NeoDen9

High Speed Pick and Place Machine
User Manual

Model： Neoden9 High Speed Pick and Place Machine
Version： V1.0

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Removal of antirust protective film
In order to prevent the equipment from rusting due to environmental impact during transportation, we pasted a protective film on the following parts of the machine as protection. This protective film needs to be removed manually before the equipment is powered on. If there is any omission, there will be hidden danger of poor operation and the possibility of damage;
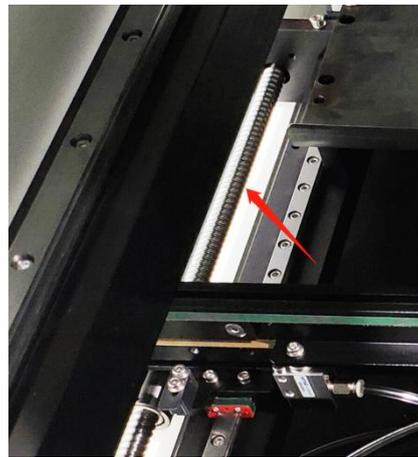
Figure A

Figure A：the trapezoid screw on the track's left and right；
Figure B：the line rails of moving load-carrying on the y-axis's left and rightY；
**Figure C：the line rails of moving load-carrying on the track's left and right；**

**Figure B**

Figure C

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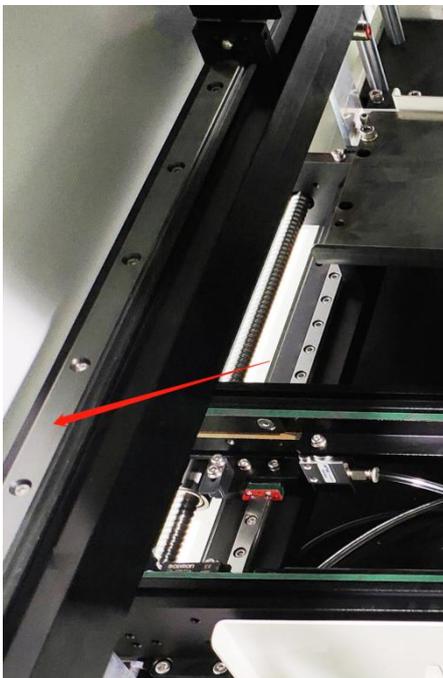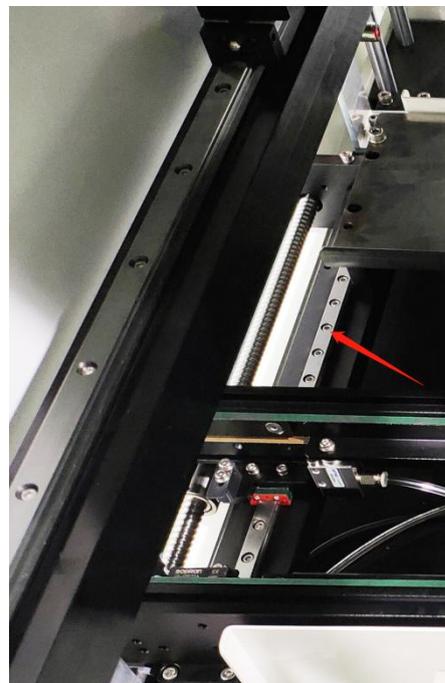
1. Equipment installation and precautions

1.1 Machine Dimension
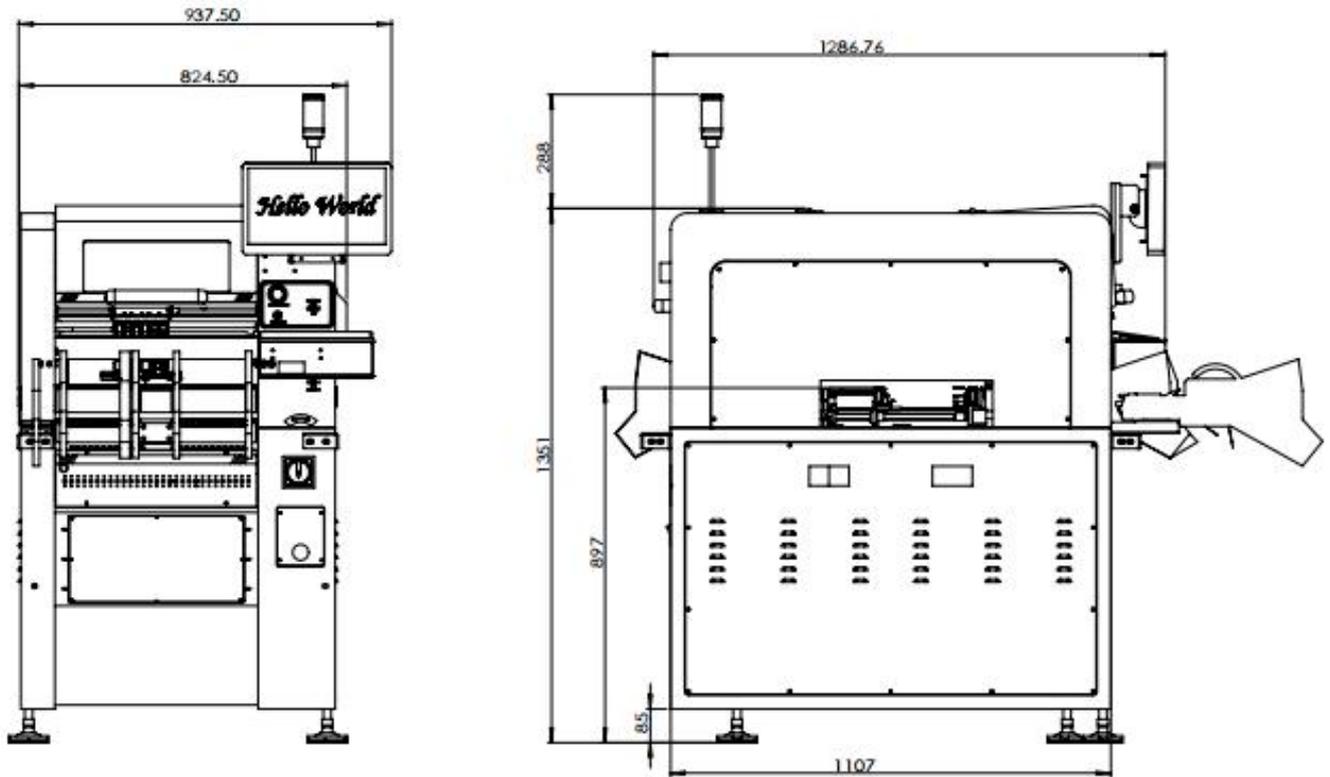
Figure 1- Machine dimension

1.2 Structure of Neoden9
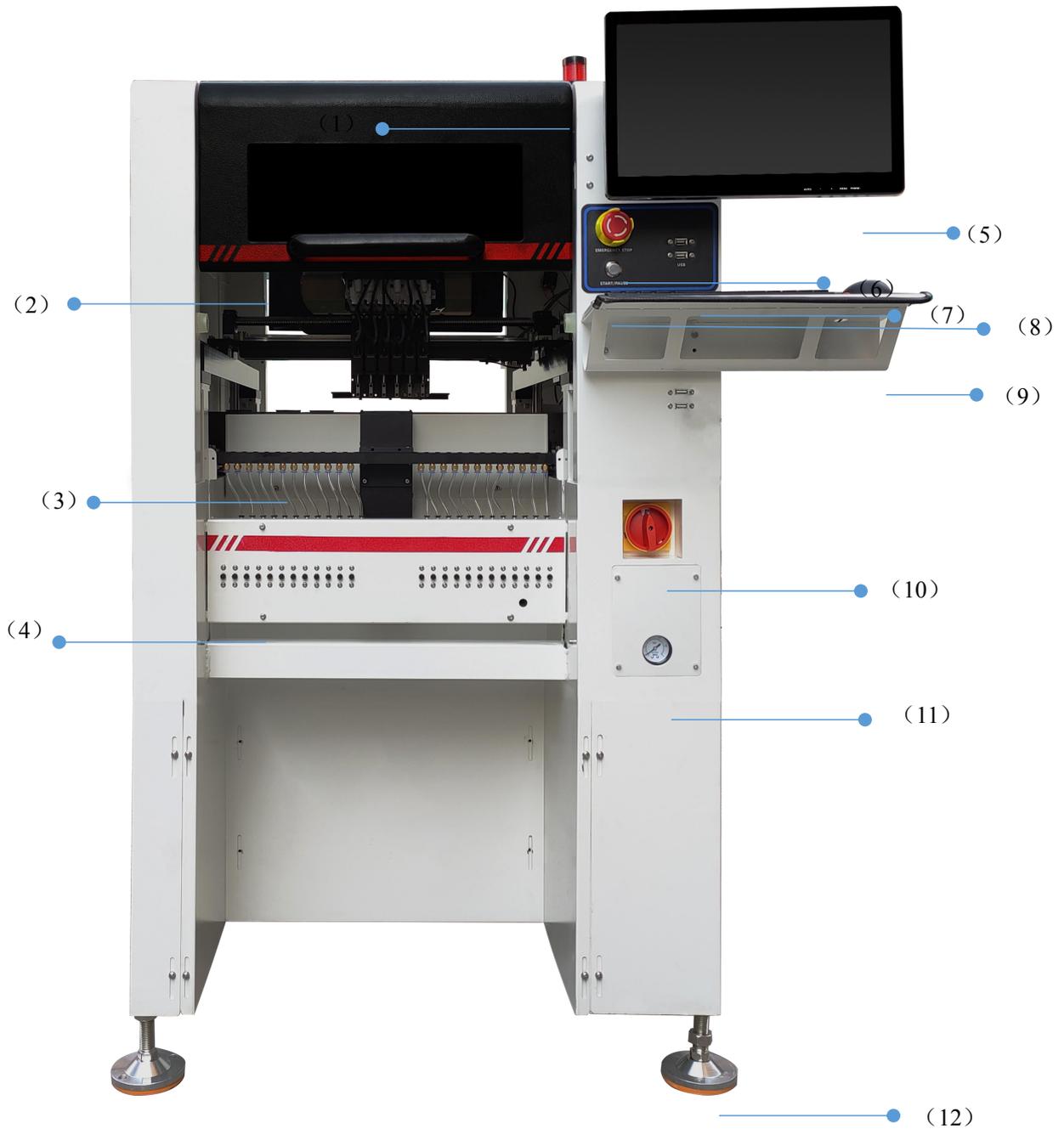
Figure 2-Ports and Appearance

（1）Warning Light（Triple Color）   （7） USB port

（2）Safety cover   （8）Pause button

（3）Front Feeder Slots 1-33（Reference value representation）

（4）Electric Feeder Port   （9）Mouse keyboard bracket

（5）Display   （10）Power Switch

（6）Emergency Button   （11）Air source input

                                                              （12）Heavy load pedestal

1.3 Working Area Structure

Back Feeder Slots

IC Tray

Rails

IC Camera

Front Feeder Slots
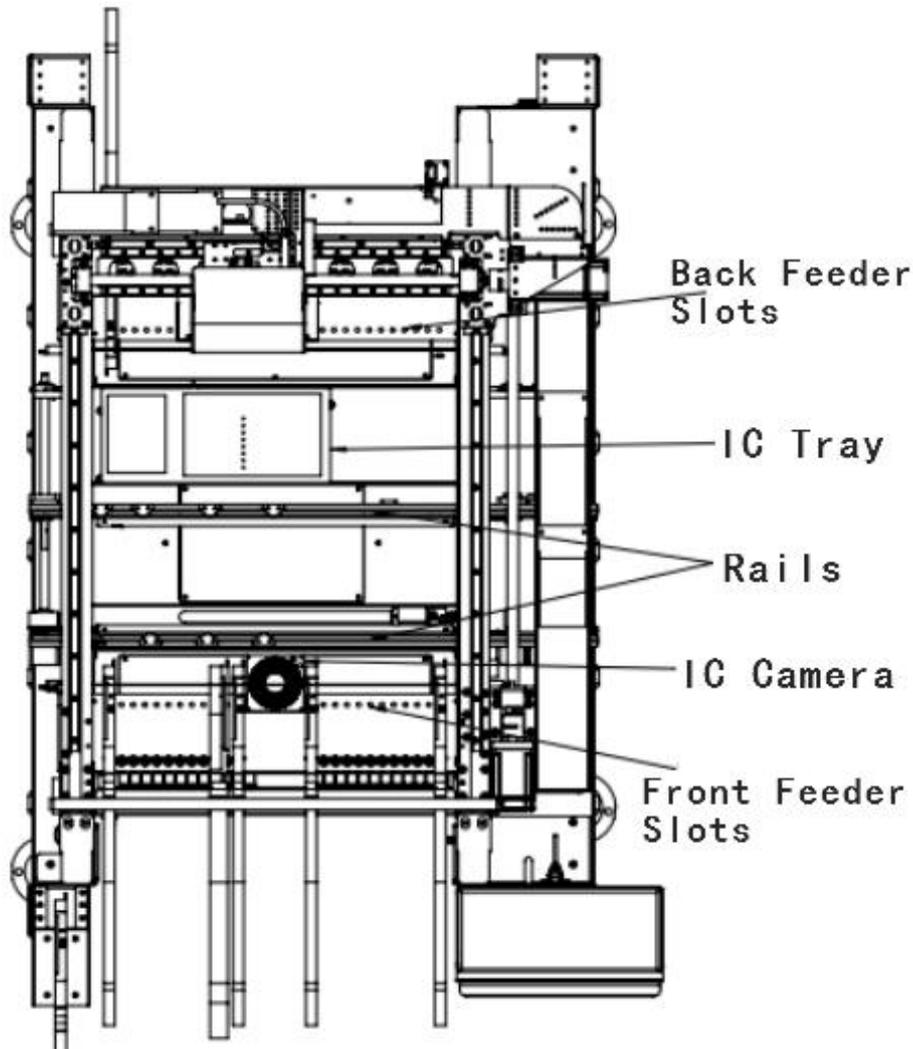
Figure 3- Top view of main mounting area

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Figure4- X-axis Beam
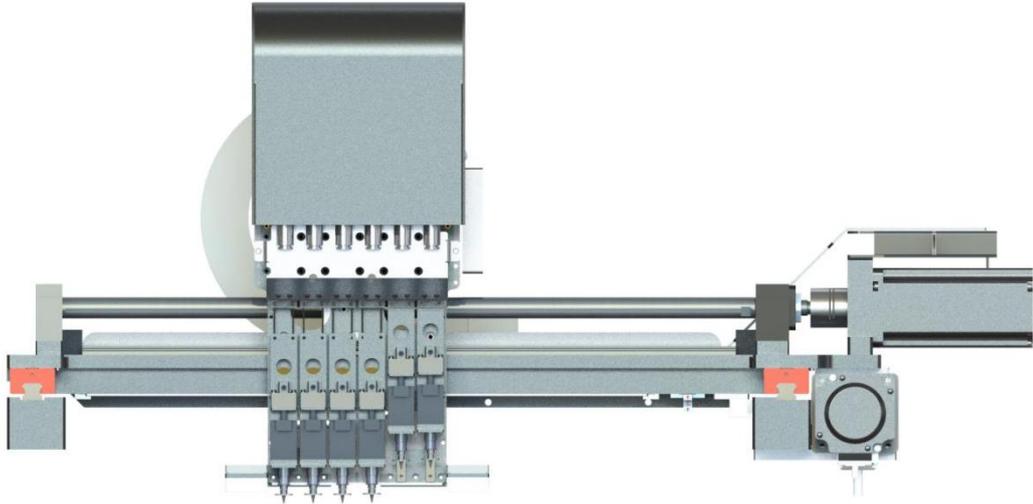
Figure5- Main Placement Head Camera

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1.4 Important Notice

|	
⚠️	**Warning of failure risk of camera identification，please referring to Figure 3 and Figure 5：The following parts are forbidden to touch and impact** ❶Front IC Camera　❷Back IC camera　❸Left mark camera　❹Right mark camera
⚠️	**Warning of accuracy failure risk, refer to Figure 3: The following components are prohibited from touching and impacting.** ❶Return to zero column **For the risk of accuracy failure, refer to Figure4: When manually moving XY, it must be carried out on the X-axis beam moving point;**
⚠️	**Warning of electric shock, be sure to follow the requirements below：** ❶Connect the input power supply that meets the requirements of the equipment, the electrical interface of the machine to the ground must be effectively grounded； ❷Any time you enter the case and stick to the head for maintenance, you need to shut down
⚠️	**Warning of equipment life reduction，be sure to follow the requirements below：** ❶When installing the equipment, the equipment must be leveled； ❷Correct shutdown: shut down the operating software and the system before turning off the main power switch；
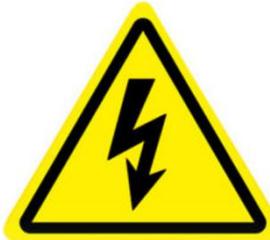
Figure 6-The air supply of the equipment shall not be less than0.55MP　　Figure 7- Feeder Pressure 0.5MP

Remark: At 0.55MPA pressure input, the air consumption of the machine is 12L/min. It is recommended to use a compressed airtank of no less than 70L.

1.5 Operation flow chart

NO.	Flow chart	Note
1	**Start-up steps** **Preparation** ↓ **Power ON** ↓ **Automatic Test** ↓ **Power on page**	1. The pick and place machine is a precision equipment. In the installation position of the machine, it is necessary to carry out horizontal correction before and after the equipment to prevent the uneven operation of the equipment from damaging the service life of the equipment; 2. Connect and fix the equipment interface before and after the equipment, and connect and fix the ground wire; 3. The access power must meet the requirements of power identification; 4. No less than 0.55mp air source input and adjust the pressure value to OK; 5. Check the safety of the working area of the mounting head; 6. The XY transmission parts are not fastened and interfered, and check that the emergency stop switch is in normal state;
2		Power on and turn the power switch clockwise;
3	**Program and Edit; Production** ↓ ←**Modify**	1. When the self-test is carried out, the head indicator light of the mounting head and the light source of the IC camera will be on and flash briefly to indicate that the self-test is normal; 2.XY initialization (origin reset) is normal, the software enters the file list interface, and no error report pops up;
4	**Mounting** Abnormal	After power on, directly enter the file list page;
5	**Shutdown steps**	See page 13 for the introduction of machine operation for details;
6	**Production Finished** ↓ **Exit** ↓ **Software shut down**	Suggestions on production process: 1. First component confirmation: confirm the component angle and polarity, component picking position and mounting position; 2. Start production after confirming solder paste printing and temperature setting;
7	**System shut down**	Production process;
8	↓	After the production is finished, reset the origin and prepare to shut down;
9	**Power OFF**	Shut down the system via computer, then power off the machine.
10		Disconnect the electricity supply after the system being powered off.
11		Keep the machine clean, daily maintenance of the nozzles assures high utility.

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1.6 Flow chart of making a programming file

```
┌─────────────────────────┐
│          Start          │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│       Edit the file     │◄──────────┌─────────────────┐
└─────────────────────────┘           │    See P 12     │
             │                        └─────────────────┘
             ▼
┌─────────────────────────┐
│     PCB feed setting    │◄──────────┌─────────────────┐
└─────────────────────────┘           │    See P 14     │
             │                        └─────────────────┘
             ▼
┌─────────────────────────┐
│ Penalized PCB first chip│◄──────────┌─────────────────┐
└─────────────────────────┘           │    See P 19     │
             │                        └─────────────────┘
             ▼
┌─────────────────────────┐
│     Component setup     │◄──────────┌─────────────────┐
└─────────────────────────┘           │    See P 19     │
             │                        └─────────────────┘
             ▼
┌─────────────────────────┐
│     Fiducial setting    │◄──────────┌─────────────────┐
└─────────────────────────┘           │    See P 26     │
             │                        └─────────────────┘
             ▼
┌─────────────────────────┐
│     Feeder settings     │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│     Save and return     │◄──────────┌─────────────────┐
└─────────────────────────┘           │    See P 31     │
             │                        └─────────────────┘
             ▼
┌─────────────────────────┐
│   Select file and start │
└─────────────────────────┘
```
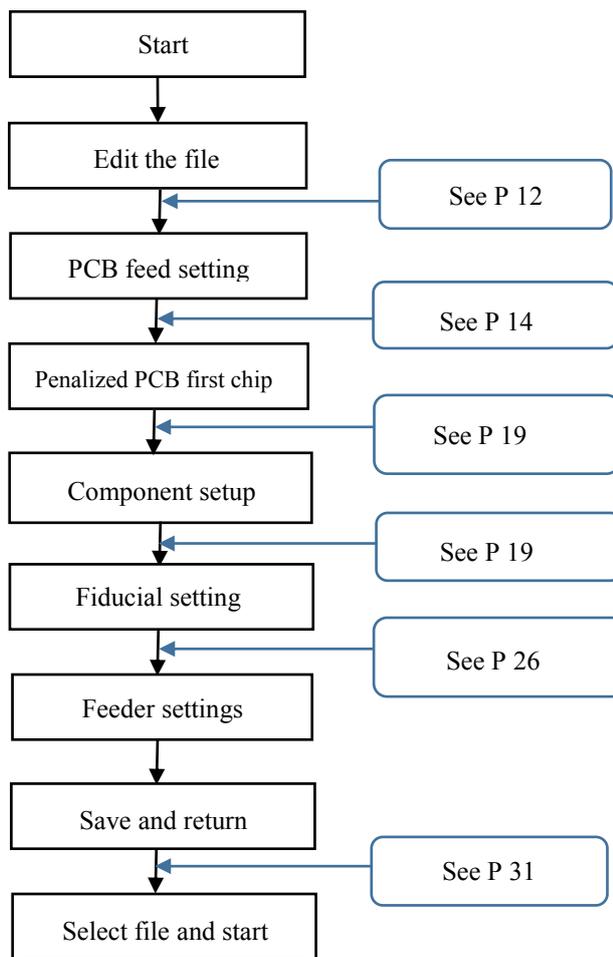
Note:

A. The basic procedure of making a programming file by manual programming or import coordinate file is similar, but there are two different parts: component list and fiducial setting.

B. Please find the detailed operation steps of the differences on relative page.

2.PCB Editing

On the file list page, select an existing file for editing or add a new file and name it, select the file for editing, and enter the editing interface:

File list introduction:

(1) Excel Open：The Excel table of the file can be modified directly in the table for some routine operations, simplifying the programming operation.

(2) Edit: select a file and click Edit to enter the corresponding editing interface.

(3) Processing: after editing the file, after checking the correctness, select the file and click processing to mount.

(4) Export file: After connecting an U disk, select the file and click Export, after the successful notice pops up, the export is finished.

(5) Import from U disk: for the files that have been edited offline, they can be directly imported from U disk for mounting. After connecting U disk, click Import from U disk, select the corresponding files in the new window, and click OK. When the imported files are showed in the file list, the operation is finished.

(6) Delete: select the corresponding file, click delete, a prompt window will pop up, and click Yes.

(7) Copy: select the corresponding file, click Copy, and the file list will generate a file of xxxcopy1. In order to prevent misoperation, a new file can be copied before operation.

(8) Add a new file: click Add to open the input window, input the file name, and click OK. At this time, when the file

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list interface displays new files, the operation is successful.

2.1 PCB information

In manual programming, this item is the primary editing item, as shown in the figure:
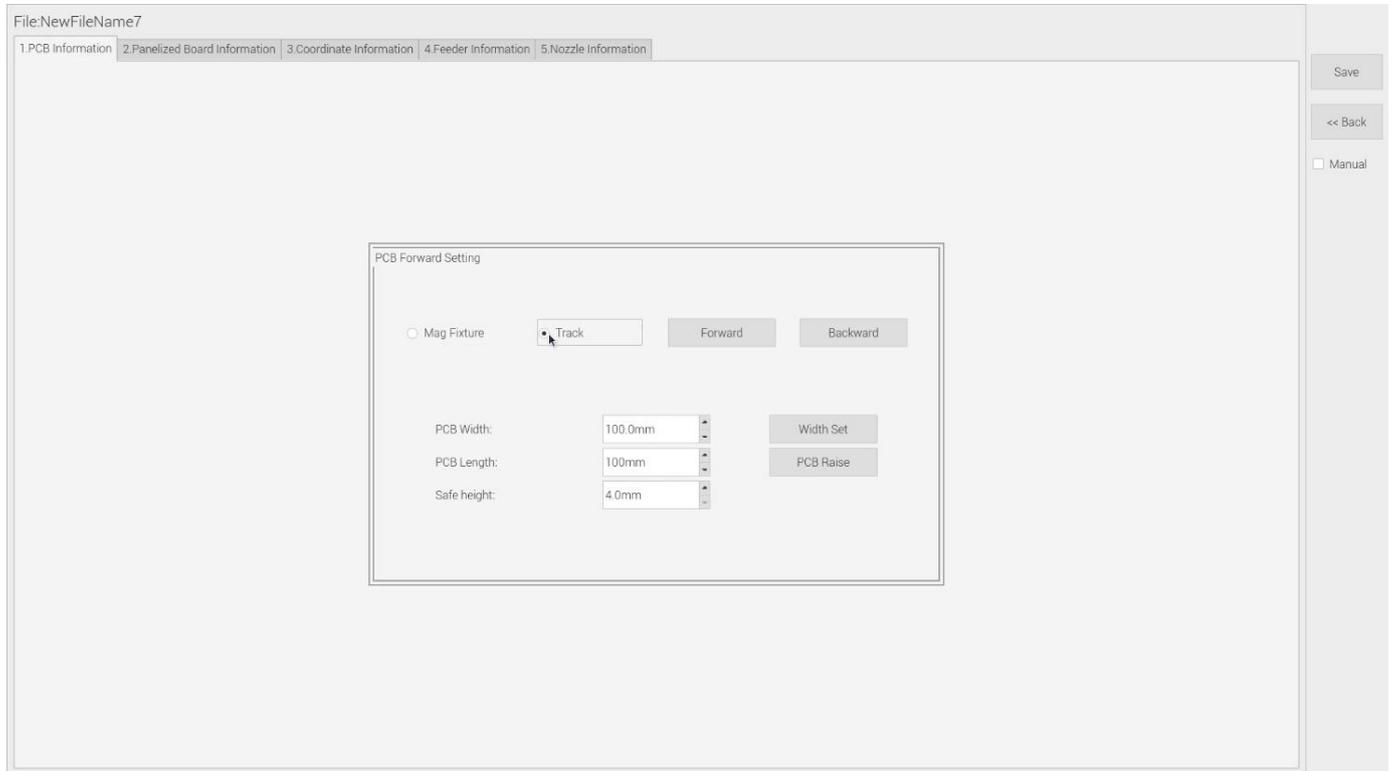
2.1.1 PCB Forward Setting

● Mag Fixture

Select "Mag Fixture" mode, click "Forward" to feed PCB into the mounting position.

● Track

Select "Track" mode, put PCB at the track entrance position and click "Forward", it will be fed into the stop pin position (this position can be adjusted manually). Once pcb was stopped, the cylinder will raise pcb and pin return back.

2.1.2 Backward

Click "Backward", cylinder will descend and pcb be transit to the end of track, it will stop above the sensor position. If there's SMT conveyor connected and release signal to pnp machine, pcb will be automatically transit into SMT conveyor.

2.1.3 Width Set

Generally setting the width data in this way: pcb width+1mm. Input the data and click "Width Set", against the tips to check if it meet with the width back to zero condition. The track will be firstly back to zero width and then widen to the adjusted data, after that you can put pcb on the track and push it slightly to test if board can be moved smoothly.

2.1.4 PCB Length

It refers to the whole length of PCB. Specially when you need to import the bottom layer coordinates, please firstly input the PCB length, save it and then import bottom layer, the coordinates will be positive data.

2.1.5 Safe Height

If there's some special higher component on the PCB, please must set the safe height in case any collision during mounting. Safe height can be set same as the higher component thickness.

3.Panelized Board Information

3.1 SMD 1 Position Setting

This is mainly to determine the first component on single or panelized PCB of manual program or imported file. The principle is to collect and calculate the data of each board's relative spacing, in order to achieve the calculation of the real coordinate.

3.1.1 Single Board Setting

Click "single board setting", you will see the "align" button of the SMD1 position that means the first component on the component setup. Click "align" to enter the vision align interface, we need find the first component that on the component list, generally we choose the center of the component, see figure：
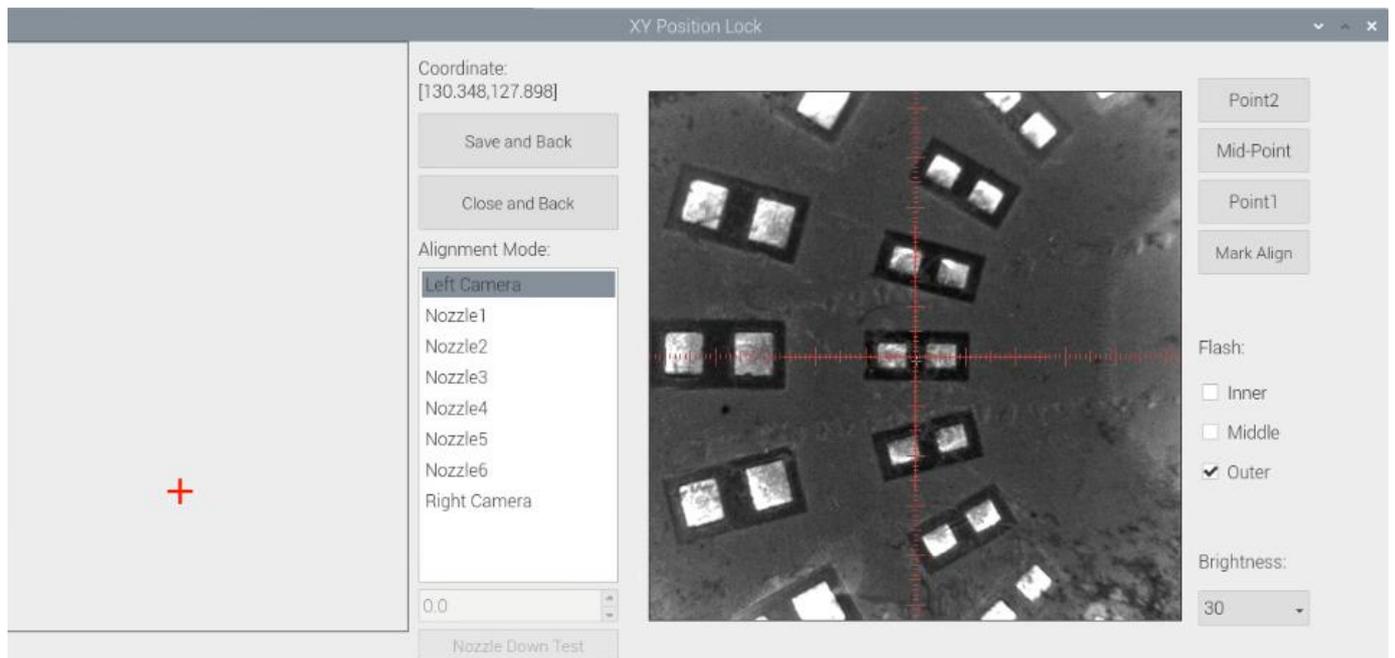
Click "Save and Back", it will go back to the previous interface, click "create panelized list" button, the data which on the panelized list will change. Can see the "SMD1 information"on the list and do double check via "align" button.
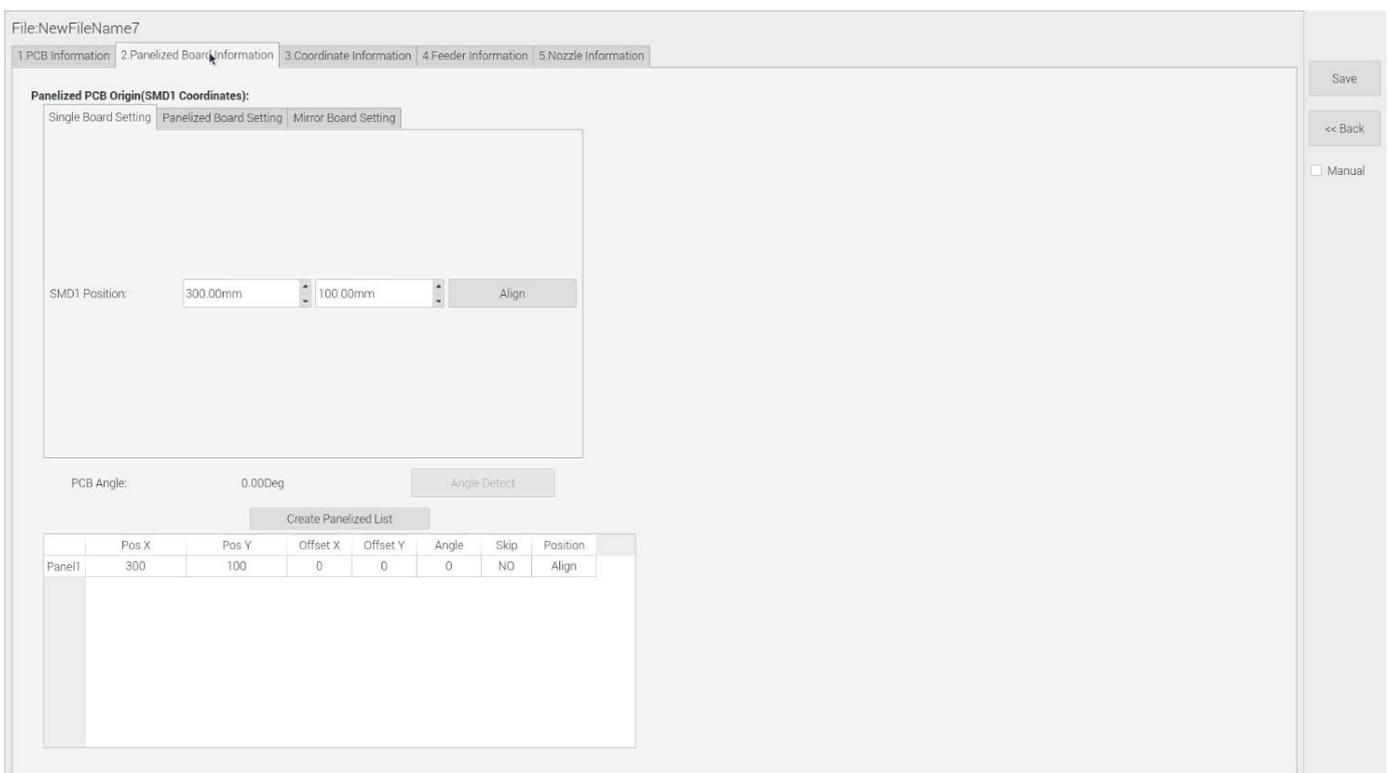
Notice: when you program under "Manual" mode, as we cannot assume the related PCB to be absolute 90° or 0°, we need to setting the "PCB angle" (angle deviation of PCB board compares to rails). To minimize the deviation, please select two points in parallel positions, machine can calculate the PCB angle automatically.

When you program under the mode of import coordinate file, no need to set this step. The default angle under this mode will be 0°.

3.1.2 Panelized Board Setting
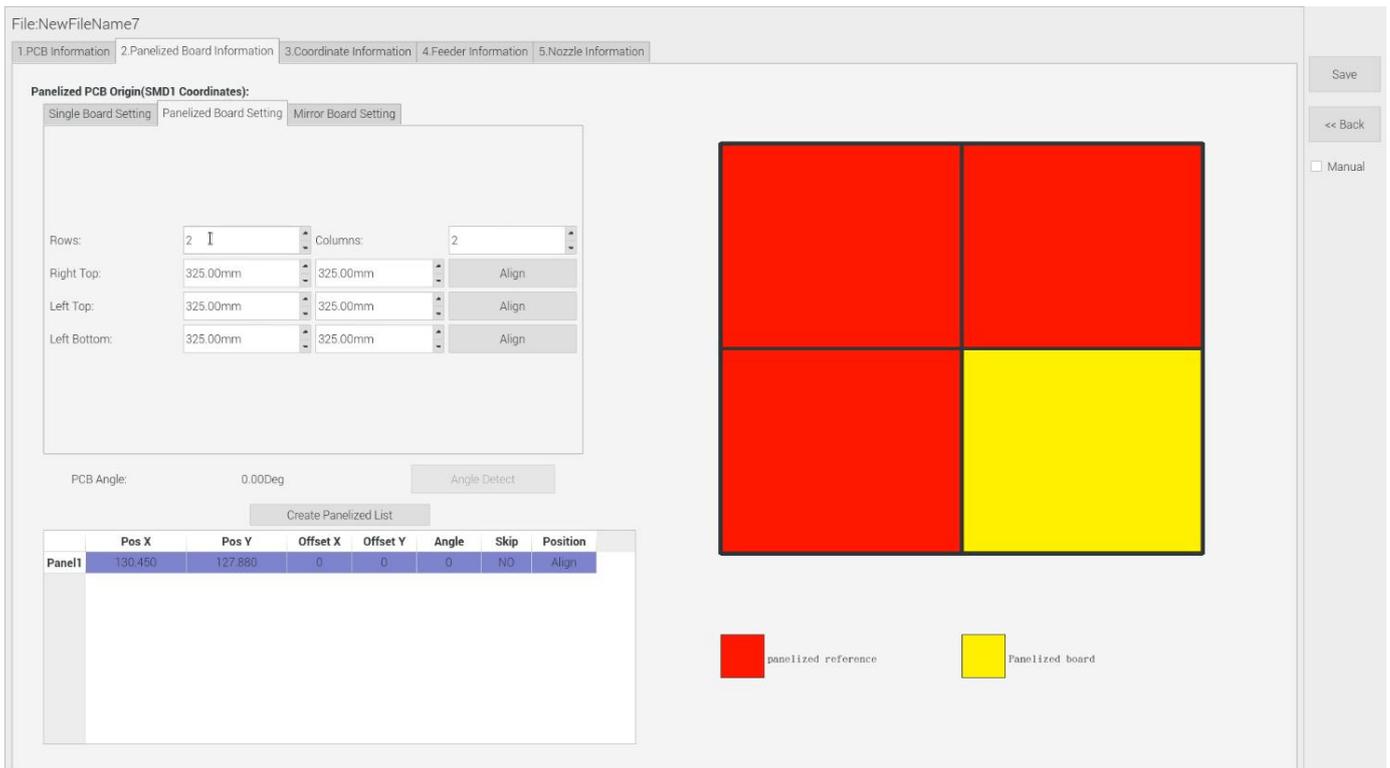
The steps of the panelized board setting are similar with the single board, but need pay attention to several points below：

（1）The row and column are determined by the positioning of PCB on working area. The direction along the rails is the X , the direction perpendicular to the rail is Y , then please enter data in the row and column.

（2）Detailed introduction for each position's info.:

- The data of "left bottom" is collected according to first component in the component list of programming file. Press "align" of left bottom, find the left bottom panel that is nearest to the left side and nearest to the feeding position, then find the first component which on the chip list of this panel, align the center of this component. After saving the data, it will return to the "PCB information" automatically.

- The data of "left top": on the alignment interface, find the left top panel that is nearest to the left side but farthest to the feeding position, then find the component same as the component that aligned on the "left bottom", align the center of this component. Click save and back, it will return to the "PCB information" automatically.

- The data of "right top": on the alignment interface, find the right top panel that is nearest to the right side but nearest to the feeding position, then find the same component as the component that aligned on the "right top", align the center of this component, click save and back, it will return to the "PCB information" automatically.

After setup, click "create panelized list", the panelized list will be generated accordingly in the blank. You can also double-confirm each position by clicking "Align".

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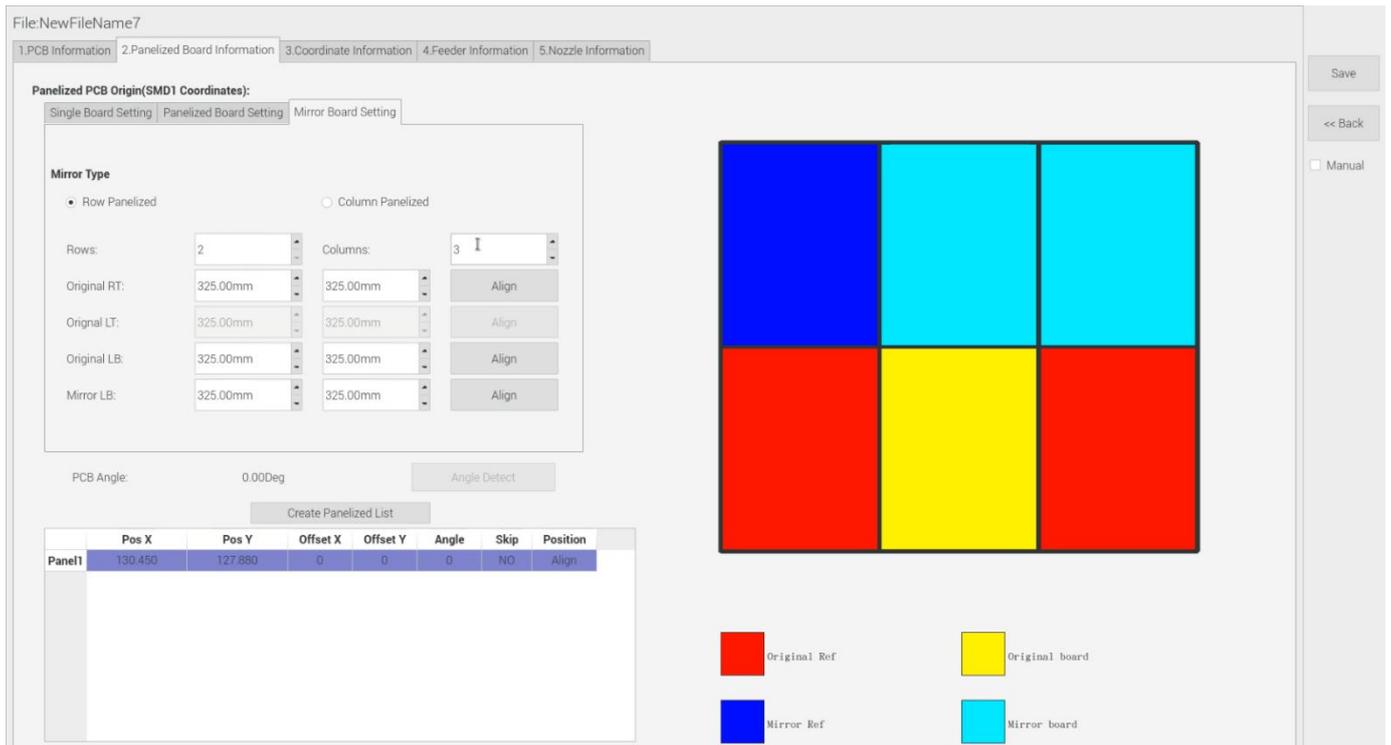
3.1.3 Mirror Board

The steps of the Mirror board programming are similar with the Panelized board, but need pay some attention to several points below：

（1）Mirror board includes row panelized and column panelized

Row panelized: several same PCBs are arranged in horizontal direction (X), and the nearby rows are mirrored.

Column panelized: several same PCBs are arranged in vertical direction (Y), and the nearby columns are mirrored.

（2）Panelized Board Row and Column

The direction along the rails is the X axis ,the direction perpendicular to the rail is Y, then please enter related qty data in the row and column.

（3）Please refer to the data collecting method of each position information as following:

After select the corresponding mirror board panelized method(column or row)and data of column&row,may occur the situation of the align interface turn to gray and can't be edited, then no need do position align. Based on actual mirror board data, right side is showing corresponding images and can find the first component on it.

- The data of "right top"on original board: on the alignment interface, find the right top panel that is nearest to the right side but nearest to the feeding position, then find the first component which on the chip list of this panel, align the center of this component, click save and back, it will return to the "PCB information" automatically.

- The data of "right top"on original board: on the alignment interface, find the right top panel that is nearest to the right side but nearest to the feeding position, then find the first component which on the chip list of this panel, align the

center of this component, click save and back, it will return to the "PCB information" automatically.

● The data of "left top"on original board: on the alignment interface,find the left top panel,then find the component same as the component that aligned on the "right top",align the center of this component, click save and cancel, it will return to the "PCB information" automatically.

● The data of "left bottom"on original board:on the alignment interface,find the left bottom panel,then find the component same as the component that aligned on the "right top", align the center of this component. After saving the data, it will return to the "PCB information" automatically.

The data of "left bottom"on mirror board:on the alignment interface,find the left bottom panel,then find the component same as the component that aligned on the "right top", align the center of this component. After saving the data, it will return to the "PCB information" automatically.

After setup, click "create panelized list", the panelized list will be generated accordingly in the blank. You can also double-confirm each position by clicking "Align". Note: The angel difference between original and mirror board is 180 degree, original board is 0 degree, mirror is 180 degree.

● Skip: For the block component corresponding to the number entered in the panel number (edit box), if no placement operation will be performed, then select "Yes" in the drop-down list.

● Placement: For the block component corresponding to the number entered in the panel number (edit box), if perform placement operation, then select 'No' in the drop-down list.

● Recognition: Used for bad board detection. The current bad board detection function is still under development and cannot be used yet.

4. Coordinate information

4.1 PCB Mark setting

PCB Mark setting interface see below fig.：
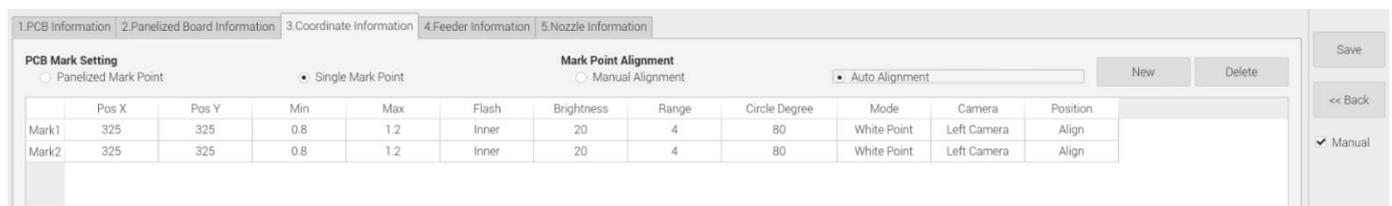
1.PCB Mark Point

（1）Panelized mark point

It is mainly used for multiple identical PCB boards consistent of the whole board, when place every panel board, the machine will rescan small panel board's mark point.

（2）Single mark point

It is mainly used for a single PCB board and multiple identical PCB boards consistent of the whole board (Notice: coordinate programming is done as a single board) Generally, need to select 2 or 3 mark points.

2. Mark point alignment

（1）Manual alignment:

If the fiducial point quality is poor and the recognition is not accurate, the reference position can be determined manually. If there is no fiducial point on the PCB, which can through some location holes and set up some special reference point manually to replace and confirm reference position. Note: Generally use SMD1 coordinate in chip list and the one that is relatively easy to find far away from SMD1 as fiducial points .In this way, the relative placement effect will be better during placement, the reference point is determined manually.

(2) Auto alignment

The machine will scan and align fiducial points automatically.

3.Mark Point information

（1）Mark point coordinate

Import the coordinate automatically status: the data collection of fiducial point, which through PCB circuit board to find fiducial point coordinate information directly, and input directly.

Manual programming status: Select fiducial point on the list and click "align", enter the image capture page, and then find the center of the fiducial point via movement, select suitable light source and brightness, click "Mark align" see below figure, and then click "Save and Back" to go back to main page.
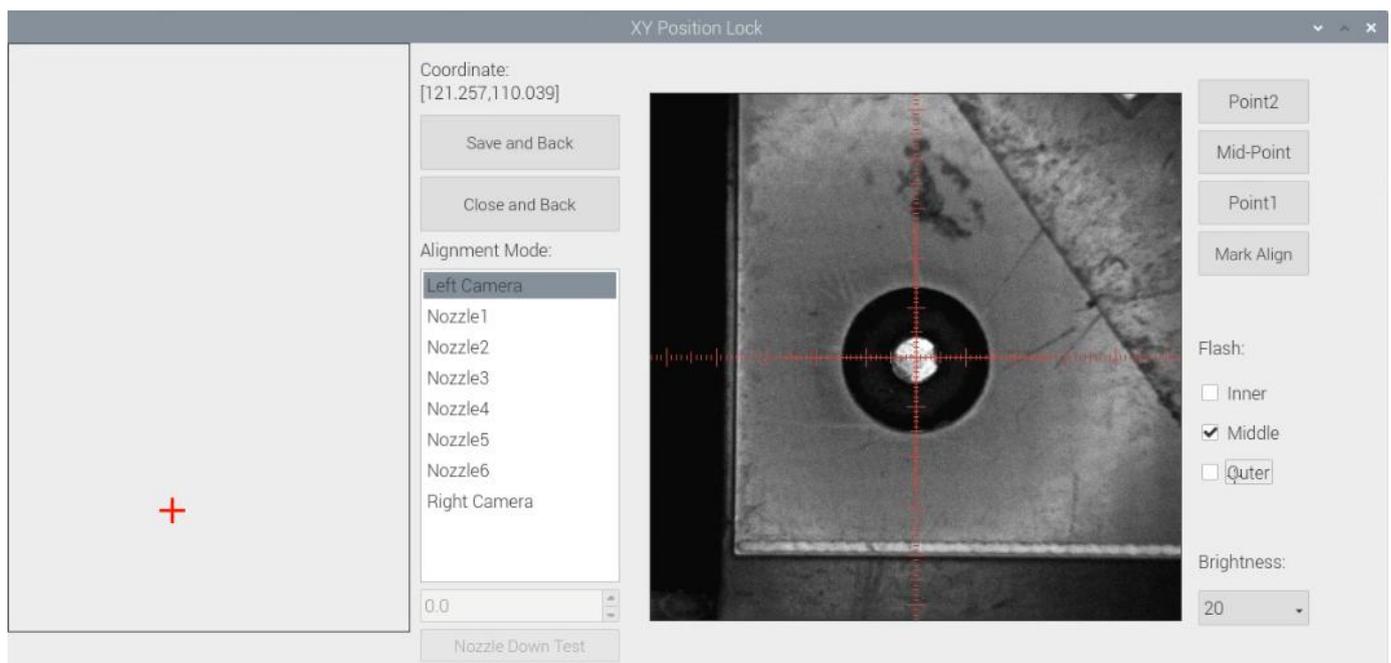
（2）Min, max value

It means the size of mark point, it has a floated value, which can prevent recognizing mark point wrongly.

（3）**Light source**

Light source divide into inner、middle、 outer、inner and middle、middle and outer, whole lights. The user can make adjustments accordint to fiducial point recognition situation.

（4）**Brightness**

The user can adjust the brightness when align the fiducial point according to actual situation.

Selection of light source and brightness: The user can lock the location of the fiducial point through the XY position lock interface, select the light source and brightness through the recognition of the Mark camera on the right, and fill the corresponding parameters into the mark point information.

（5）**Range**

If there are interference points near the Mark point, you can input a certain value and ensure identify the Mark point more accurately.

（6）**Circle Degree**

Input reasonable circle degree value,can avoid interference from other points effectively.

（7）**Mode**

Dividing into white point and black point, select black point mode if have hole and bright point,select white point mode if have bright point.

（8）**Camera**

Support select left camera and right camera(user can select the camera for calibration according to the actual situation),also can select default setting camera. If user select camera that can't reach the position, the machine will use corresponding camera during work.

（9）**Mark point add and delete**

Click "new" to add new fiducial point(base on mode of the latest fiducial point). Click "delete" to remove the selected fiducial point you want.

4.2 Component list setting

Function: display the information and mounting order of components. The components' quantity and mounting information can be added through manual programming or importing files , see below figure:

File:TEST1

1.PCB Information 2.Panelized Board Information 3.Coordinate Information 4.Feeder Information 5.Nozzle Information

PCB Mark Setting
○ Panelized Mark Point   ● Single Mark Point

Mark Point Alignment
○ Manual Alignment   ● Auto Alignment

	Pos X	Pos Y	Min	Max	Flash	Brightness	Range	Circle Degree	Mode	Camera
Mark1	325	325	0.8	1.2	Inner	20	4	80	White Point	Left Camera
Mark2	325	325	0.8	1.2	Inner	20	4	80	White Point	Left Camera

	Feeder	Comment	Footprint	Designatior	Nozzle	Pos X	Pos Y	Angle	Skip
Comp1	1	10k	0402	R1	1	325	325	0	□
Comp2	1	10k	0402	R1	1	326	325	0	□
Comp3	1	10k	0402	R1	1	326	325	0	□

Save
<< Back
□ Manual
New   Delete

Import Top Layer
Import Bottom Layer
New
Delete
Move Up
Move Down
Move to First
To Current Position
Position Correction
Batch Create

4.2.1 Operation introduction of component list

1.Manual programming

（1）Select manual programming;

（2）The component information list displays multiple rows of sample components. First, modify the sample components: coordinate XY, click the position lock to enter the lock interface. According to the image presented by the Mark camera, find the corresponding component and confirm the center position coordinates, click save.

（3）Fill in the information of component: Stack refers to which stack No. the component located; Nozzle refers to which nozzle used to mounting the component; Specification refers to the component's value; Footprint refers to the common footprint name as 0402,0603,0805 etc; Skip setting includes true or false, false means keep mounting, true means skip mounting this component. After finish all parameters' editing, the setting of first component information finish.

（4）Click 'New' to add one row on the component list. The information will exactly copy from last row. Click align to find the component's coordinate. Then click save then edit other information such as name, value, footprint and angle etc. Keep adding new component until the whole PCB finish. Please note that the stack and nozzle do not need to be edited manually. It can be set through feeder setting interface with 'Assign all sequentially' button to assign the information to component list automatically.

2.Import the processing file

（1）Export the component coordinate information through computer by choosing metric system CSV format to the USB flash disk.

（2）Plug the USB into the machine, do not choose the manual programming, import the processing file by clicking related layer file import button. The right side click 'file import top layer' and the reverse side click 'file import bottom layer' . It will pop up a selecting window, choose the processing file and click save, the information will be imported to the list. (Note: when import bottom layer, the PCB length(the whole board), need to be set and save before importing, so as to ensure that the import coordinates will not have negative values). The following figure show the process of importing Toy layer.
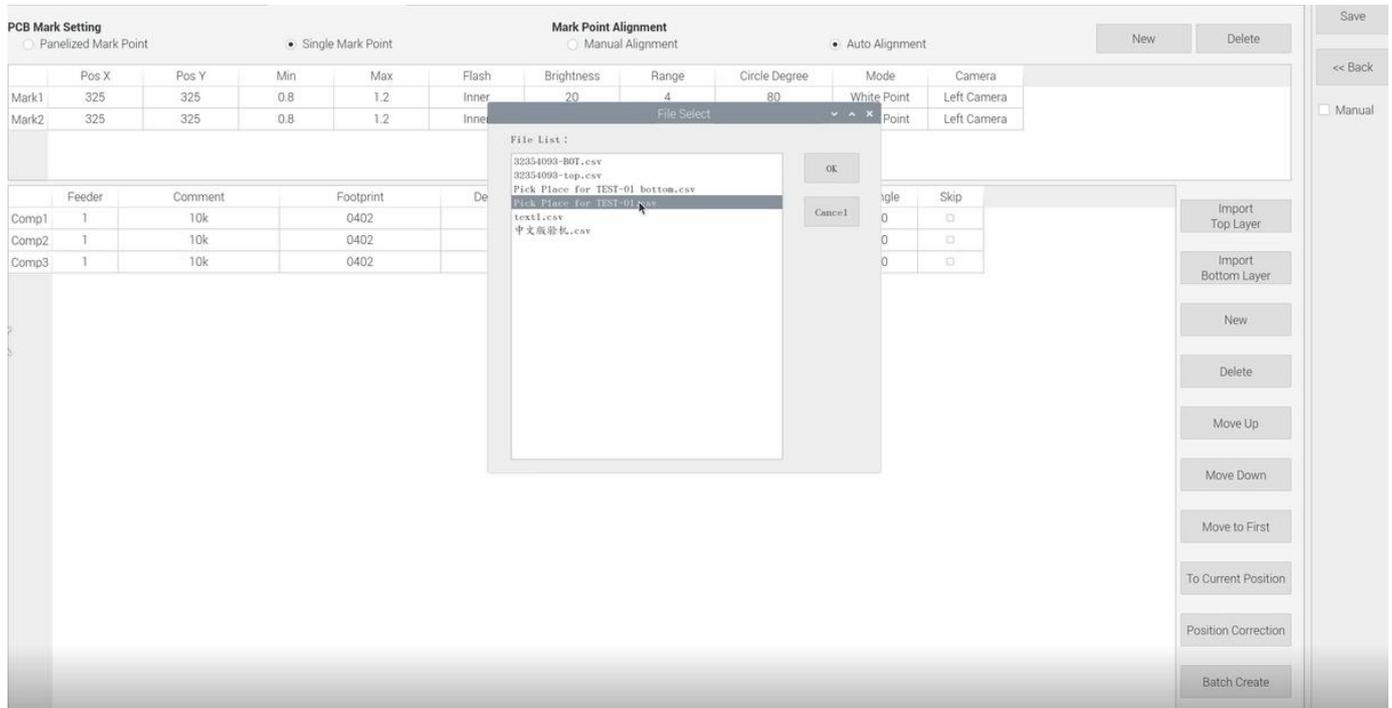
Introduction of other functions:

（1）Addition of component: Click 'New' , the component list will copy one row from the adjacent row, then modify the component information.

（2）Delete component: Select the wrong component row, click delete to remove the component.

（3）Movement of component:When editing, sometimes we need to do a slightly adjustment for the edited file, we have three ways of movement:

- Move up: to move the selected component upward.

- Move down: to move the selected component downward.

- Move to head position: To move the selected component to the first row. Please notice the first row component must be the same as the first component to place on the PCB.

（4）Convert to current machine coordinate

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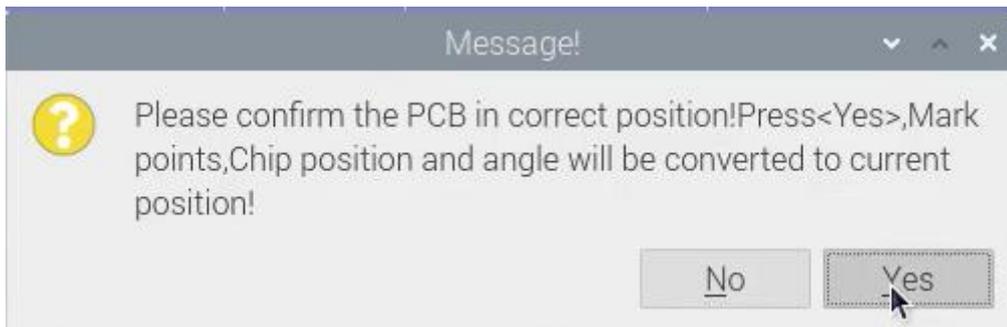
After finish all editing operation, click convert to current position. It will pop up the above dialogue, click yes, the machine will recognize the fiducials automatically and convert all component coordinate to machine coordinate. After convert successfully, it will pop up a dialogue, click align to check if the components' position are still correct.

（5）Position correction

After mounting, if there is a deviation(deviations are regular and relatively consistent), please click position correction to enter the new vision page. Click the left mouse button to align the center of the placed component; Click the right mouse button to align the center of pad. Then correct next one until finish all component and save. The machine will remember the position after correction. It will fix it automatically at the second placement.
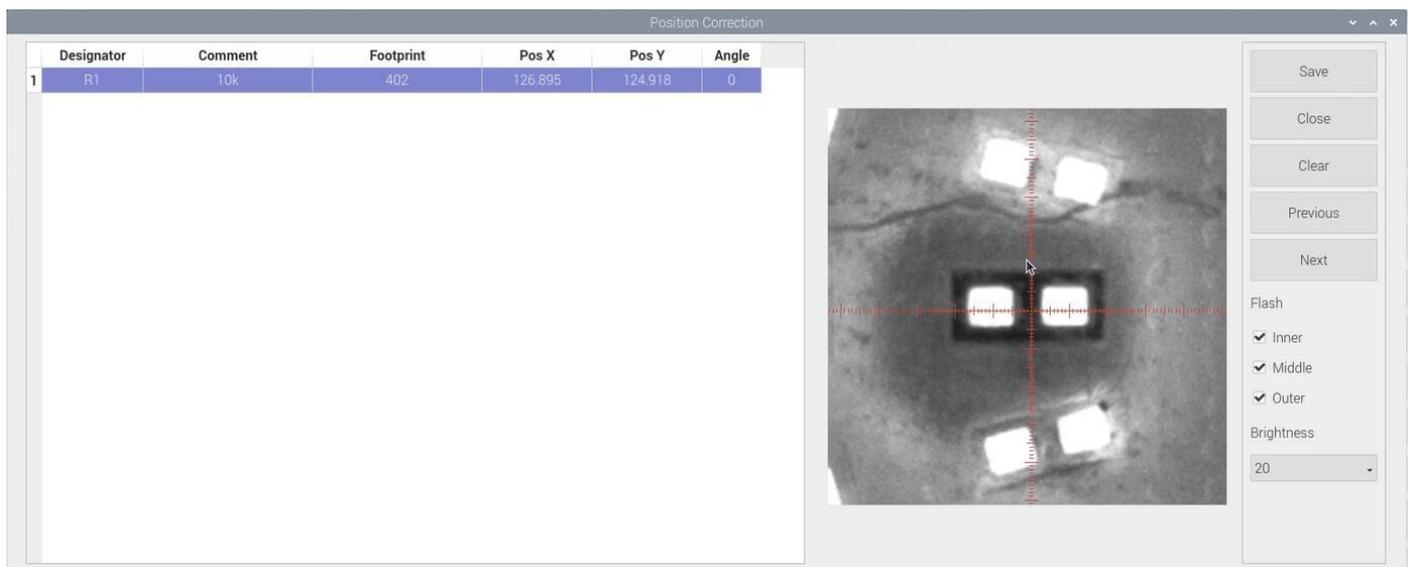
（6）Batch create components

Some circuit boards are relatively regular and easy in real editing situation. For this type of circuit board, we can generate coordinate in batch , the interface as shown in figure:

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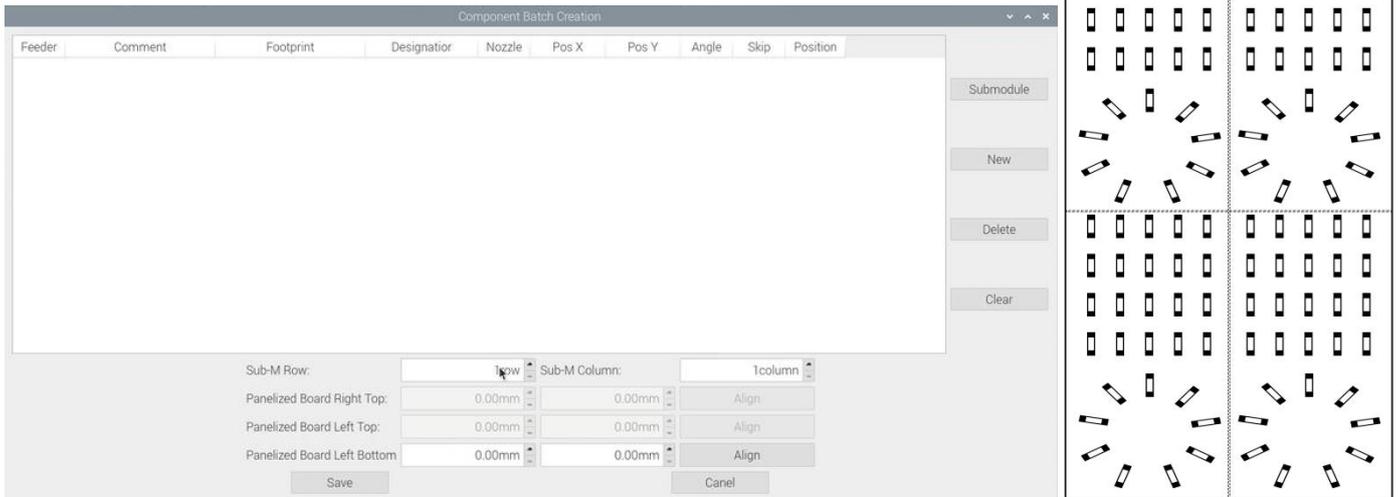
For example: we can see the above picture which has a rectangular block and a circular block to form a small panel. We call such panel as submodule. We can generate the whole panel board through creating a submodule.

Two ways to generate submodules: rectangle and circle.

(1) The way to generate rectangle panel: Click: 'submodule', below dialogue will pop up. Please fill in specification and footprint of component. We can see the panel has four rows and five columns. Fill in 4 rows and 5 columns in the dialogue, and align the three components(right top, left top, left bottom). The component degree will be based on actual situation. Click 'create', the machine will generate all the coordinate automatically.
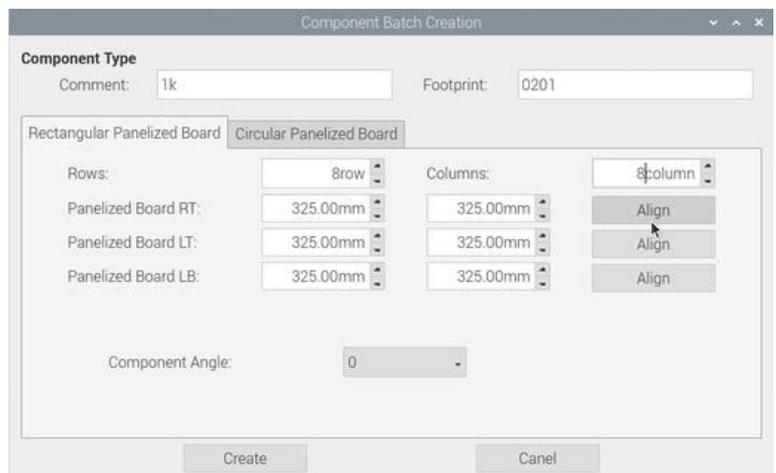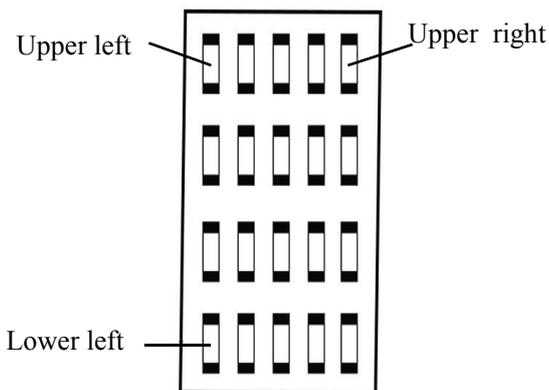
(2) The way to generate circle panel

● When the quantity of component is even: Click: "batch create", below dialogue will pop up. Please fill in specification and footprint of component. Choose circle panel, the component number is 24 in the example, the angle is 0. Since the quantity of component is even number, we only need to find two symmetry components to align, Start point and Component point 2. After that, click create, the 24 components coordinate will be generate automatically.

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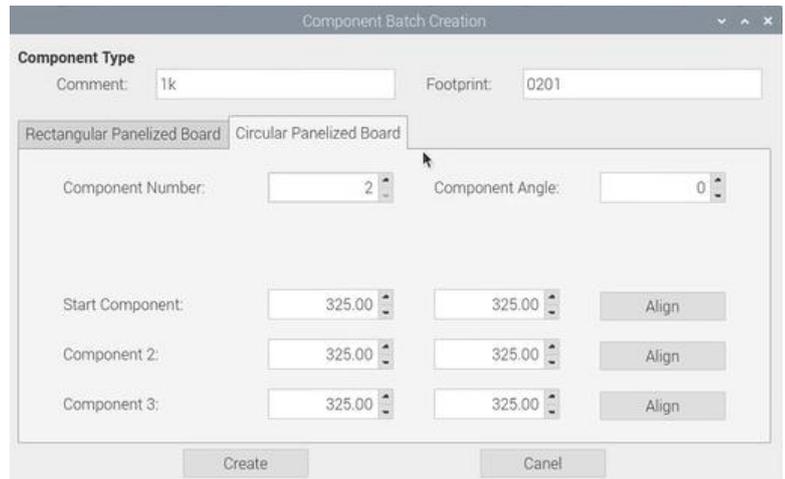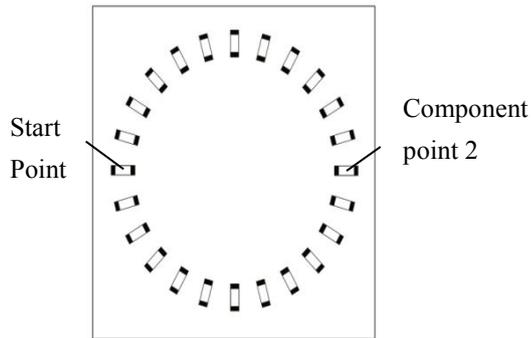
Fig.（2.1.3.2-6）

- When the quantity of component is odd: the component type will be the same. We can see that the panel has 9 components , because the quantity number is odd, we need to find 3 components that are in isosceles triangle, and then align the coordinates of those three points by turn. Click "create" to generate 9 components' coordinate in circle panel.
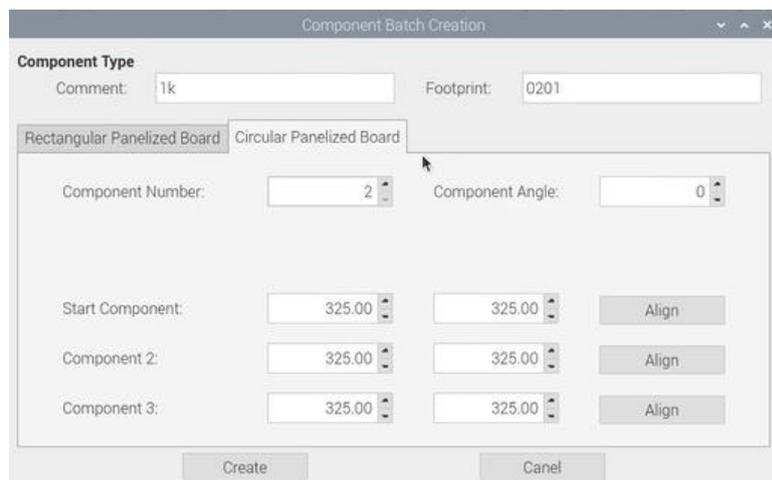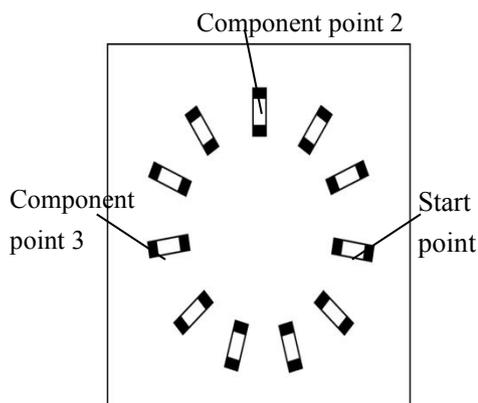
All components' setting on this files list, such as nozzle selecting, stack setting, the coordinates of pick components, adjustment setting, and others components' setting need to be fulfilled here.
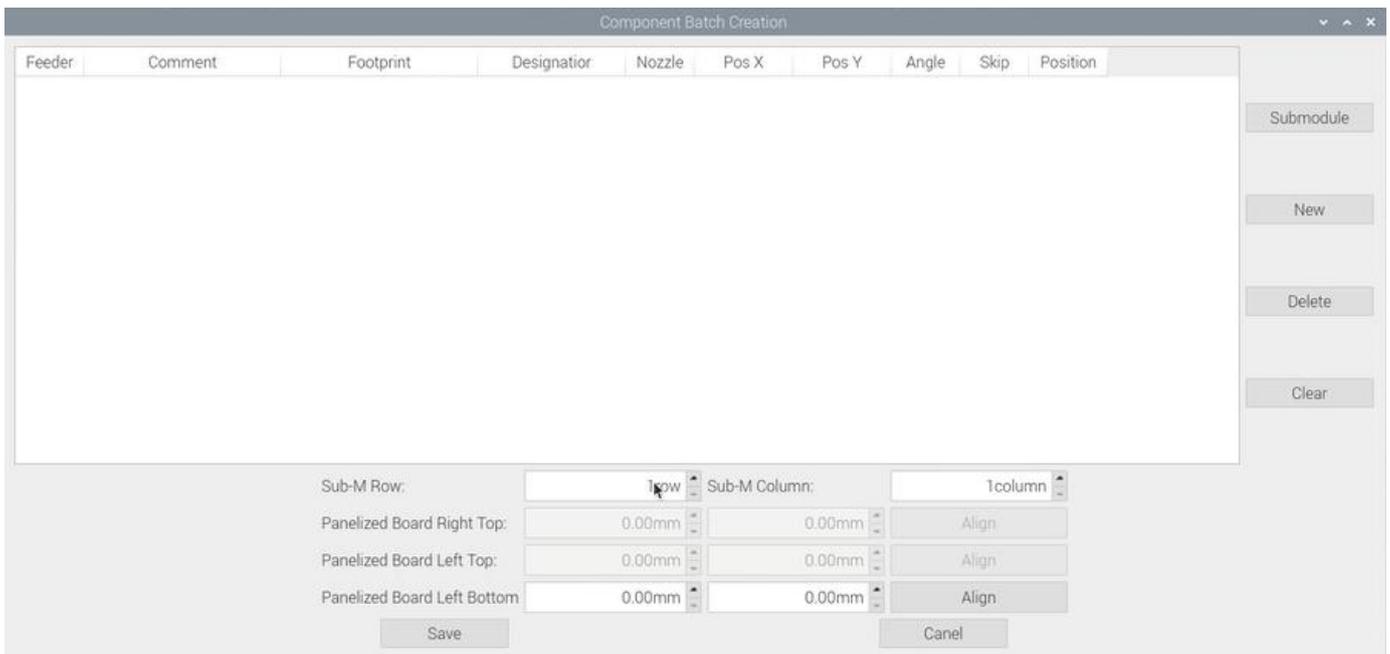
After click to save,the coordinate information will be finished.

File:TEST1

| 1.PCB Information | 2.Panelized Board Information | 3.Coordinate Information | 4.Feeder Information | 5.Nozzle Information |

PCB Mark Setting
○ Panelized Mark Point   ● Single Mark Point

Mark Point Alignment
○ Manual Alignment   ● Auto Alignment

New   Delete

Save   << Back   ☐ Manual

	Pos X	Pos Y	Min	Max	Flash	Brightness	Range	Circle Degree	Mode	Camera
Mark1	4	9	0.8	1.2	Inner	20	4	80	White Point	Left Camera
Mark2	196	91	0.8	1.2	Inner	20	4	80	White Point	Left Camera

	Feeder	Comment	Footprint	Designatior	Nozzle	Pos X	Pos Y	Angle	Skip
Comp1	1	10K	C0805	R49	1	36	27	0	☐
Comp2	1	10K	402	R136	1	62	33.5	0	☐
Comp3	1	10K	402	R135	1	60	33.5	0	☐
Comp4	1	10K	402	R134	1	58	33.5	0	☐
Comp5	1	10K	402	R133	1	56	33.5	0	☐
Comp6	1	10K	402	R132	1	54	33.5	0	☐
Comp7	1	10K	402	R131	1	52	33.5	0	☐
Comp8	1	10K	402	R130	1	50	33.5	0	☐
Comp9	1	10K	402	R129	1	48	33.5	0	☐
Comp10	1	10K	402	R128	1	62	35	0	☐
Comp11	1	10K	402	R127	1	60	35	0	☐
Comp12	1	10K	402	R126	1	58	35	0	☐
Comp13	1	10K	402	R125	1	56	35	0	☐
Comp14	1	10K	402	R124	1	54	35	0	☐
Comp15	1	10K	402	R123	1	52	35	0	☐
Comp16	1	10K	402	R122	1	50	35	0	☐
Comp17	1	10K	402	R121	1	48	35	0	☐
Comp18	1	10K	402	R120	1	62	36.5	0	☐
Comp19	1	10K	402	R119	1	60	36.5	0	☐
Comp20	1	10K	402	R118	1	58	36.5	0	☐
Comp21	1	10K	402	R117	1	56	36.5	0	☐
Comp22	1	10K	402	R116	1	54	36.5	0	☐
Comp23	1	10K	402	R115	1	52	36.5	0	☐

Import Top Layer
Import Bottom Layer
New
Delete
Move Up
Move Down
Move to First
To Current Position
Position Correction
Batch Create

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5.Feeder Information Setup

All components' setting on this interface, such as nozzle selecting, stack setting, the location of pick the 1st components, adjustment setting, and others components' setting need to be finished here. We can see that No.1-24 stack on bottom line, No.25-53stack on top line, No. 54-73 feeders are the tray stack. According to the actual feeder width, the feeder qty will be reduced.
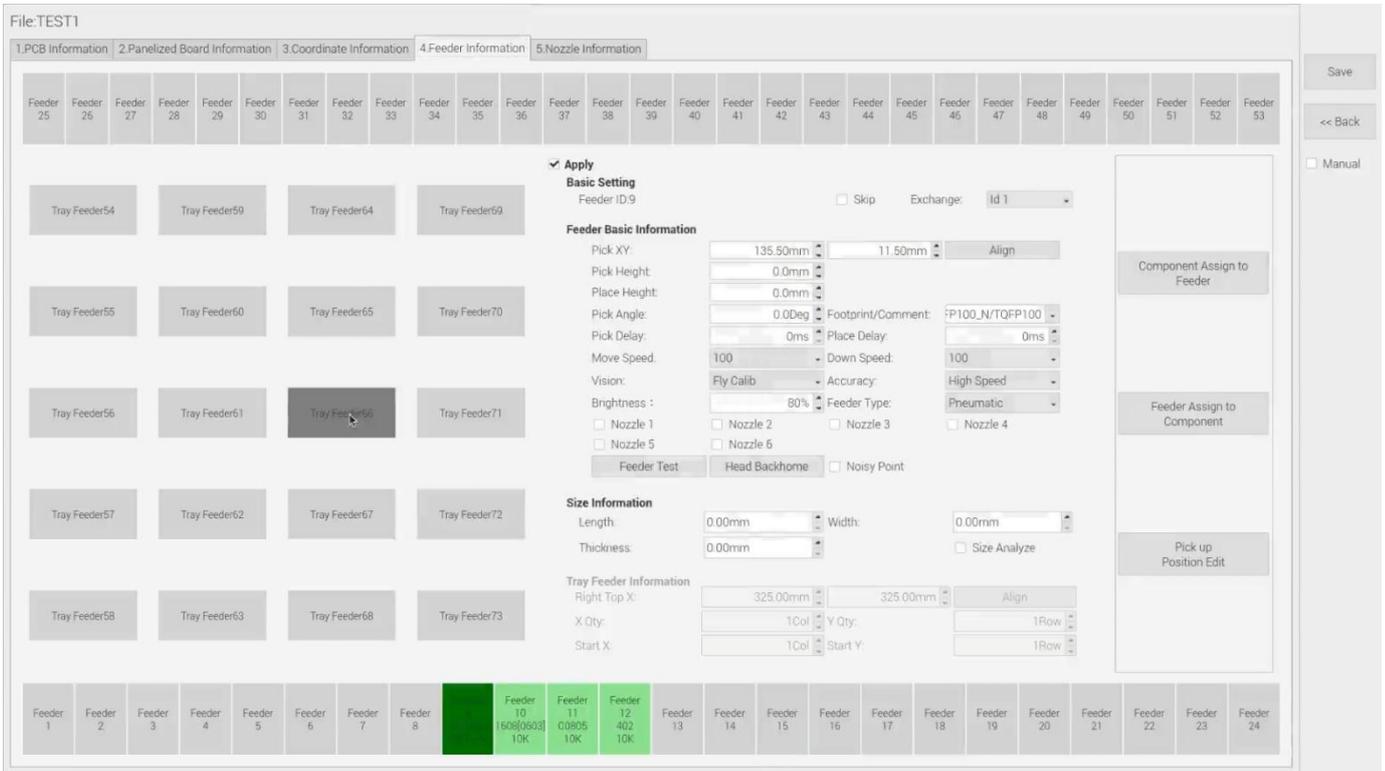
5.1 Function of Feeder Information

（1）Assign all sequentially: After complete component information setting, click 'Assign all sequentially', the setting information will be assigned to each feeder automatically.

（2）Assign feeder and nozzle: After complete stack information and nozzle setting, click 'Assign feeder and nozzle', all information will update to the component list automatically

（3）Batch editing for pick position: Press this button, it will show below：

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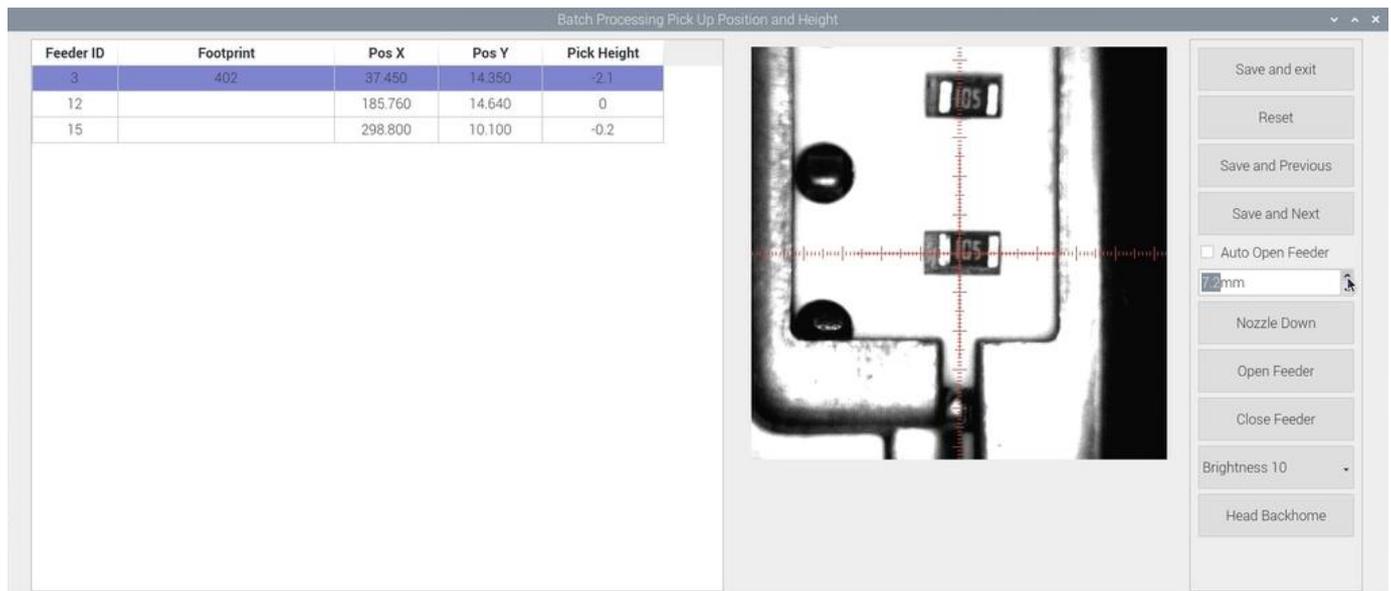
Batch setting for pick position: please select one stack to start setting (default start from the first assigned stack), at the same time, a real-time image will be showed as right side. Please adjust the red cross to the 1st component's center (generally if the feeder is in off condition, red cross will be at the edge of feeder's tape cover), click "save and next" until all are set up. There will be beep sound as a warning, then click "save and exit" will be OK.

While setting the pick position, the function of "Feeder open"/ "Feeder close" can help to set the cross's position more conveniently.

5.2 Feeder setting

For feeder NO.1-53, the default settings are grey and inactive. Select a feeder, click "Apply" to active the settings, such as feeder exchange, feeder, nozzle, IC tray feeder etc.

The setting sequence is: Feeder (or IC tray feeder)→ Feeder basic information→ Nozzle.

（1）IC tray feeder info

It is used to set tray package component's pick position.

● Right top XY: it refers to align the farthest component on the tray (generally take the component at right top as the final one on the tray, and take the component at left bottom position as the first one)

● X qty: it refers to how many components in X direction

● Y qty: it refers to how many components in Y direction

● Start X, Start Y: It refers to the first IC in X/Y direction if the tray is in full package; If some ICs have been used whic h cause the tray is not full, you can directly set the exact position as actual situation, start X will be the location of its a

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ctual column and start Y will be its actual location of row.

（2）Feeder basic info: fig(4.2.1)

- Skip: once selected, all components in this feeder will be skipped

- Feeder exchange: this function can be used if any reel tape was installed at wrong or inappropriate position. Select the feeder/ IC tray feeder you need to exchange, then the related feeder info will be synchronized to the swapped feeder/ IC tray feeder.

- Pick XY: Align the first component position in the feeder as fig, which is Mark camera align the component central position, then click "save and back", the well-saved position's X/Y coordinates will be automatically show up as fig. (P.S.: pick position can be set one by one or be set by the scale setting, scale setting is more convenient).
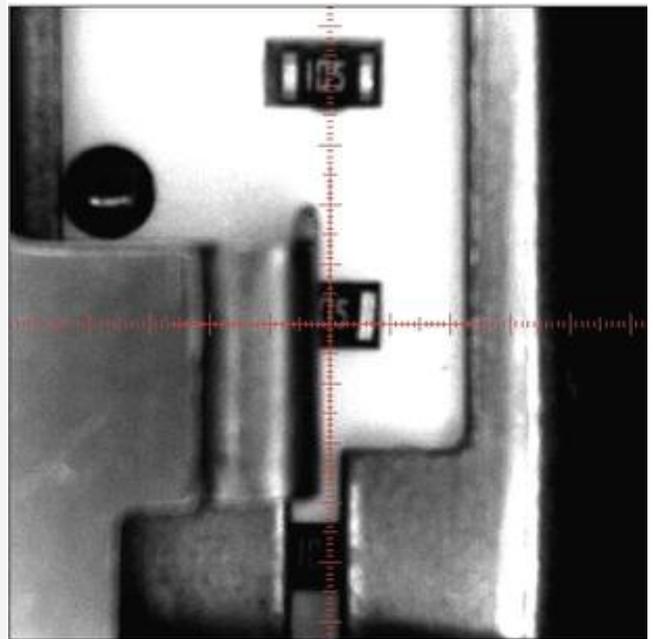
Fig（4.2.1）   Fig（4.2.2）

- Initial angle: default is 0°, in some special cases, you can change the mounting angle of the entire components by modifying the angle here. Here specially pay attention to some components with direction requirement, such as LED red/green, diode, IC chip etc.

- Footprint/ Value: component footprint/ value. Footprint refers to the footprint name, such as 0603, 0805, 1206 etc., Value refers to component data, such as 10K, 75Ω etc.

- Pick height:

Measuring method of pick height: you can bulk edit the pick position to measure the pick height. According to different components, you can input appropriate pick height at first and click the nozzle to go down(if the feeder is cloesed, when clicking nozzle to go down, the feeder will turn on automatically and then the nozzle goes down)to manually observe whether the height is reasonable and make fine adjustment.

In XY motion interface, when selecting nozzles No.1-No.6, user should lock the position at first, input a certain height value and then click the nozzle test to go down to measure whether the pick height is reasonable.(Note: when testing the pick height in locked interface,the feeder won't turn on automatically. You can select the component above the edge of the sheeting to measure.

● Place height:

Measuring method: first measure the height from the nozzle to the pcb board. Considering the thickness of the component itself, press down about 0.1mm or o.2mm. For special component, make appropriate adjustment.

● Pick delay: for special components,such as large IC, 0402 resistor and capacitor etc, it's better to set some long time on the pick delay to make sure nozzle can pick up them stably.

● Place delay: for special components,such as large IC and large capacitor etc, it's better to set some long time on the place delay to make sure nozzle can still suck the component stably during the movement to the board.

● Move speed: it is used to control the head's movement speed. For general component like 0603, just keep default value 100. For special component like large IC, please adjust this value to slow down the movement speed.

● Down speed: it is used to control the nozzle head's Z-axis downward speed (Special notice: for lead pitch distance<0.5mm, please set this to a lower speed).

● Vision: against component to choose applicable vision method. Such as:

For resistor/ capacitor--- please select Flying calibration.

For component which does not require high precision --- you can also select No action.

For IC --- you can select IC correction or big IC correction according to different IC sizes. The two methods difference is: IC correction is one shot recognition; big IC correction is separately taking photos for IC's four corners. So, make sure the complete image of the component can be taken if you choose IC correction, otherwise you can only select big IC correction method.IC pre-rotation correction is to rotate the component to the placement angle at first and then perform the placement.

● Accuracy: including high speed and high accuracy. Generally normal resistor/ capacitor is default as high speed mode, do not need to modify it; For IC, please select high accuracy mode.

● Brightness: it refers to the brightness of component recognition (after component being picked up) in assembly procedure.

● Feeder type: two types for selection---Pneumatic and Electric .

● Nozzle: you can select single nozzle or several nozzles in different cases, once selected, they'll be automatically assigned to each feeder. Notice: for edge position feeders, you can just use limited nozzle head to pick up components. If you're not sure, just click "Feeder Test" button under the nozzle selection part. It will pop out below, you can test

which nozzle is available to pick up component from this selected feeder. Details for each button:
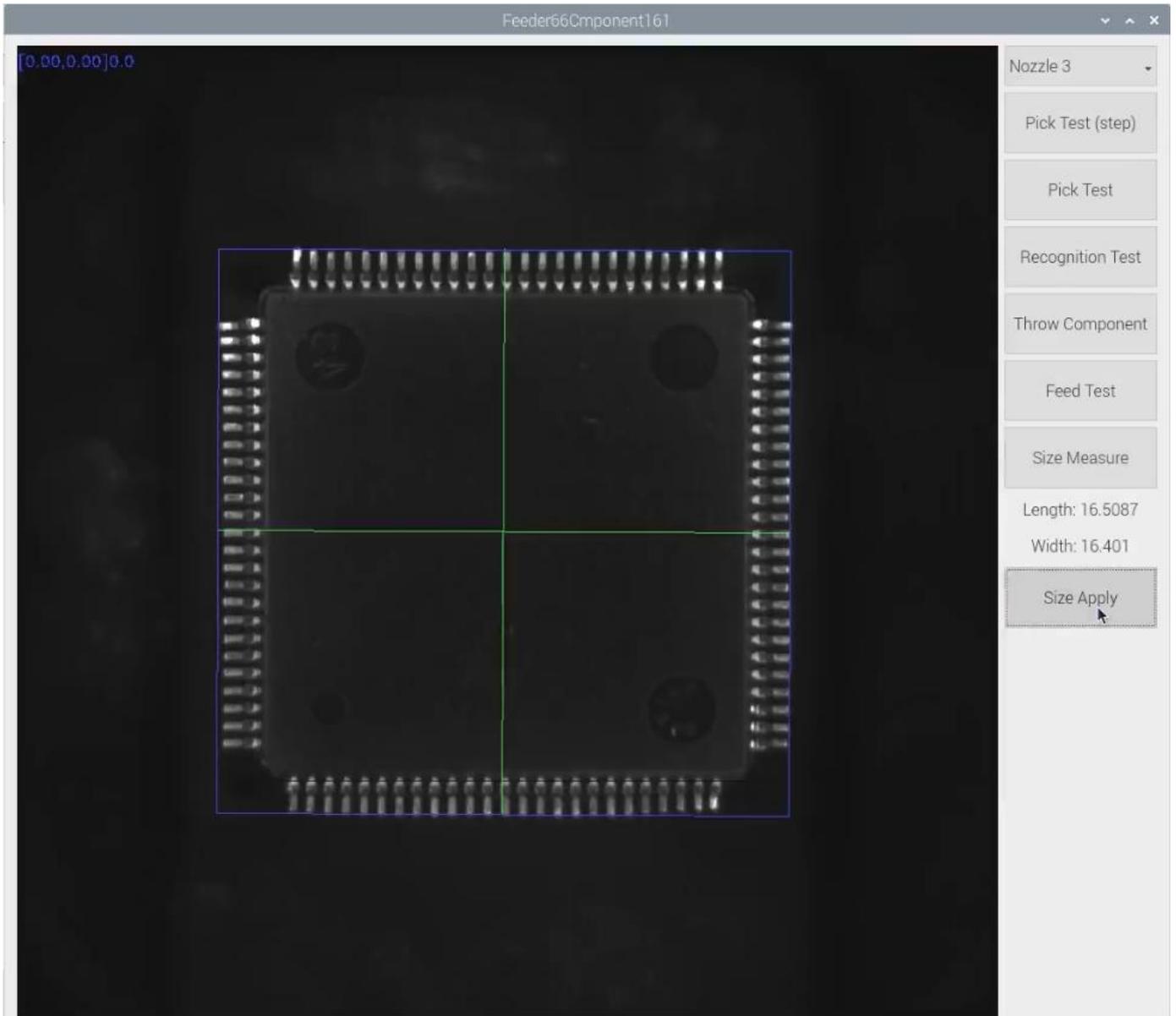
- Nozzle: select the nozzle head you need to test

- Step pick test: click this button after nozzle is selected, the detailed process: the nozzle head moves to this feeder→feeder cover opens → the nozzle lowers down to pick up component. This is single step operation, which can help the operator check whether pick position/ pick height is correct or not. If there is problem, they can be re-set in feeder basic setting.

- Pick test: after nozzle selection, click this button, the head will move to feeder position, the component is feeded, nozzle lowers down to pick component. This procedure is finished without any pause.

- Recognition test: after the "Pick test" with component picked up, then click this "Recognition test" to reognize the photo taken by flying camera according to selected recognition method. If the photo is with problem, you need to do some adjustment for the problematic recognition after finding the reason(such as interference reason and recognition

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brightness reason)

- Feed test: feeding component, this is used to test if the feeder works normally.

- Size measurement: after setting the pick position and pick height and selecting the nozzle, click the button "size measurement", the machine will measure the length and width of component automatically. If the size is correct, click the button "size confirmation", the length and width data will be synchronized to size information in feeder setting interface.

- Size information: If you input the length and width of the component,the image taken by flying camera will be identified and recognized with the corresponding pixel. Note: For special thick component, you must input the thickness! User can choose whether to click "open size recognition" according to their own requirement. If "open size recognition" is clicked, the machine will throw the component and pick again when working if the component size is not in corresponding with setting size information.

After above feeder information setting is finished, click "feeder assign to component", then component list will be updated accordingly. Click "save"and "back". All the procedures are finished.

6. Nozzle Information

Below records the nozzle type of nozzle No.1-No.6. When replacing the nozzle, just replace the nozzle according to the file recorded nozzle type.

File:NewFileName7

| 1.PCB Information | 2.Panelized Board Information | 3.Coordinate Information | 4.Feeder Information | 5.Nozzle Information |
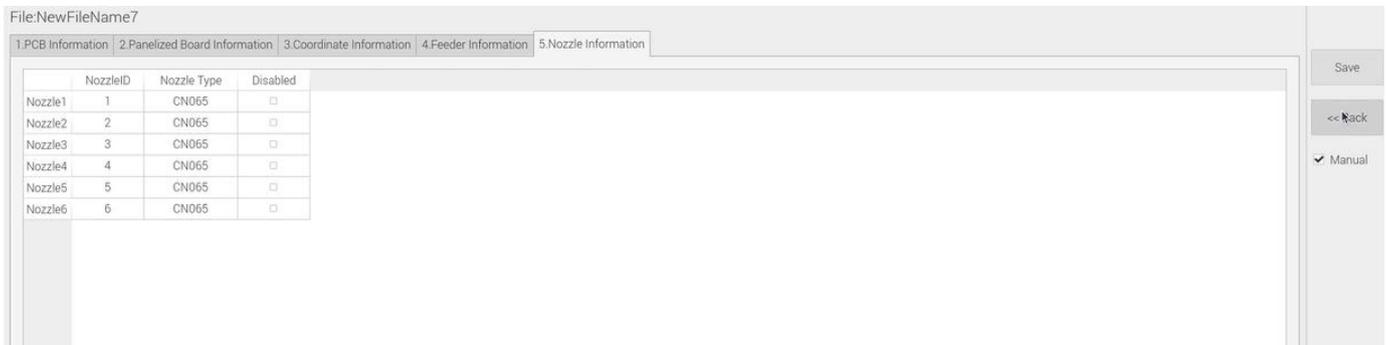
	NozzleID	Nozzle Type	Disabled
Nozzle1	1	CN065	☐
Nozzle2	2	CN065	☐
Nozzle3	3	CN065	☐
Nozzle4	4	CN065	☐
Nozzle5	5	CN065	☐
Nozzle6	6	CN065	☐

Save

<< Back

✔ Manual

7. Assembly Interface

Choose the programmed file in file listed interface, click "Mount", it will go into assembly interface as below:

File:TEST1 Count1
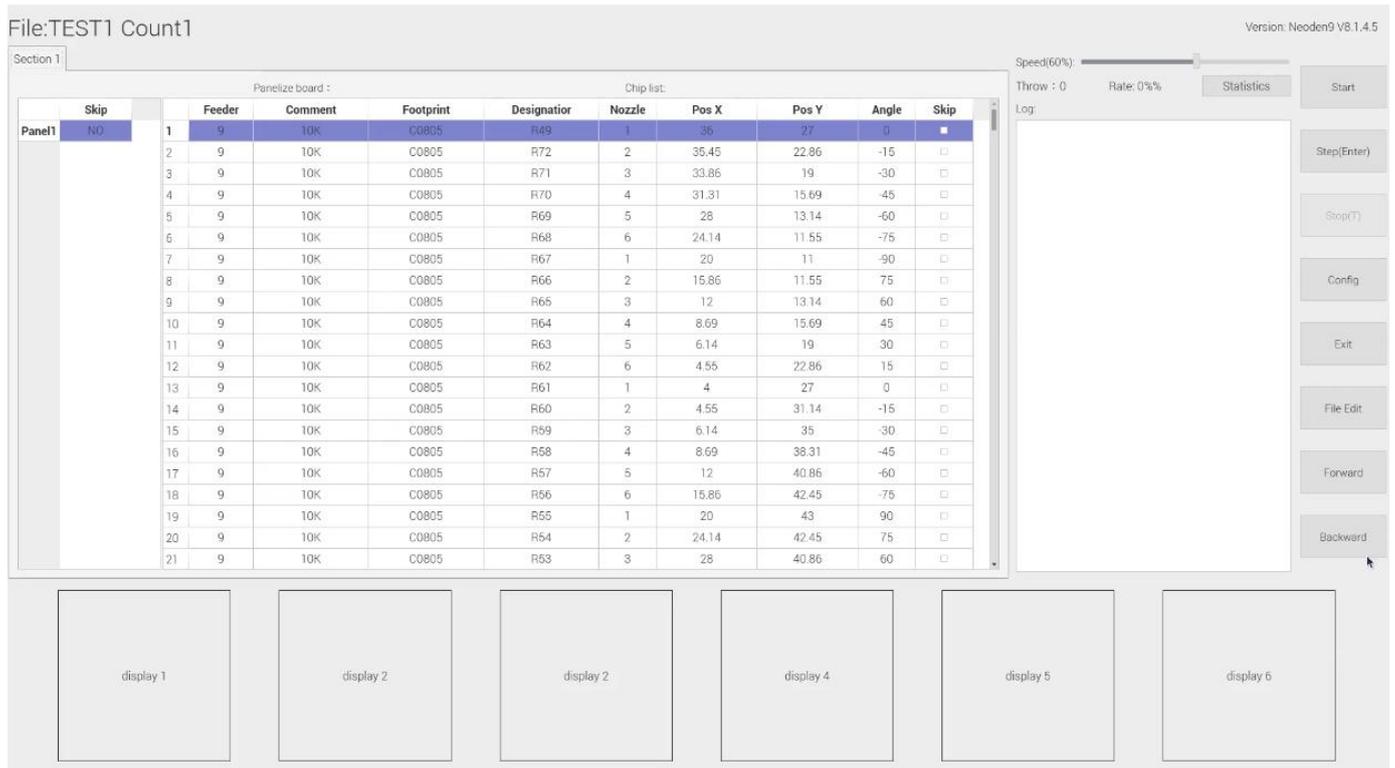
(1) Left part is detailed component list, you can get a real-time assembly situation with the varying of the highlight blue area;

(2) Right top part shows the current assembly speed, you can drag the scroll bar to adjust it(the max is 100%);

(3) Throw and Rate will make a statistics for thrown components and you can check each feeder's component pick failure rate and get the information that which kind of component is easily picked failure, then find solution to improve it.

(4)Log will show some informations like rate of throw component, current average speed and quantity of components which have been assembled under the current file.

(5)The bottom side 6 display windows are real-time feedback for component recognition images.

(6)Right side buttons' introduction:

Start: machine starts the current file's assembly procedure.

Step: operation for each single assembly procedure.

Stop: stop current assembly work.

Exit: after assembly is finished, please directly click this button and back to home interface.

File edit: if the component picking is failed several times or there is big deviation of placement accuracy, the operation need to be paused. After analyzing the reason, you do not need to exit the assembly interface and just click "file edit" to modify it. After the modifying is finished, save it and come back to assembly interface.

Config: press this button, a detailed configuration setting interface will pop out as below:

Place detailing parameter configuration

Track Configuration
PCB Raise
100.0   Width Set

Debug Set
☐ Mark Alignment Debug
☐ Support Step Detailing
Log Level: 5
Open Picture Log   Clear Image

Placement Configuration
☐ Support Simultaneously Pick
☑ Continuous Moutning
☐ Pick Up Position Optimization
☐ Position Optimization After Place
Action coherence1%

Save

Back

Place count permit count set (108622/200000)

Configuration interface introduction:

Tracks configuration: the function of PCB Raise and Width Set are totally same as that in PCB Information interface.

Debug Set:

(1)Support step detailing: once this is clicked, every time you click "Step", the machine will only execute one command. This is strongly recommended for the first tial assembly procedure after the programming file is finished.

(2)Open picture log: after pressing this button, the file of stocking recognition photos will be opened, from which

recognition details of components can be checked.

Placement configuration:

(1)Support simultaneously pick: once this is clicked, the nozzles with same pick height will lower down to pick components

at the same time, which will greatly improve placement speed (It is recommended for component whose size is bigger than

that of 0603). For NeoDen9, the simultaneous pick nozzles are nozzle 1 and nozzle 4,or nozzle 2 and nozzle 5, or nozzle 3

and nozzle 6.

(2) Rail continuous mounting: this is for PCB continuously feeding to realize continuous automatic assembly operation.

(3)Pick up position optimization: once this is cliked, nozzle head can automatically optimize the pick position when picking

components(It is recommended only for small components).

(4)Position optimization after placement: if this function is selected in the first time, it will directly come to position correction interface after placement is finished. User needs to correct the position according to the actual placement situation.After the correction is completed, machine will place the components according to the corrected position when the placement is performed again.

8. Manual Test

Before programming, perform a manual test at first to debug whether the machine can work normally.

(1) Feeder No.1-No.53: after loading tape reel on feeder, click the feeder to test its feeding function.

(2) Alarm light: click this button to test if the light could work correctly, the color should change from red, green to yellow by sequence.

(3) Buzzer: click this button, the buzzer beeps.

(4) XY initialize: click this button to have XY back to zero.

(5) XY Move: it's to move to a specified position or get the current coordinate. Click this button to enter a vision interface. The movement modes are optional. Use the crosshair on the left vision interface to move the placement head.

(6) Front IC Camera: it's to test the photograph function.Click this button, front IC camera will take a photo and the image above front IC camera will be displayed.

(7) Right Mark Camera,Left Mark Camera: it's to test the photograph function. Click this button,the corresponding mark camera will take a photo and the image below the corresponding mark camera will be displayed.

(8) Head initialize: head initialization can be executed before mounting.

(9) Nozzle Height Calib: it's to adjust the height of the nozzles to the same height. Adjustment method: 1.Preparation tools: 1pc of A4 paper, 1pc of standard nozzle. Steps: 1.Visually confirm whether there is a nozzle on the placement head, click "nozzle height calib"; 2.Lock the nozzle position to above the track(after selecting the position and nozzle No.1's alignment method, save it). Select the corresponding nozzle and click the up button and down button on the keyboard to to adjust the height of nozzle to make sure that the nozzle just presses on the upper plane of the track after the nozzle is lowered. After

the adjustment is complete, just save it.

（10）Head Home back: click to move the head back to original left top position.

（11）Nozzle Replace: click to replace nozzles, the head will move to its position for easier replacement.

（12）Head Nozzle: click to test rotation, suction, blow and moving down functions of nozzle NO.1-NO.6.

（13）Width Initialize: initialize the width of rails back to zero.

（14）Width Set: after the initialization of rails width, enter the expected width, click Width Set, the rails be widened accordingly.

（15）Introduction of Lock interface, as below fig.
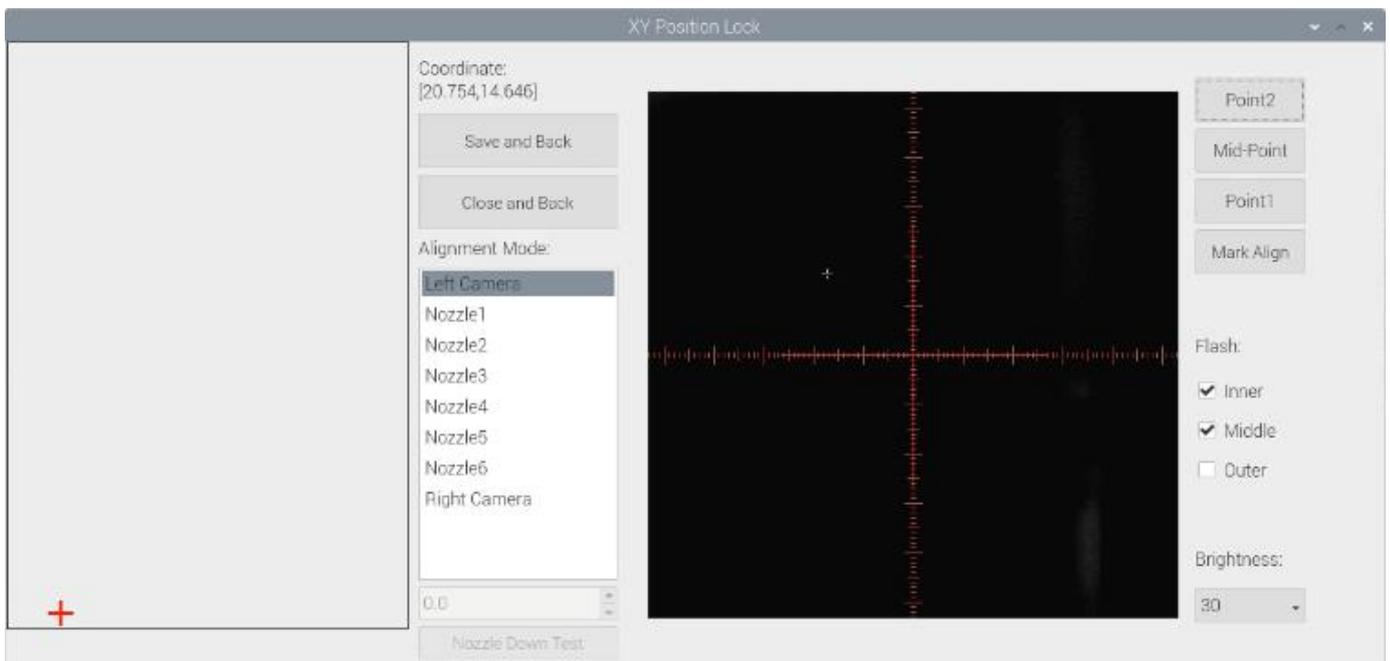
Save and back：After align the center of components,click "save and back" to save the date.

Close and Back: Refer to exit the current interface.

Align method：Include left mark camera,nozzle 1-6,right mark camera,choose the alignment method according to the actual situation,right side will show the real image by mark camera alignment.

Nozzle Down Test：

When mark cameras are selected as the alignment mode, this function is gray and inoperable.

When selecting nozzle 1-6, this interface turns black and can be operated. The user must first lock the position, enter a reasonable height value, and then click the nozzle down test button to measure whether the reclaiming height is reasonable. (Note: when locking the interface to test the reclaiming height of Feida, feeder will not open automatically. You can select the material above the edge of thecomponent to measure.)

Point 1, Point 2, Mid-point：This operation is used to select the center position of some components.

For example, select " left mark camera" as alignment mode. First select the center of the first pin of the lower left foot

of the chip, click "point 1", then select the pin center of the upper right foot opposite to left 1, click "point 2", and then click the middle point. The machine will automatically calculate the center position of the chip.

Light source: outer ring,middle ring,Inner ring,Mark point generally select to use outer or inner ring,select corresponding light source according to PCB kind.

Brightness: Image recognize brightness can be adjusted on the drop-down list.

9. System Setup

> **Warning: this part aims at machine's global parameter settings, any modified parameter will influence all working files, when modify this part please consider seriously.**

If any revision is required, we suggest you contact our engineer to get detailed instruction first. (P.S. All parameters were set up before shipping, usually no adjustment is required.) This section will provide a brief introduction for all parameters, to get detailed adjustment instruction, please contact our technical engineer.

Right buttons functions:

Config save: to click Save after changing the parameter.

Administrator login: to prevent any misoperation, this interface will be inactive and greys out. To make it inactive, Administrator needs to login.

Change password: before Administration login in, this function is not visible.

If the password needs to be changed, please login and click Change password. A window will pop out, enter the original password. Then follow steps to enter the new password. A successful window will pop out when it's finished.

Version: the current software version will be displayed below.

When any software upgrade is required, please copy the upgrade file into the subdirectory of U disk, click "software upgrade" to load it. Then follow instructions to upgrade it.

English: this machine supports Chinese and English. To convert it into English, a password is required.

9.1 Feeder Position Config

This interface is used to setup pick offset and test feeding for each feeder.

Feeder Position Config:

	Pos X	Pos Y	Align	Test
Feeder1	4.255	14.639	Align	Test
Feeder2	20.755	14.639	Align	Test
Feeder3	37.255	14.639	Align	Test
Feeder4	53.755	14.639	Align	Test
Feeder5	70.255	14.639	Align	Test
Feeder6	86.755	14.639	Align	Test
Feeder7	103.255	14.639	Align	Test
Feeder8	119.755	14.639	Align	Test
Feeder9	136.255	14.639	Align	Test
Feeder10	152.755	14.639	Align	Test
Feeder11	169.255	14.639	Align	Test
Feeder12	185.755	14.639	Align	Test
Feeder13	289.031	14.117	Align	Test
Feeder14	305.531	14.117	Align	Test
Feeder15	322.031	14.117	Align	Test
Feeder16	338.531	14.117	Align	Test
Feeder17	355.031	14.117	Align	Test
Feeder18	371.531	14.117	Align	Test
Feeder19	388.031	14.117	Align	Test
Feeder20	404.531	14.117	Align	Test
Feeder21	421.031	14.117	Align	Test
Feeder22	437.531	14.117	Align	Test
Feeder23	454.031	14.117	Align	Test
Feeder24	470.531	14.117	Align	Test
Feeder25	1.551	523.659	Align	Test
Feeder26	18.051	523.659	Align	Test

The left column refers to feeder No., Pick X and Pick Y refer to the coordinates of pick offset. After "click to align", this interface will be displayed. Align the center of component (edge of tablet), then save it.
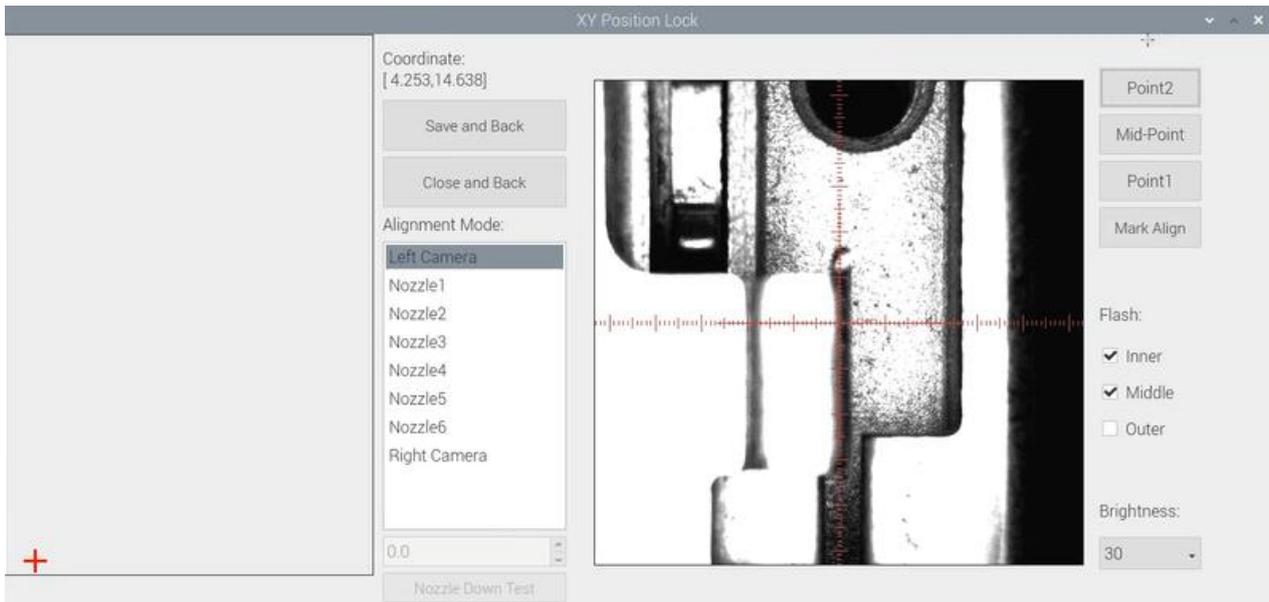
9.2 Component Positions Setup

Component Position Config:

	X	Y	Position
Left Mark Camera Relative	262.432	33.585	Align
Right Mark Camera Relative	95.685	33.614	Align
Nozzle1 front IC Central	234.984	33.515	Align
Nozzle2 front IC Central	212.222	33.567	Align
Nozzle3 front IC Central	190.483	33.604	Align
Nozzle4 front IC Central	168.318	33.477	Align
Nozzle5 front IC Central	146.341	33.672	Align
Nozzle6 front IC Central	124.545	33.457	Align
Trash Box Position	231.000	350.000	Align
Placement Head Rest	181.000	325.000	Align
Exchange Nozzle	343.000	10.000	Align

Auto calibration

XY Linear Encoder Initialize

Mounting Head Linear Encoder Initialize

Nozzle Height Set Zero

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（**P.S. Password is required to activate the items to avoid misoperation, please contact technical engineer before calibrating.**）

1. Mark Camera Relative Position
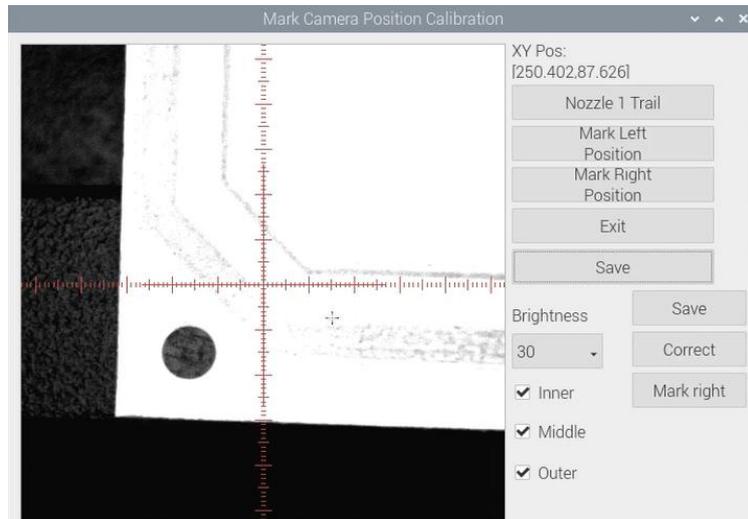
- Stick a piece of label on the edge of rail and apply ink or ink on the nozzle;

- Enter the manual test interface, click XY to move, find the position of the label paper (the position pasted on the rail surface) through the reference camera, then switch the alignment mode to "nozzle 1", and then click "close and return". After entering the factory settings, the administrator logs in first, clicks "click lock" at the relative position of the mark camera, and a prompt window pops up (do you want to leave a mark at the current position). Click Yes, and the following interface will appear. Click "nozzle 1 leave a mark" and the sticker will drop, leaving a dot. Observe the position deviation between the mark point and the center point of the red cross cursor, You can use the Red Cross to select the center position of the mark point. If the deviation position is within 10 wires, it is regarded as the completion of the mark. After the left camera is aligned, click mark to locate it right. Similarly, you can also use the cross to select the center position of the line mark point. Note: both left and right cameras shall be positioned and then saved (if the deviation is too large, the Engineer shall be contacted in time for correction)

2. Introduction of Mark Camera Relative Position function：

Left Mark Camera Positioning： The left camera is used to recognize the image after leaving the mark

Right Mark Camera Positioning： The right camera is used to recognize the image after leaving the mark（In principle, the images of left and right cameras are the same）

Exit： Exit without leaving marks

Save： After the marking operation is completed and the center position of the marking point is also selected, click save to save the data.

Brightness： The brightness of the mark camera when recognizing an image, it can be adjusted in the drop-down list

according to the actual situation

3.　Nozzle and IC camera center position

Nozzle 1 front IC Central Position: click to align,nozzle 1 will move to front IC camera and take photos. Once the photo is displayed, to align the central position of nozzle with white crosshair and save the data.(P.S. Once the Nozzle 1 front IC Central Position, nozzle 2-6 central position will be changed based on nozzle 1.) Apply the same operation for Nozzle 2 front IC Central Position and Nozzle 6 front IC Central Position.

4.　**Trash Box Position:** after Administration Login, click to align the position of trash box accordingly.

5.　**Placement Head Reset Position:**after Administration Login, click to align the position of Placement Head Reset accordingly.

6.　**Exchange Nozzle Position:** after Administration Login, click to align the position of exchanging nozzles accordingly.

7.　Automatic calibration

Check Nozzle Position：Check the position of nozzle 1-6 in the center of the front IC camera. Click this button, 1-6 nozzles will act automatically and display in this interface

Automatic positioning of nozzle: It can realize the automatic positioning of nozzle and front IC camera.

Left and right mark camera positioning: this function is currently under development.

Front and rear IC camera angle: the camera may have an angle when the equipment is installed. This function can automatically measure the angle of the front IC camera to improve the mounting accuracy. Click this button, the nozzle 1 takes the mark point and acts. After the action is completed, click return, and the automatically measured data will be synchronized to the initial angle of the front IC camera in the right basic configuration.
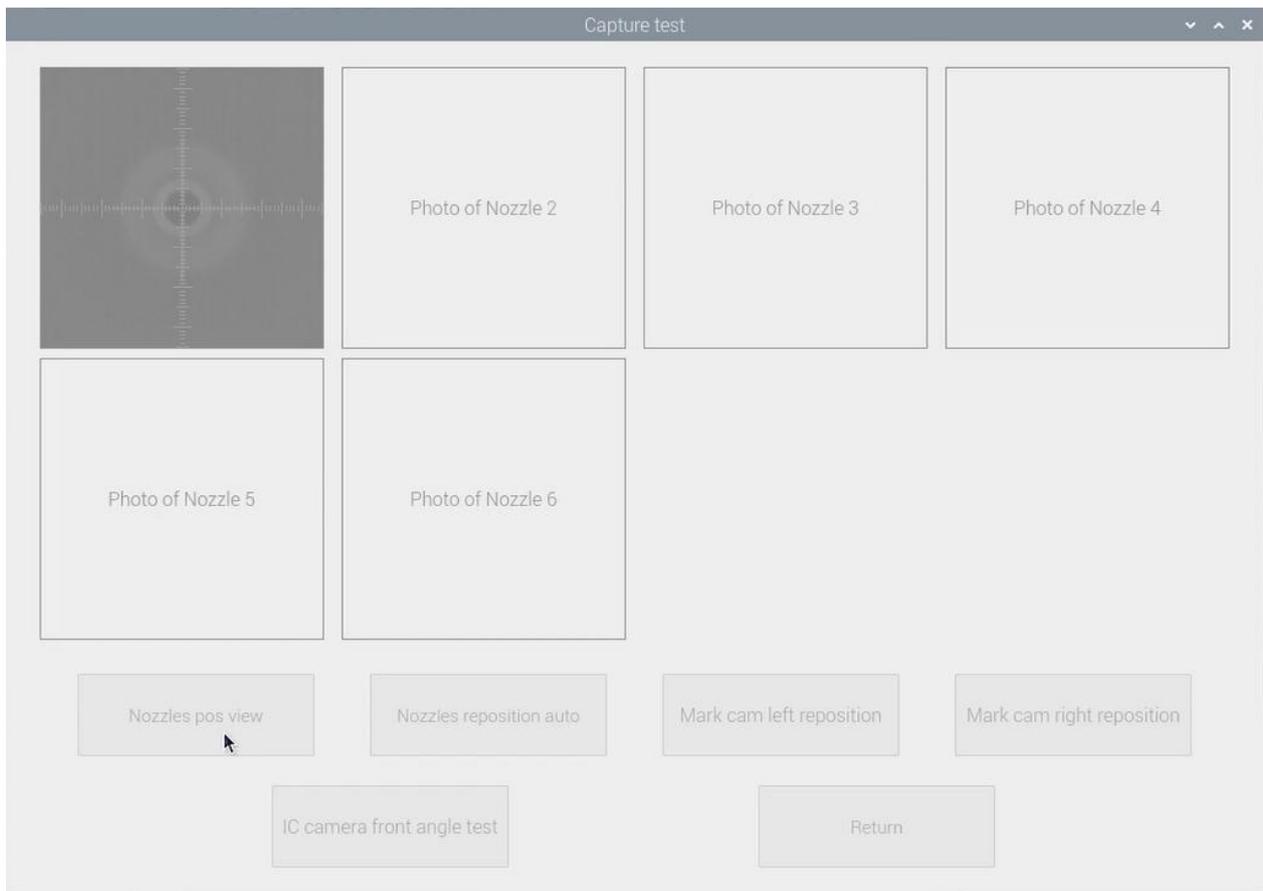
Fig.Auto Calibration Interface

8. XY Linear Encoder Initialize

> **Warning: This is only need to do after the Linear was reinstalled or some mechanism changed. Please do not change it without checking with NeoDen Team.**

9. **Mounting Head Linear Encoder Initialize**

> **Warning:This is only need to be done after nozzle height set zero. Please do not change it without checking with NeoDen Team.**

10. Nozzle Height Set Zero

> **Warning: This is a must-do step after replaced the motors and belts or re-tested. Otherwise the nozzles may crash down to break somewhere. And also please do this step cautiously under the instruction from NeoDen technical engineer to avoid unnecessary**

9.3 Basic Configuration

Basic Configuration:	Value
Default Working Speed	50
Mark Camera Brightness	30
IC Camera Brightness	60
Left Mark Camera Initial Angle	0.00
Right Mark Camera Initial Angle	0.00
Front IC Camera Initial Angle	0.29
IC Background Brightness	0
Track Feeding PCB Duration(s)	5
PCB Track Delay(ms)	200
Track speed percent	100
Open Cover to Cut Off Motors	0
Pressure Zero Offset	0.0
Pressure Gain Correction	1.0
Speed Expand Mode	0

Fig: Basic Configuration

Default Working Speed: this is adopted by the placement speed in the mounting interface

Mark Camera Brightness and IC Camera Brightness: they are the default value when coming out from the factory. The default value for Mark Camera Brightness is 30,and for IC Camera Brightness is 40. They can be adjusted according to the real situation.

Left Mark Camera Initial Angle,Right Mark Camera Initial Angle,Front IC Camera Initial Angle and Back IC Camera Initial Angle:

Warning: the values are already set up before shipping, no extra adjustment is required. There is a risk to lead to malfunctional condition, please kindly contact technical engineer before

Track Feeding PCB Duration(S): track forward to the conveyor and sending the signal,the duration of waiting for the PCB feeding

Open Cover to Cut Off Motors: this is to prevent any body damage during picking and placing. if set value 0, in the mounting process when open the cover, the machine will turn to Step mode to do the mounting, due to the safety

consideration; if set value 0, and open the cover in the mounting process, the machine continues mounting but with lower speed as 20.

10. First trial and test

10.1 Program first dry run

Usually we would suggest you to have a dry run (no components are loaded) before production test. After it goes smoothly, you can start to produce few boards.

10.2 First production test

1 Make a programming file

2 Test the file to pick and place components to finish one board.

10.3 Component Inspection

Inspection items

●Check if the specification, direction, polarity of components is aligned with what they should be.

●Whether the components are damaged or the pins are distorted.

●Whether the component is off beyond allowance.

The inspection methods vary from the equipment that you have.

Except visual inspection, all of amplifier, microscope, online or offline AOI equipment can be applied if the pitch of IC is quite small to check.

Inspection Standard

Please follow SOP to do inspection or any other general standards (IPC Standard and SJ/T10670-1995 SMT General Technical Requirements). Adjust the programming file according to the placement effect after the first production test.

1. If there are any specification, direction and polarity issues, please do the adjustment according to the process file.

2. If there is any deviations of the chip placement, please do the adjustment by following two methods:
(1) If the placement effects of all components are off in the same direction, it would be the fiducial issues. Please adjust the coordinates of fiducials according to its value of deviation.
(2) If there are several components off beyond allowance, you'd better adjust their coordinates on working file with down-looking camera. If there are couple of issues occur during test, some other points need to be considered.

3. Frequent pickup failure. Some suggestions are listed below
(1) The pick height is inappropriate, please revise the value after an inspection or a pick-test
(2) The pick offset needs an adjustment, it should be aligned with the center of component reel slot rather than that of component.
(3) Due to peel strength or installation issue of wasted film, the film on tape won't be peeled completely

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(4) The nozzle was blocked

(5) The nozzle is damaged or has a crack

(6) The size issue of nozzle would cause air leakage or insufficient suction

(7) The air hose is blocked or has a leakage problem, and even the pump has an issue.

4. Frequently throwing components. Some suggestions are listed below,

(1) Up-looking camera can't take a clear picture of component due to brightness issue for example

(2) The pins are distorted

(3) The size or shape isn't aligned with that in "Footprint library''

(4) The size of nozzle is inappropriate or insufficient suction.

(5) The nozzle has solder paste or rubbish cause air leakage

(6) The nozzle is damaged or cracked cause air leakage

10.4 Continuous SMT production

Follow the SOP to start production

Notes:

(1) Do not touch the surface to board to avoid damaging the printed solder paste.

(2) When the error message occurs, please check out and solve it a.s.a.p.

(3) Once reloading the component during production, pay attention to the model, specification, polarity and direction of

components.

(4) Clear the reject box timely to avoid wasted materials stacked too high to damage the mount head

11. Structure and maintenance instruction

11.1 Feeder Brief Introduction
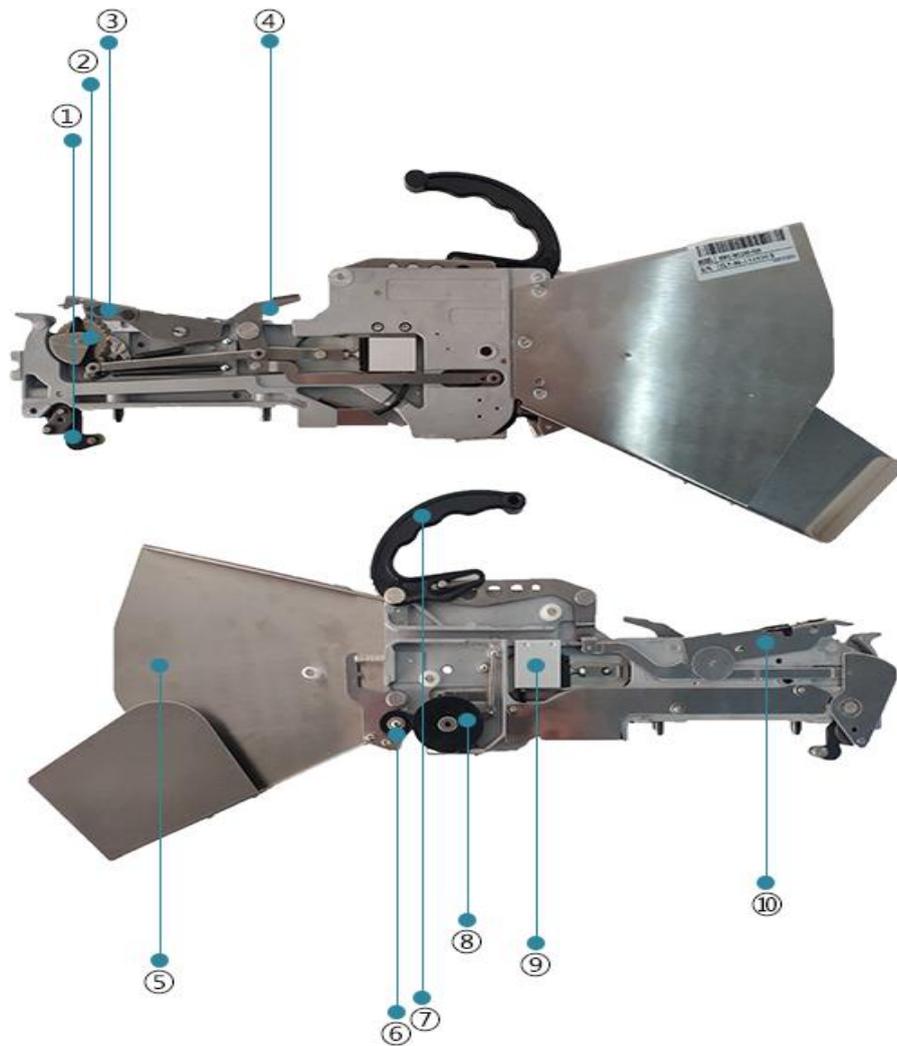
①Front fixed buckle   ⑥Single-track wheel

②Material-sending wheel gear   ⑦Hand Shank

③Press material cover   ⑧Tape coiling wheel

④Locking Claw   ⑨Cylinder

⑤Tail board   ⑩Snap joint cover

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11.2 Installing tape and reel components
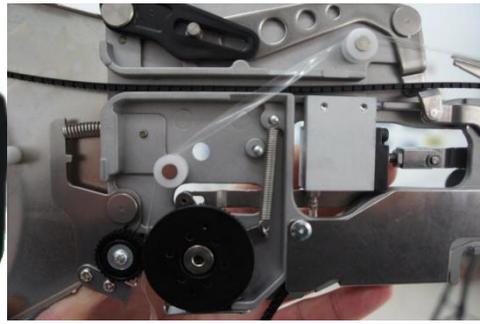
figure 1   figure 2

1. Making the feeder in open status to wait for installing the tape reel ①Lift up the feeder fixing handle；②Press the material-sending handle with left hand ③meanwhile press the lamellule at right side of the feeder with your right hand；loosen the material-sending handle, ensure the proper wrapped (see figure 1) then loosen the lamellule

2. Installing the tape and reel components: setting the reel on reel storage at the back side of the feeder, pull out approximately 10cm length tape, separate the film and tape, then put into transfer storage (see figure 1).The tape should be closely matched with the gear, and the film should pass through the upper denomination groove (see figure 2) through two white guide wheels and then be sandwiched between two gears.

Fig 3

3. Finish installing tape and reel components.

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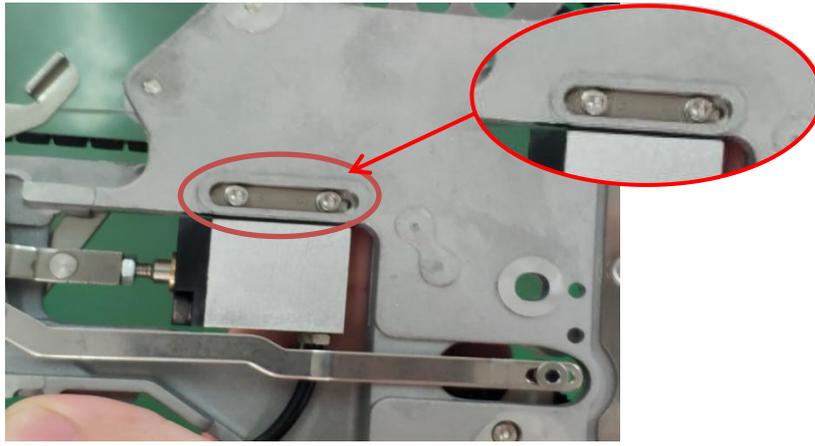
Fig 4

For 12mm,16mm width feeder, the feed rate can be adjusted by adjusting the parameters of the feed regulator.

11.3 Incorrect installation Samples：

1. Incorrect setting of reel in reel storage (see figure.5)
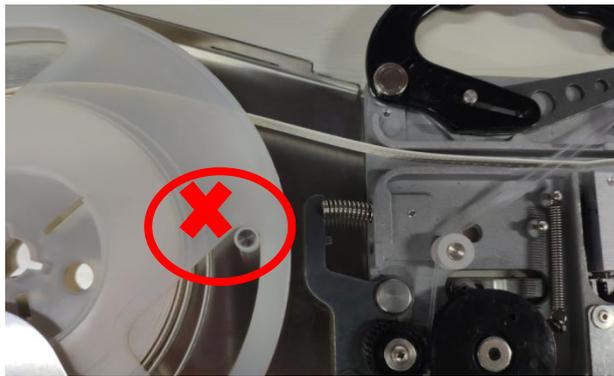
Fig5

2. The film is twisted, not tight enough, or the film is not between the white guide wheel and the black gear
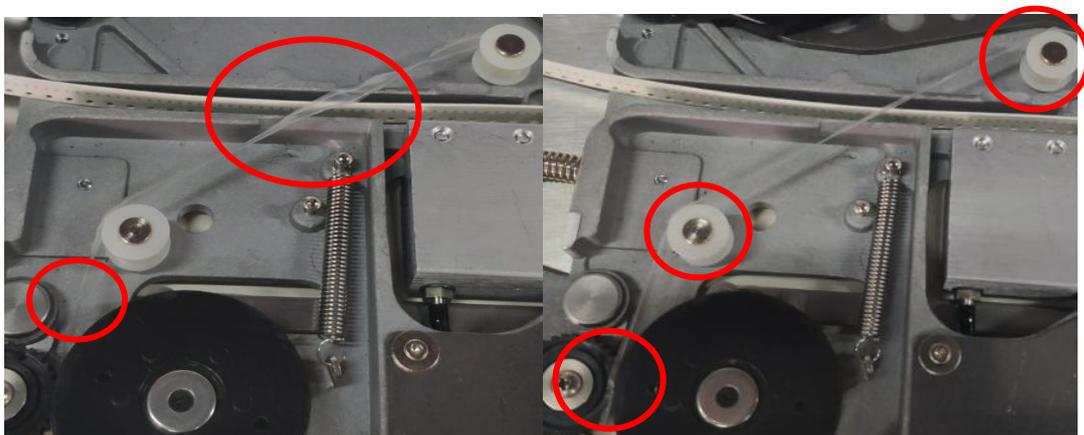
3. Cautions: Strictly refer to the instruction manual to use the feeder, and non-standard operation is strictly forbidden

Warning: when installing the feeder, if feel the hand press is not strong, or loose match in place, then it is forbidden to

operate. Otherwise will cause feeder floating in the operation and collision problem. In case of this situation, please contact

the after-sales department of our company
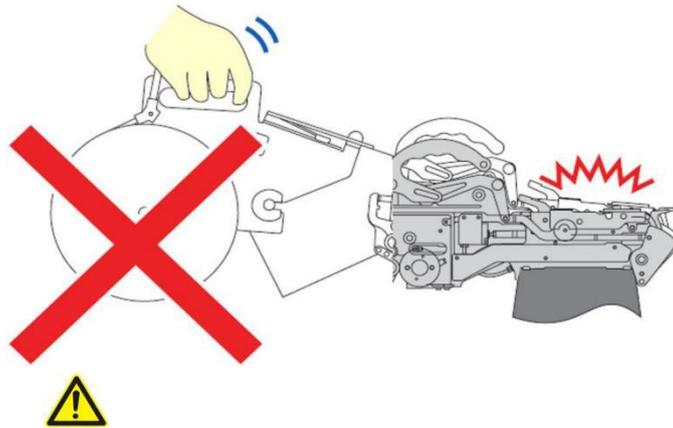
Warning: when installing the feeder on the equipment, make sure there is no foreign matter on

the feeder fixed plate, and make the bottom surface of the feeder fully fit with the fixed plate. The handle is the main way

to lock the feeder, so pls pay attention to protect this part. (Note:Don't move the feeder while the equipment is running,

or it may cause collision problem.)

11.3.1 Nozzle

The size of the nozzle

Please choose nozzles according to the shape and size of components.

Table1-1 Nozzle

Type	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
Model	CN030	CN040	CN065	CN100	CN140	CN220	CN400	CN750
Illustration								
External Diameter	0.6mm	0.8mm	1.0mm	1.8MM	2.0mm	3.6mm	5.0mm	9.0mm
Inner Diameter	0.3mm	0.4mm	0.7mm	1.0MM	1.4mm	2.2mm	4mm	7.5mm

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Type	Special	Special	Special	Special	Special	Special	Special custom
Model	YX01	YX02	YX03	YX04	YX05	YX06	-
Illustration							
Shape							

The reference of nozzles selection

In order to ensure the placement accuracy，please select nozzles according to the shape and size of components

Table 1-2 size comparison of Nozzles

Model	Recommendation（Imperial system）
CN030	0201
CN040	0402（optimal）
CN065	0402、0603 etc.
CN100	0805、diode、1206、1210 etc.
CN140	1206、1210、1812、2010、SOT23、5050, etc.
CN220	SOP series ICs、SOT89、SOT223、SOT252, etc.
CN400	ICs from 5 to 12mm
CN750	ICs bigger than 12mm
YX01	3528serices Soft bead
YX02	High power lamp beads
YX03	Chips and BGA from 11mm to 17mm BGA
YX04	Chips and BGA bigger than 17mm
YX05	4148 circular diode
YX06	3535 ball shape LED(Spherical height 1.4mm,overall height 1.9mm）

12.Maintenance

12.1 Take effective measures to reduce /avoid malfunction

12.1.1 Reinforce daily maintenance

P&P machine is that high-accuracy device which requires a clean working environment with constant temperature and humidity, so it's necessary to have a routine maintenance.

12.1.2 Requirements for operator

● Operator should get a basic operator training, which should cover fully all the skills and knowledge needed to safely operate the type of pick and place machine.

● Operating strictly against equipment's instruction. Don't use machine with problems. Stop the machine once malfunction appears and contact with the after-sales service staff, restart to work after problem solved.

● Operator should be concentrated.

Observation-- to see whether there is abnormal situation, such as peel-box doesn't work, plastic tape is broken etc.

Listening-- whether have strange sound, such as noise from placement head, sound of loss component, strange noise of conveyor etc.

Handwork-- solve some small problems in time, such as install feeder, correction placement position etc. If the main machine body or circuit problem, please consult after-sales staff. Formulate measures to reduce/ avoid big problem.

12.1.3 Formulate the measures to reduce/avoid big problem

The most easily appeared problem during work are placement wrong components and placement misaligned. Supply below measures for ref.

①It needs to check whether the components package is matched with related feeder. If not, please correct them.

②As to tape reel feeder, when ran out of one reel, operator must check whether newly changed tape reel is correct or not.

③After import the SMD file or edit chip list manually, please recheck each components No., nozzle rotation angle and placement position to make sure correct.

④Operator must check the first finished PCB of each file. If any problem, please find solutions such as revise program to solve it.

⑤To check the placement position misaligned or not, component loss problem in regular work. Find reason in time and solve it.

⑥Set pre-welding detection station (manual or AOI)

In sum, P&P machine's running speed and placement accuracy still has limit. Peoples work is important to run machine on its proper role. So, it's necessary to comply with effective measures to keep machine normal work, its placement quality and efficiency.

12.2 Maintenance

Arrange regular inspection and maintenance system.

12.2.1 Daily Inspection

	Items
Items check before power on	①Temperature& Moisture: Temperature 20℃～26℃, humidity 45~70%
	②Indoor environment: Air clean without aggregate air.
	③No clutters within the placement area and keep rails clean.
	④No spots on cameras and keep lens clean.
	⑤No obstacles around the head nozzles
	⑥Checking if nozzles are dirty, distorted; If so, please clean or change the

	nozzle. ⑦Checking if feeders are correctly installed in stacks and confirm no clutters on stack. ⑧Checking the connection of air connector and air hose ⑨Checking air pressure.
Items check after power on	①Checking if the monitor display normally after system start up. ②Checking if emergency button can work normally or not. ③Checking if placement head can move back to the origin. ④Checking if there's abnormal noise while placement head move. ⑤Checking all nozzles vacuum pressure. ⑥Checking if PCB moving on rails smoothly or not; Sensor workable or not. ⑦Checking if the board has been well fixed by magnetic bar and pins.

12.2.2 Monthly Inspection

Items	Detailed Inspection
X/Y axis	Make sure no abnormal noise while placement head moving.
X/Y motor	Make sure X/Y motors no overheating.
Nozzle	Checking if all nozzles are good without bend and nozzle surface is horizontal
Air hose	Checking the connection between air hose and machine, keep sure the hose in good situation without wearing or air leaking.
Step motor	Checking if any dirty on step motor, synchronous belt, Synchronous wheel. Make sure the Z-axis motor can up, down and rotate smoothly.
Z-axis motor	Checking if the placement head can go up and down smoothly. Use your finger to push the nozzle to check if it moves smoothly. Let each nozzle head up and down beyond the normal range.
Vacuum pressure	Checking all nozzles' vacuum pressure. If abnormal, please clean nozzles.
Positive pressure	Checking if the positive pressure normal.
Optical axis	Checking whether it is covered dusk. Please keep it clean and lubricated
Operation button	Checking each button to make sure they are well-worked
Connector	Checking if well-connected the air hose and air connector.
PCB clamp block	check their wear pattern

12.3 Related issues during solder paste printing process

12.3.1 Stencil Printing Technology

Screen printing technology refer to using ready-made stencil, directly connect to the printer in a certain way, make the solder paste evenly flow on the stencil and then leak into the mesh through the holes. When getting the stencil away, solder paste had been covered to the printed circuit board solder graphics, then finish the solder paste printing on the PCB.

12.3.2 Inspecting of solder paste printing

Printing process is one of the key working procedures to ensure the quality of surface mounting. According to the statistics, under the premise of guaranteed quality about components and PCB, correctly PCB design, 70% of the surface quality

problem caused during printing process. In order to ensure the quality of SMT assembly, it is necessary to strictly control the quality of the solder paste printing.

The amount of solder paste printing requirements are as follows:

(1)The using amount of solder paste should be uniform, good consistency. Solder paste graphics should be clear, try to avoid adhesion between adjacent graphics. Solder paste graphics and solder graphics should be consistent.

(2)In general, keep unit area amount of solder paste about 0.8 mg/mm². For fine pitch components, should be 0.5 mg/mm² (using stencil thickness and hole size to control in the actual operation).

(3)Printed on the substrate of solder paste compared with required value, a certain deviation is permissible, the covering area of the solder paste on each solder pad should be more than 75%.

(4)Should be no seriously collapsing problem and edges neatly after solder paste had been printed, the dislocation shouldn't be larger than 0.2 mm, for solder pad of fine pitch components, dislocation shouldn't be larger than 0.1MM, pollution by solder paste is not permitted to the PCB.

Inspection by 2~5 times magnifier or 3~20 times microscope.

12.3.3 The defects of solder paste printing, reasons and solutions

Excellent printing graphics should be uniform in both vertical and horizontal direction, full, clean all round, solder paste fill solder pad. Using above such printing graphics device, after reflow soldering, will get good welding effect then.

Problem	Reason	Issue	Solution
Solder paste graphics dislocation	Holes on the stencil not good match with solder pad; No enough precision of the Printing machine	easily cause bridge connection	Adjust the stencil position; Adjust the printing machine
Solder paste graphics have icicles and dents	Scraper pressure is too large; Rubber scraper hardness is not enough; Holes are too big in the stencil	Solder paste required volume is not enough, easy to appear faulty soldering; solder joint strength is not enough.	Adjust the printing pressure; Use metal scraper; Improved holes designing in the stencil.
Too much solder paste	Holes are too big in the stencil; The gap is too big between stencil and PCB	easily cause bridge connection	Check the holes size in stencil; Adjust the parameters of printing, especially the gap between PCB and stencil
Graphic uneven (have breakpoints)	Holes' wall are not smoothness enough; not wipe residual solder paste in using for many times; Solder paste's thixotropy is bad	Easy cause no enough solder paste, lead to the problem such as faulty soldering.	Wipe the stencil
Contamination of the graphics	Not wipe residual solder paste in stencil after using for many times; Poor quality of solder paste; Shake problem when getting the stencil way	easily cause bridge connection	Wipe and clean stencil; replace solder paste; adjust the machine