pop-up a dialog as shown below. Refer to 8.1 New Project and 8.2 Open Project.

Refer to 8.1.2 Select Resolution and 8.3 Open global mark point.

Enter the interface of scan.
refer to 8. Common Functions, Scan precautions, Delete scan, Mess, Save, Share and Main Menu, the right toolbar can refer to 8.10 Right Toolbar.

7.3 Handheld Rapid Scan

Choose Handheld Rapid Scan as shown below:
Refer to 8.1.2 Select Resolution and 8.3 Open global mark point.

Enter the interface of align mode, Texture Scan and resolution selection. The left picture is with mark point align mod, the right picture is without mark point align.

Mark point and feature align mode refer to 8.1.3 Select Align mode
8.1.2 Select resolution.
8.3 Open global mark point file.
Enter the interface of scan.
8. Common Functions

8.1 New Project

Enter the interface of scan. Click New Project, it will pop-up the window below.

The default project save location is the desktop, then it will remember where the user last created a new project.

- Free scan and auto scan project suffix name is: fix_prj;
- Handheld HD scan project suffix name is: hd_prj;
- Handheld rapid scan project suffix name is: rap_prj.
8.1.1 Select Texture

The texture selection interface is shown below. Texture scan is only active when the scanner is with texture camera. The process of Non-texture Scan and Texture Scan are same.

8.1.2 Select Resolution

Suitable for handheld scan mode.
Select resolution interface as shown below, the higher the resolution, the better the details. If select the “others”, you can drag the sliding block to other locations, flexible choice of point distance.

- Handheld HD Scan point distance range: 0.2mm—3.0mm, high 0.2mm, medium 0.5mm, low 1.0mm;
- Handheld Rapid Scan point distance range: 0.5mm—3.1mm, high 0.5mm, medium 1.0mm, low 1.5mm.
Note:
1. Higher resolution takes more time to scan and consumes more memory of graphic card, and size of the object to be scanned will be limited. Theoretically, the maximum size of scan = point distance*8192/mm. In actual process, the size of the object can be scanned depending on computer graphic card.
2. Choose high resolution, the data output is slow, please be patient.
3. When import project, and continue the scan, the scanning will be in accordance with the imported project resolution.

8.1.3 Select Align Mode (Handheld Rapid Scan)

Suitable for Hand-held Rapid Scan.
The interface of select align mode as below, including mark point and feature align mode。（Mark point align mode needs to buy）

![Align mode select](image)

Note:
Mark point align: good for objects are without any features, or with symmetry features.
Features align: good for objects are with detail features, or those are now allowed for reference points sticking.
If there is no limitation about surface points sticking, and there is enough features, both align methods can be selected.

When select Marker Point align mode, you can use “open global mark point file” (refer to 8.3 Opening the Frame Point File).
The following figure shows the mark point align scan.
8.2 Open Project

Enter the scan mode, or click on the right side of the toolbar, you can operate the “open project”. Open project default location is the computer desktop, then it will remember where the user last opened a new project. If you want to import project, the opened project should be scanned under the same calibrated condition and scan mode. Refer to Start Scan, Edit, Data post processing.
Note:
1. The scanning projects created by different scan modes (Industry fixed scan, handheld HD scan and handheld rapid scan) cannot be reciprocally imported. The projects created by auto scan and free scan can be reciprocally imported.
2. After importing the project, direct access to scan, choose the scan mode based on whether the imported project is texture. The texture project cannot be continued to scan if the scanner is without color texture camera.
3. Handheld rapid scan will follow whether the imported project is mark point align or feature align. If imports a mark point align project or global mark point project when there is no such function, you can’t do further scan but only edit or merge the project.
4. Handheld scan mode: When import project, and continue the scan, the scanning will be in accordance with the imported project resolution.

8.3 Open global mark point file

In the new project interface, select , can import three formats as asc, txt and p3. Import global mark point as shown below. Note: the use of global mark point, the only point in the framework can scan.
8.4 Adjust Brightness

8.4.1 Brightness in Fixed Scan

After new project or open project, it will show the window as below, the cameras view point on the left, you can drag the button to adjust the brightness. The brightness is appropriate at the right scan distance: equipment against objects, the cross is clearly in the brightness viewing window.

![Brightness adjustment window](image)

8.4.2 Brightness in Handheld Scan

You can adjust the brightness before scanning, click button to call up the camera viewport, drag the brightness bar above to adjust. Click the button again, and the camera viewport will be hidden. Or double click to activate brightness adjustment model, press '+' or '-' to adjust brightness, double click to exit the brightness adjustment model. Observe whether the data is integrated during scan process, if not it is able to adjust the brightness.
**Brightness Judgment:**
1. Handheld HD Scan: When the view port presents fringes clearly and the 7 lines appear on object completely and continuously, the brightness is good, otherwise you have to adjust it again. As shown below.
2. Handheld Rapid Scan: Check brightness through exposure whether the light frame is clearly shooting on the object.

8.5 HDR Brightness

Suitable for free scan and auto scan.

Free scan and auto scan mode can be set to HDR, the HDR brightness is below the camera viewport, enable HDR brightness can scan bright and dark objects.

8.6 Mouse operation prompts

Lower left corner of the interface is the mouse operation prompts:
- After scanned or imported project, the prompt text is as follows:
  - **Hold down the left mouse button:** Rotate the object;
Hold down the middle mouse button: pan the object;
Hold down the mouse wheel: Scroll up and down to the object; scroll down to enlarge the object;
Hold down the Shift + left mouse button: select the area on the object;
Delete: Delete the selected area.

Press and hold shift + left mouse click: Select point to start manual align

8.7 Frame, Points and Triangles

- Fixed Scan mode, When scanning it will show the current points and current triangles in the lower right corner;
- Handheld Scan mode, When scanning it will show the Frame rate, current points. After merging, it will show current triangles in the lower right corner. Handheld HD Scan’s scan speed is 15 frames/sec, Handheld Rapid Scan’s scan speed is 10 frames/sec.
  When you edit the scan data, the current points and the current triangles change in real time.

8.8 Distance bars

  Suitable for handheld scan mode.
  Handheld HD scan and handheld rapid scan mode, when scanning it will show distance bars on the left, as shown below, green indicates the optimum distance, blue indicates the distance is too far, red indicates the distance is too close. Get the best position according to the color bars. You could also refer that to the light on the equipment handle, the indication of which is as same as above.
8.9 Edit buttons

Edit buttons introduction:

1. Deselect  
2. Revert  
3. Delete  
4. Undo  
5. Show/Hide Stripes

Non-texture scan, there is no such button.

Note:
1. Free scan and auto scan mode, both the scan data and mark points can be edited;
2. Handheld Scan mode, only can delete scan data, mark points do not support editing. Handheld Rapid scan mode does not support deleting all the scan data.

8.9.1 Single-piece edit

Single-piece edit is suitable for fixed scan mode (free scan and auto scan). You can edit the current part data after each scan. As shown below, you can do the below edition if the data has excess parts, both data and mark points can be edited.

SHIFT+ left mouse button to select excess parts, as shown below:
Click Or DELETE to delete selected data, as shown below:

Click right corner of the interface to end Single-piece edit, delete the current scan data.

8.9.2 Whole-piece edit

After end the single-piece edit, the right toolbar will display, and now can edit the whole scan data. The specific operation the same as the single-piece edit.

You can also do the whole-piece edit after importing a project, the specific operation can refer to 8.9.1 Single-piece edit.

8.9.3 Handheld scan mode edit

Under handheld HD scan mode and handheld rapid scan mode, the data can be edited only when suspend scanning or import a project, and does not support the deletion of mark points.

SHIFT+ left mouse button to select excess parts;

Click Or DELETE to delete selected data.

Refer to 8.9.1 Single-piece edit.
Note:
1. Handheld scan mode does not support the deletion of mark points.
2. Handheld rapid scan, feature align, use the edit button to delete all the data, continue scanning will restore the last deleted data.

8.10 Right Toolbar

8.10.1 Buttons Introduction

- The following figure shows the right toolbar of fixed scan mode, free scan mode has no pause scan button.

- The following figure shows the right toolbar of Handheld scan mode:
8.10.2  Project button

Click the Project button, as shown below, refer to **8.1 New Project** and **8.2 Open Project**.

8.10.3  Start Scan button

8.9.3.1 Fixed Mode scan precautions

Before scanning adjust the distance between the object and device (suitable working distance is 350 ~ 450mm), until the cross is clearly to be seen on the object.
a) Free Scan

**Note:**
You can use mark point align, feature align and manual align. Mark point will be recognized to align automatically when there are mark points on the object.

Click to start scanning. When the scan is completed, change the position of object or scanner for next scan. If use feature align, make sure the overlap area of currently scan area and the last scanned data is more than 1/3. If use mark point aligns, the common points should more than 3. Then click scan button, the data will automatically align, until the whole scanning completed.

b) Auto Scan (Align mode selection)

The default is encoded point align mode, you can also choose mark point, feature or global mark point align, as shown below. Align mode can be re-selected after the turntable has rotated one circle. If you import global mark point file when creating a new project, the align mode is global mark point, and the project cannot change to other align mode. Refer to [8.3 Open global mark point file](#).

![Align Mode](align_mode.png)

Before scanning, you can set the scan times per round under turntable scan by . The default setting is 8 times.

Click to start scanning. After the turntable has rotated one circle, you can change turntable steps and align mode.

**Note:**
1. Choose encoded point align mode, Please make sure that the object won’t block the mark points on the turntable. Or, there will be no fringe pattern, while turntable will be still rotating.
2. If the scanned object is too high and will block the mark points on turntable, you can stick mark points on it (if allowed) to continue auto scan. At this time, please make sure that the encoded marks on the turntable are covered, so as not to affect the scanning. As shown in figure1 below.
3. Feature align, when scan it will verifying and scan 3 piece of data. As shown in figure2 below.
8.10.4.2 Handheld HD Scan

HD scan relies on reflective mark points to align. Stick mark points on the object in random, avoiding sticking in one line.

**Note:**
The single scan range is 210mm X 150mm, public areas alignment require at least four mark points. While placing the points, uniformly stick the mark points on the object, and make sure that in each single scan area has at least 4 points.

After new a project, click or the button on the hardware to start scanning.

Brightness adjustment refer to **8.4 Adjust brightness**.
Distance bar’s introduce refer to **8.8 Distance bars**.

8.10.4.3 Handheld Rapid Scan

- Mark point align mode, before scanning should stick mark points on the object in random, avoiding sticking in one line. The green area is the current scan, as shown below
When the position tracking fails, it will appear "Tracking Lost". You need to go back to the previous markers to get to be tracked again to continue scan.

Feature align mode, when start scanning, keep the scanner opposite to the object for 3 seconds, and start to move when scan data shows. To improve the scan efficiency, the movement should be continuous and uniform.

If the scanning presents purple color and "Tracking Lost" appears, it indicates that the position tracking fails. You need to go back to the previous scan area and wait for about 3 seconds and adopt merging features for about several seconds, and then try to scan normally.

**Note:**

When the scanned data quality is not good, please check the distance, and if the brightness is proper in good distance condition. Check brightness through exposure whether the light frame is clearly shooting on the object.

### 8.10.4 Manual Align

Fixed mode (Free Scan and Auto Scan), use Manual Align if automatic alignment failed during scanning as shown below.
Click button 🔄 to open Manual Align view port on the left side of the software. Keep SHIFT down, and click left mouse button to select at least 3 non-collinear corresponding points in the 3D preview windows for Manual align.

The data will be corrected after manual alignment as shown below. If manual alignment failed due to incorrect selection of corresponding points, click 🔄 to re-select points.
8.10.5 Delete Current Data

Suitable for free scan and auto scan.

If you are not satisfied with current scanning data, or there is not enough overlapping region for registration, click [delete] to delete current data and then change the position of the scanner or the object to scan again.

When auto scan mode is scanning, you can click [stop] to stop the current scan. The current data will be deleted directly.

**Note:**

When import project, click [button] the free scan is remove the single data; Auto scan is to delete all the data.

8.10.6 Pause button

Suitable for auto scan and handheld scan mode.

- Auto scan, Click [pause], scanning will pause; Click [play] to resume scanning.

- Handle HD scan and Handheld Rapid scan, click [pause] or press the button on the scanner to suspend scanning and check with it. Click Scan and continue.
8.10.7 Delete button

Suitable for handheld mode.

Click to delete current scans. Reminder will appear as below:

If you want to delete the data, click Yes, otherwise click No.

8.10.8 Done button

Suitable for handheld mode.

Click when scanning data is complete as shown below:

Note:
1. When new project choose the high resolution, the slow it saves. Currently, HD scan’s speed is slow, it always keep for a long time in 10%, please be patient.
2. After click done, if you continue to close the program Data loss may occur. Please wait.
8.10.9 Mesh button

When the scan is completed, click , proceed to post-processing. You will see two modes after clicking the button, as shown in the pictures:

Unwatertight for design meshing, unclosed model, results are shown in the picture:

Watertight for print, closed model can be printed directly. You will see the pictures
pop up as following after selecting this encapsulation. Select the object details.

Note:

1. Select High for objects with fine texture, select Med or Low for objects in smooth surface or with less detail. The time for data processing is in relation to the detail setting. The higher the level of details is, the longer time the processing takes.
2. Watertight usually slower than unwatertight, high resolution takes more time, it may keep for a long time in 95%, please be patient.

Watertight results are shown as in the picture:
Texture watertight results are shown in the picture:

8.10.10 Data Post processing

After meshing, the following dialogue box of data post processing will appear. You can simplify the data per your request, do fill holes, sharpening or smoothing operations. Unwatertight and watertight, the post processing of the interface as shown below.
➢ Data simplification

After simplification, the polygon numbers, size and surface detail of data will be reduced accordingly. Check the simplify check box and set the ratio, the default is 100%. The comparison of detail between before simplification and after simplification (at 30% simplify proportion).

Before simplification  After simplification

➢ Fill holes

The default does not check the mark point and fill hole, check the fill hole you need set perimeter, choose 10-100mm perimeter to fill the hole. Mark point fill hole as an example.
Note:
1. If the edge of the hole is not smooth may cause the effect is not good, not recommended to fill hole.
2. Hole-filling: choose 10-100mm perimeter to fill the hole;
3. Handheld Rapid scan, feature align mode without mark point fill hole option.

- **Smooth**

The data to denoise processing, improve data quality, the figure before and after smoothing:

- **Sharpen**

Improve the overall clarity of the data, the figure below before and after sharpening:
8.10.11 Share button

Click after merging to share data, it will show the dialog as below.
You can share your model to Sketchfab, while model title, username and user password are required. Register an account and look at the shared model at http://sketchfab.com.

![Sketchfab Uploader](image)

**Note:** Sketchfab Normal account can only upload data maximum 50M, while Professional account can share maximum 200M, and set model as private.

8.10.12 Save button

**Save data:** Click before merging can save data as asc and p3. After merging, it can be saved as asc, stl, ply and obj. To save color texture, please select Ply and obj. To save global mark point file please select p3.

**Note:** Fixed mode, before merging can save data as asc (single). After merging, it asc(whole) or asc (single).
**Scale:** Scaling the volume of scanning data, while the quantity of triangular facets and size of data will not be changed.

![Scaling Table]

Scaling result as reference: From left to right shows double size, original size and half size respectively.

8.10.13 Main Menu

If you want to change the scan modes, click ![home icon] to go back to the homepage to select the scan mode.
9、FAQ

1. What if the merging fails when the turntable has rotated one circle?

   Solution: When scan under auto scan mode, try to adjust the distance between the scan head and turntable within 350-450mm, and the mark points on the turntable could be clearly seen by the two cameras and try to reduce the blocks.

2. What if the merging fails without mark points when the turntable has rotated several circles or when it is under free scan mode?

   Solution: Try to make sure there are at least 1/3 overlap between the current scan area and the previous scan area and the object surface should be featured. For objects which are symmetric and without rich features, using mark points or manual merger is recommended.

3. How to scan objects in transparent, semi-transparent or black?

   Solution: Scan before spraying on the surface.

4. Under handheld HD mode and handheld rapid mode, what if there are straggling points?

   Solution: (1) Adjust the brightness, until the reflected graph and mark points are clear to be seen. (2) Try to make sure the background environment is single, for example, to use a black cloth or 500mm away from other objects. (3) Do not scan opposite to the computer screen.

5. Under Handheld HD mode, what if only the mark points could be identified while there is very less data captured?

   Solution: Please do the HD scan calibration again and during the calibration and capturing graph, please make sure the calibration board and scan head are still.

6. Under handheld rapid mode, how to continue scanning when the merging fails?

   Solution: Please move back to the scanned part (undeformed) for 3 seconds where there are features and details, start to scan again when it is followed to scan.

7. What should I do if the software collapses after I create a new project?

   Solution: Make sure the project path is Chinese or English path.

8. How to scan thin-walled workpiece?

   Solution: First, scan thin-walled parts should have transition zone which can stick with markers to guarantee scanning can be transited from one side to another. Then follow the following steps. (1) Stick markers on the transition zone. Make sure from the camera viewport, there are no less than 4 mark points evenly distributed and not in one line.
(2) Scan markers on the workpiece rapidly. Do spiral rotating via transition zone. Scan as many mark points as possible on both sides and transition zone to build frame. The faster, the better.

(3) After building frame, scan the surface of workpiece slowly and carefully to finish the whole scan.
9. Under auto scan mode, if the turntable is not moving, but with a humming sound, how to solve?
Solution: Disconnect power line and connect again in few seconds.