

NeoDen N10P

High Speed Pick and Place Machine

User Manual



Model: NeoDen N10P High Speed Pick and Place Machine

Version: V1.0

CONTENTS

1. Precautions Before Using the Machine	1
1.1. Important Notes	3
1.2. Machine Dimension	5
1.3. Working Area Structure	5
1.4. Machine Structure	7
1.5. Operation Flow Chart	8
2. Main Software Interfaces	9
2.1. File List	9
2.2. Application	10
2.2.1. Head Initialization	10
2.2.2. XY Initialization	10
2.2.3. Head Move	11
2.2.4. Warm Up	13
2.2.5. Track Straight Through	14
2.2.6. Nozzle Library	15
2.2.7. Head Home	17
2.2.8. Nozzle Replace Manually	17
2.3. Manual Test	18
2.3.1. Head	18
2.3.2. XY	20
2.3.3. Track	23
2.3.4. Feeder	25
2.3.5. Power	26
2.3.6. IC Camera	27
2.3.7. Fly Camera	28
2.3.8. Fiducial Left Camera	29
2.3.9. Fiducial Right Camera	30
2.4. System Setup	31
3. Programming Procedures	32
3.1. Programming Interfaces	32
3.1.1. PCB	33
3.1.2. Component	40
3.1.3. Feeder	47
3.1.4. Place Sequence	53
3.2. Nozzle Information	59
3.3. Programming of "Import coordinate file"	61
3.4. Programming Manually	62
3.5. Long LED Board Programming Guide	63
4. Mounting Interface	65
5. First Trial and Test	70
5.1. Program First Dry Run	70
5.2. First Production Test	70
5.3. Component Inspection	70

5.4. Continuous SMT Production	71
6. System Setup	72
7. Analysis of Common Problems	78
8. Maintenance	80
8.1. Take effective measures to reduce /avoid malfunction	80
8.1.1. Reinforce daily maintenance	80
8.1.2. Requirements for operator	80
8.1.3. Formulate the measures to reduce/avoid big problem	80
8.2. Device Maintenance	81
8.2.1. Daily Inspection	81
8.2.2. Monthly Inspection	82
8.2.3. Maintenance of Screw Rods and Guide Rails	83
8.3. Cleaning and greasing of X-axis screw rods and guide rails (monthly)	83
8.4. Cleaning and greasing of Y-axis screw rods and guide rails (monthly)	85
8.5. Maintenance on Screw Rods and Linear Rails	86

We sincerely thank you for choosing NeoDen SMT machine. This machine is designed and used according to the following purpose: pick and place electric components on PCB. Please do not use this machine for other purposes.

1. Precautions Before Using the Machine



Notice to Users:

Before operating this equipment, please read this manual and understand its contents. Please keep this manual close to the equipment for reference when needed.

Persons who have not been trained on this equipment should not use this equipment.

Please turn off the power switch when inspecting the equipment, replacing or repairing parts, and performing internal settings.

The repair and maintenance work not mentioned in this manual should be carried out by the maintenance engineer recognized by the company. Customers are not allowed to perform this operation based on their own judgment, otherwise accidents may result.

It is forbidden for two or more people to operate the same machine at the same time, and it is strictly forbidden for someone to operate while putting their head or hands into the machine.



Transport Aid Fixation Removal:

In order to prevent the equipment from being damaged due to shaking of parts during transportation, we add auxiliary fixations below the machine to prevent the parts from shaking (as shown in the figure below A-B). These auxiliary fixations need to be manually removed before the equipment is powered on. If they are omitted, there may be hidden dangers of poor operation and the possibility of damage.



Remove the Rust-proof Protective Film:

In order to prevent rust caused by environmental impact during transportation, we pasted a protective film in the following parts of the machine as protection (as shown in the figure below). This protective film needs to be manually removed before the machine is powered on. If there is any omission, it may cause hidden trouble in operation and damage.



Figure A: Auxiliary fixing tie

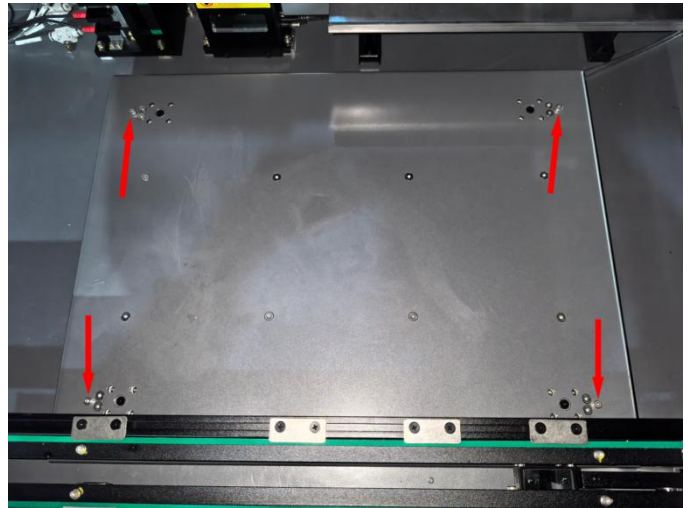


Figure B: Auxiliary fixing screw

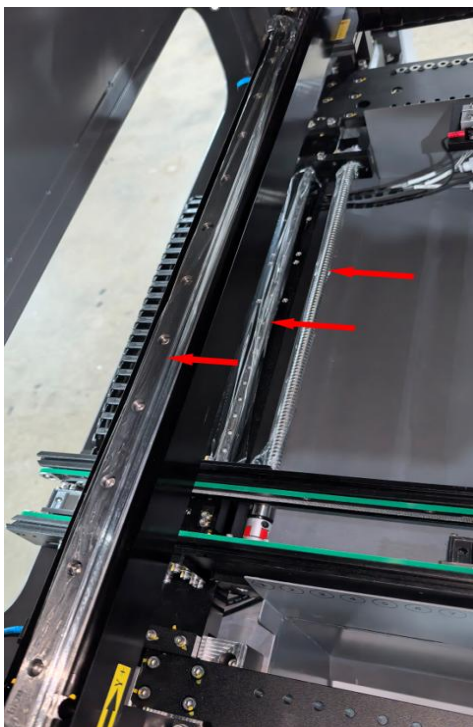


Figure C: The left side Y axis rail and track width adjustment lead screw rail protective film

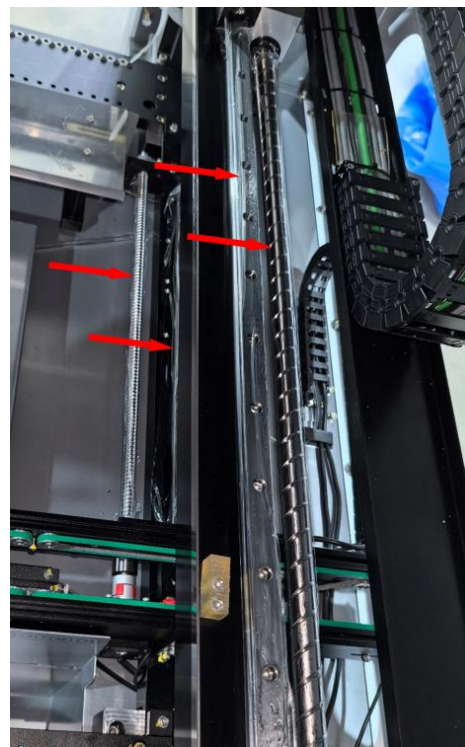


Figure D: The right side Y axis rail and track width adjustment lead screw rail protective film

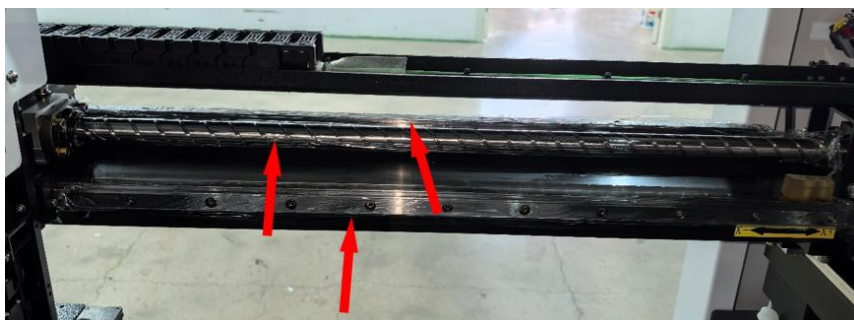


Figure E: The protective film for the X-axis lead screw guide

1.1. Important Notes



Warning of failure risk of camera identification, refer to Figure 3 and Figure 4: the following parts are forbidden to touch or strike.

◆Left fiducial camera ❖ Right fiducial camera ◆Flying Camera ☒IC camera



Warning of accuracy failure risk, refer to Figure 4:Keep magnetic materials away from the magnetic scale

☒X axis magnetic scale ☒Y axis magnetic scale



Warning of electric shock risk,be sure to follow the requirements below:

- 1.Connect to the input power supply that meets the requirements of the machine, the electrical interface of the machine to the ground must be effectively grounded.
- 2.Any time you enter the case or repair the placement head, you need to shut down the machine and cut off the power supply.



Equipment life reduction risk reminder, be sure to follow the following requirements:

When installing the equipment, the equipment must be leveled,
Proper shutdown: first close the operating software and shut down the system before turning off the main power switch



Figure F: Oil-water separator

Figure F: Oil-water separator

The air supply shall not be less than 0.6MP

Note: When adjusting the pressure, please pull up and then rotate the knob before turning it, and press down the knob for positioning. When adjusting the pressure, it should be adjusted to the required pressure value gradually and evenly, and should not be adjusted in one step.

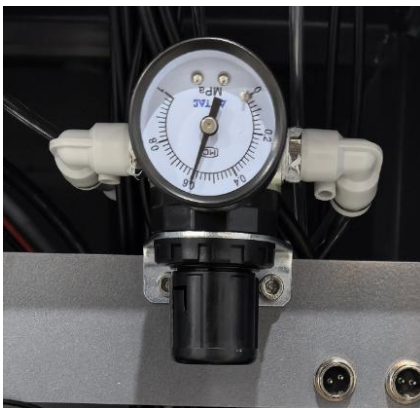


Figure G: Feeder pressure 0.6MP

Figure G: Feeder pressure 0.6MP

Note: When adjusting the pressure, please pull up and then rotate the knob before turning it, and press down the knob for positioning. When adjusting the pressure, it should be adjusted to the required pressure value gradually and evenly, and should not be adjusted in one step.



Figure H: Mounting head pressure 0.55MP

Figure H: mounting head pressure 0.55MP

Note: When adjusting the pressure, please pull up and then rotate the knob before turning it, and press down the knob for positioning. When adjusting the pressure, it should be adjusted to the required pressure value gradually and evenly, and should not be adjusted in one step.

The air supply shall not be less than 0.6MP

Note: when the pressure input is 0.6MPA, the air flow is 37L/min.It is recommended that users use a compressed air storage tank of no less than 70L.

1.2. Machine Dimension

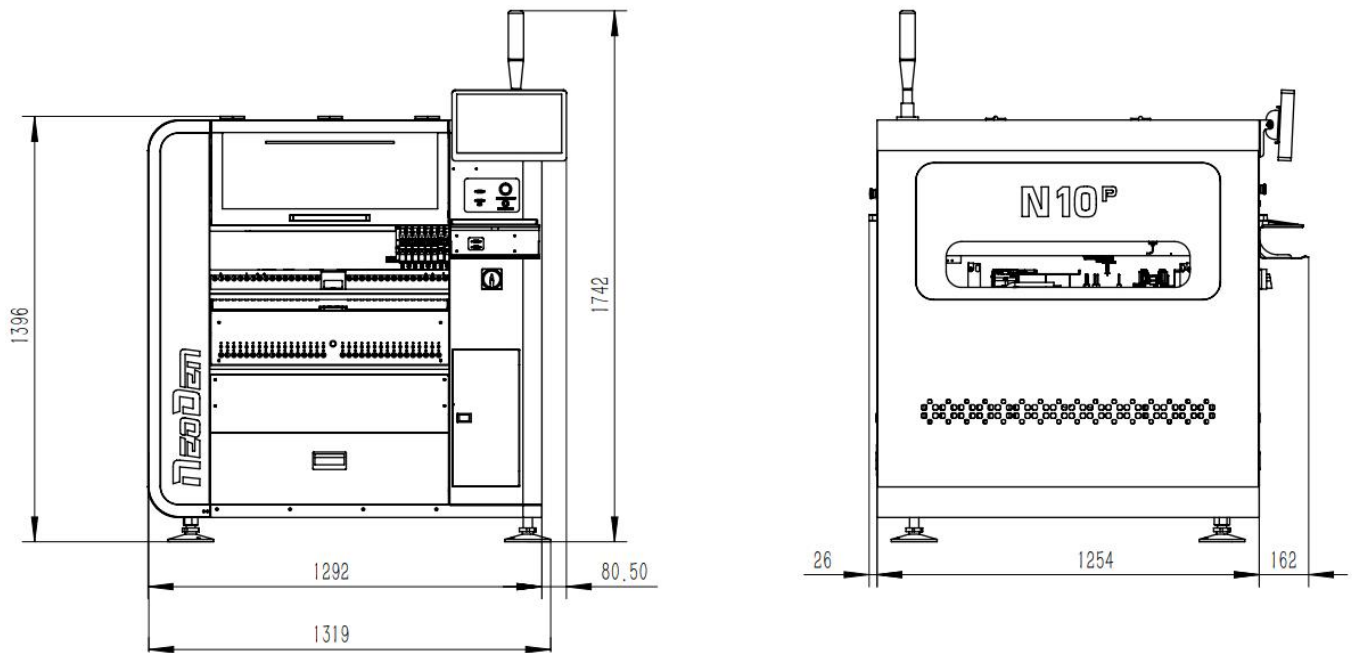


Figure 1: Machine dimension

1.3. Working Area Structure

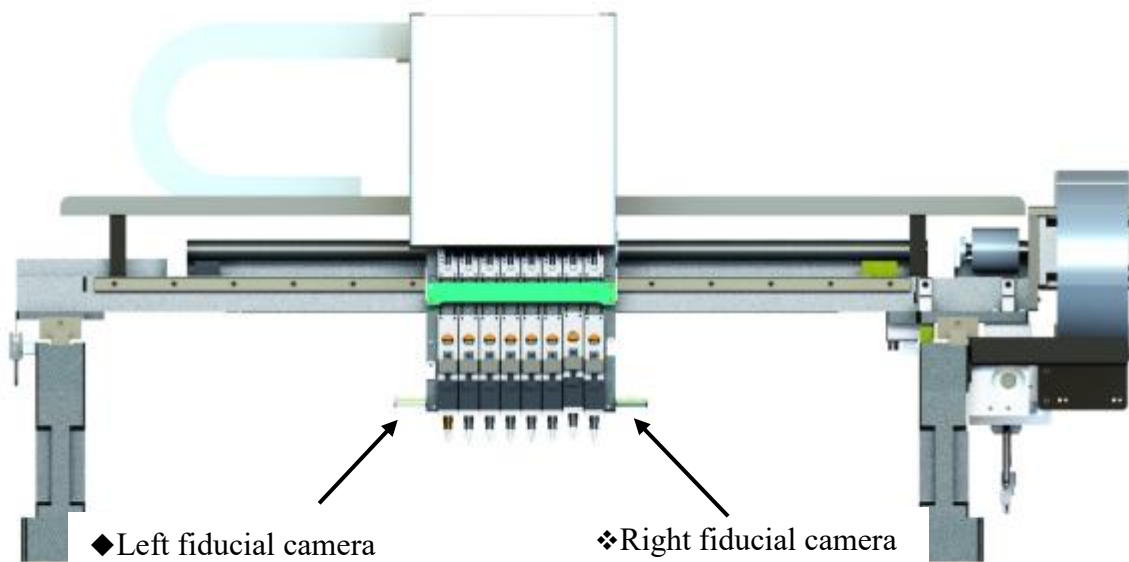


Figure 2: Main placement head cameras

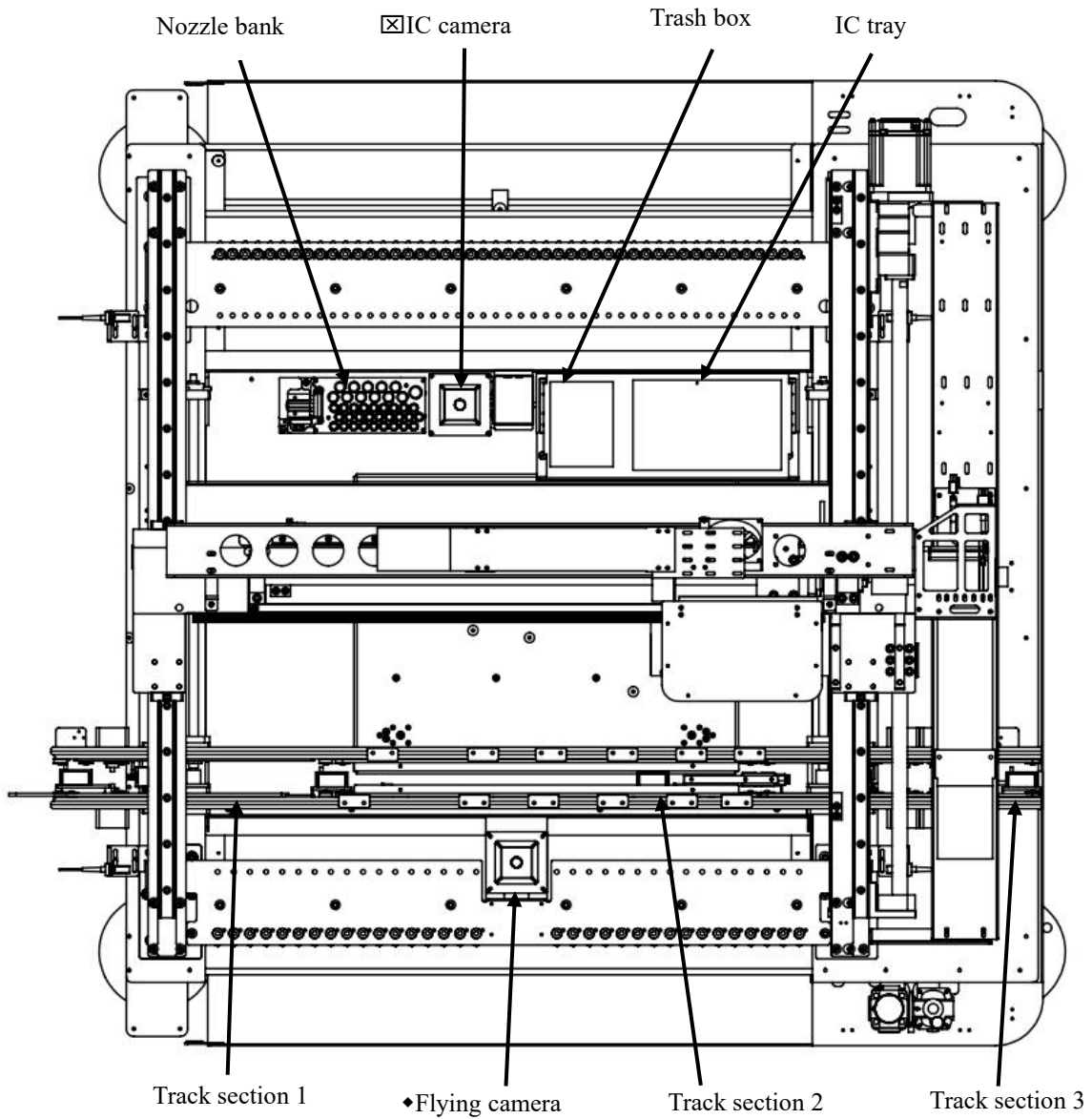


Figure 3: Top view of main mounting area

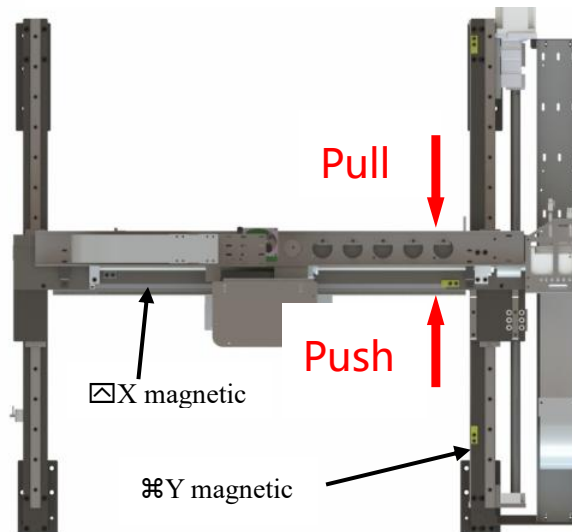


Figure 4: X axis beam (pull and push at the moving force point as above picture)

1.4. Machine Structure

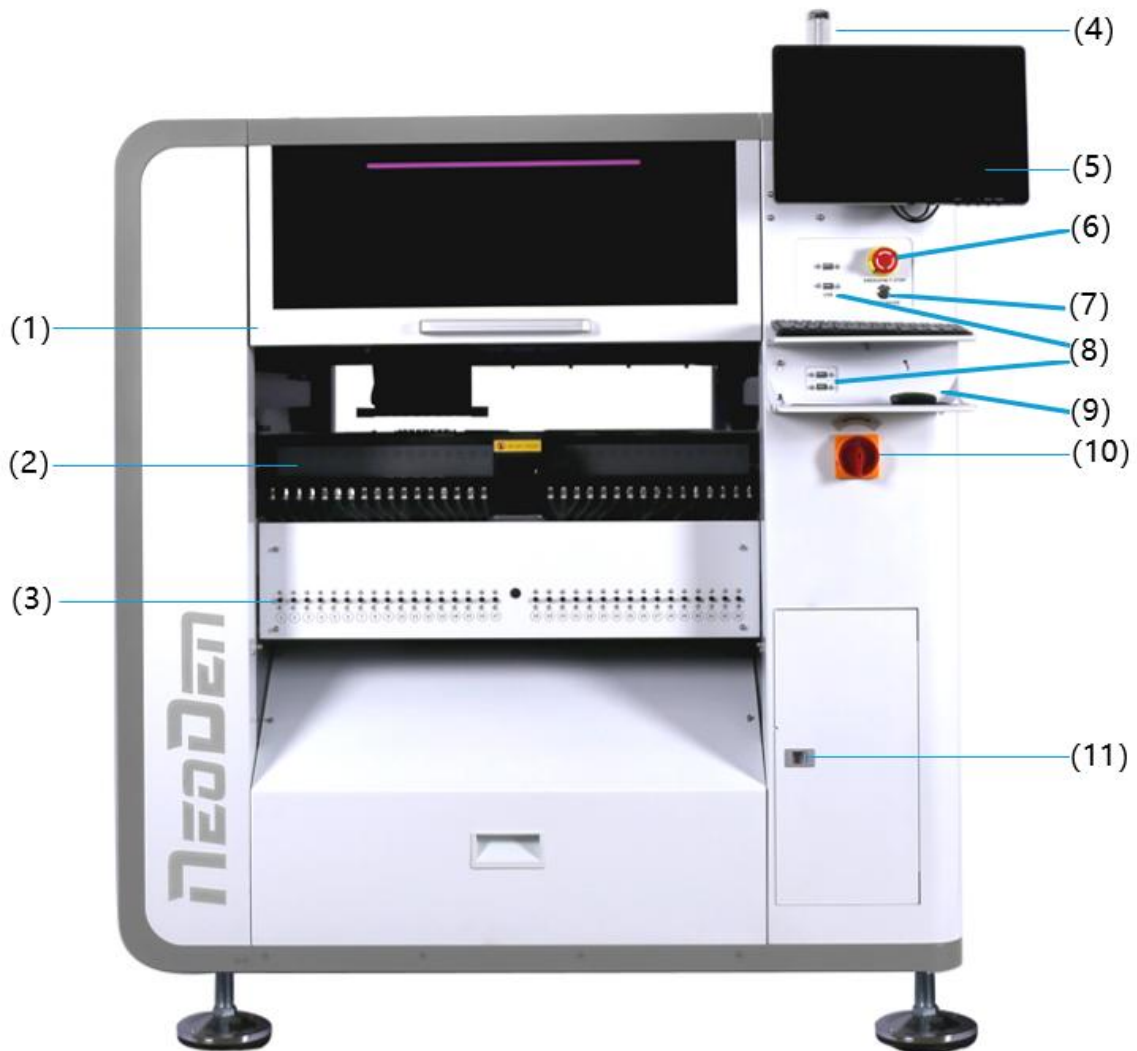
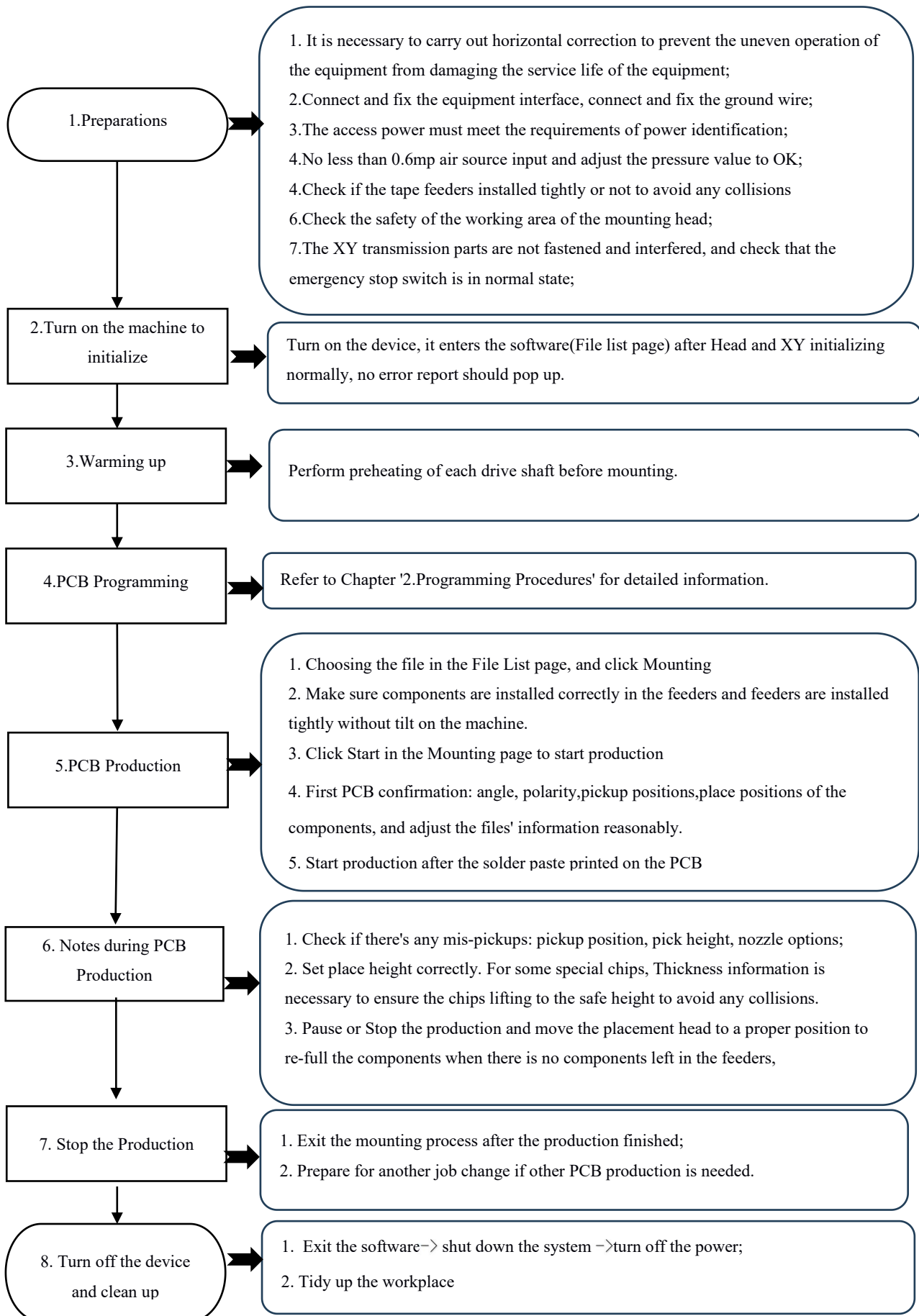


Figure 1: Ports and Appearance

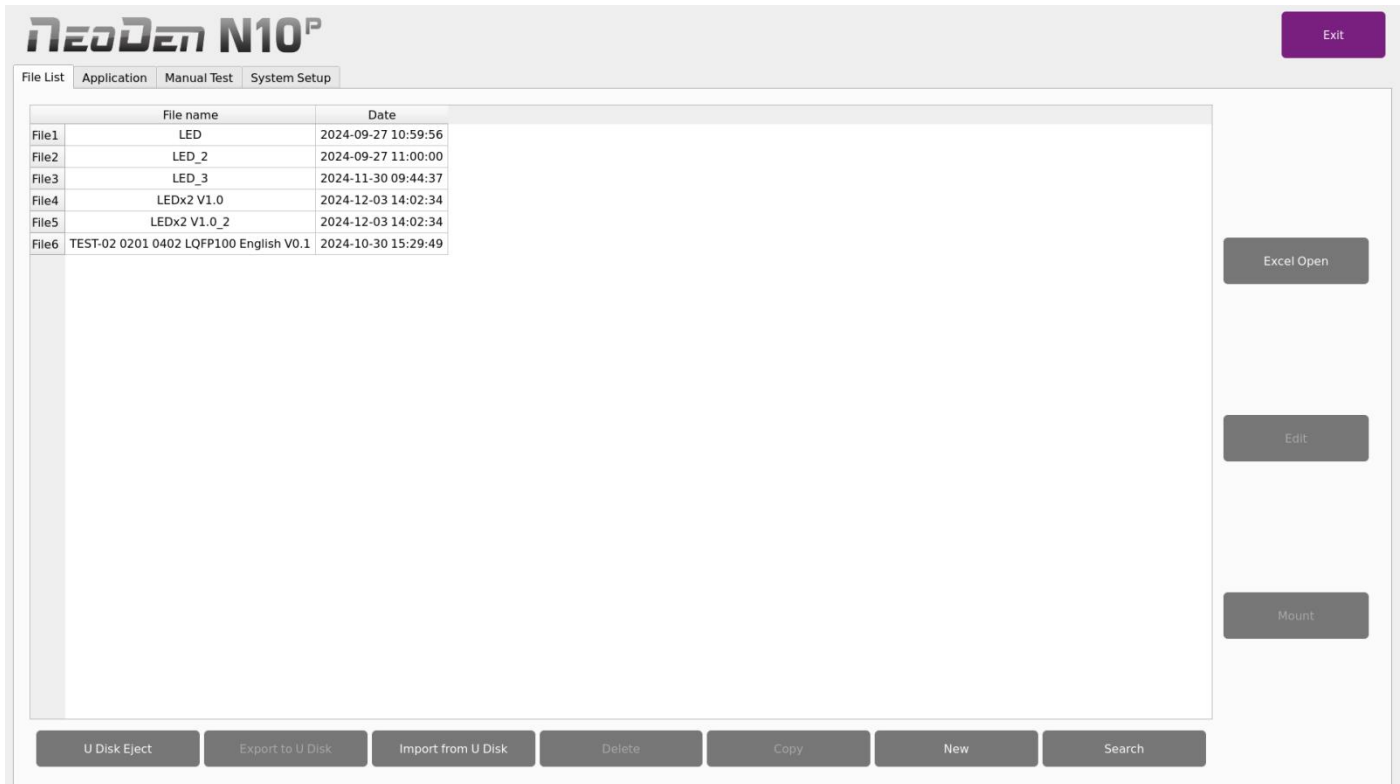
- | | |
|--|----------------------------|
| (1) Safety cover | (6) Emergency button |
| (2) Front Feeder Slots 1-33 (Reference value) | (7) Pause button |
| (3) Electric Feeder Port | (8) USB port |
| (4) Warning Light (Triple Color) | (9) Mouse keyboard bracket |
| (5) Display | (10) Power Switch |
| (11) Front cover for oil-water separator, feeder air pressure regulator, front and rear conveyor ports | |

1.5. Operation Flow Chart



2. Main Software Interfaces

2.1. File List



- (1) **Excel Open:**the file can be modified directly in the Excel, simplifying the programming operation.
- (2) **Edit:**elect a file and click Edit to enter the corresponding editing interface.
- (3) **Mount:**after editing the file, select the file and click processing to mount.
- (4) **U Disk Eject:** Eject the U disk safely.
- (5) **Export to U Disk:** Insert the U-disk to the machine, select the file to be exported, then click Export to U Disk; a small window will pop up after the file exported successfully. Please click U Disk Eject, the export will be considered successful only after after the USB stick ejects the success window. If an export file with the same name exists on this USB, you will be prompted to overwrite it.
- (6) **Import from U Disk:** For files that have been edited offline, they can be imported directly from the U-disk for mounting. After connecting the U-disk, click Import from U-disk, select the corresponding file in the file directory in the new window, click Confirm, and when the file list interface displays the imported file, it means the operation is successful.
- (7) **Delete:** select the file that you do not need, and click delete.

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

(9) **New:**click New to open the input window, input the file name, and click OK. At this time, when the file list interface displays new files, the operation is successful.

(10) **Search:** Search for one time can only find the most recent file containing the keyword; if the target file can't be found, please continue to click the 'Search' button, the software will remember the last search for the keyword filled in, click the 'OK' button, you can find the next one.

2.2. Application



2.2.1. Head Initialization

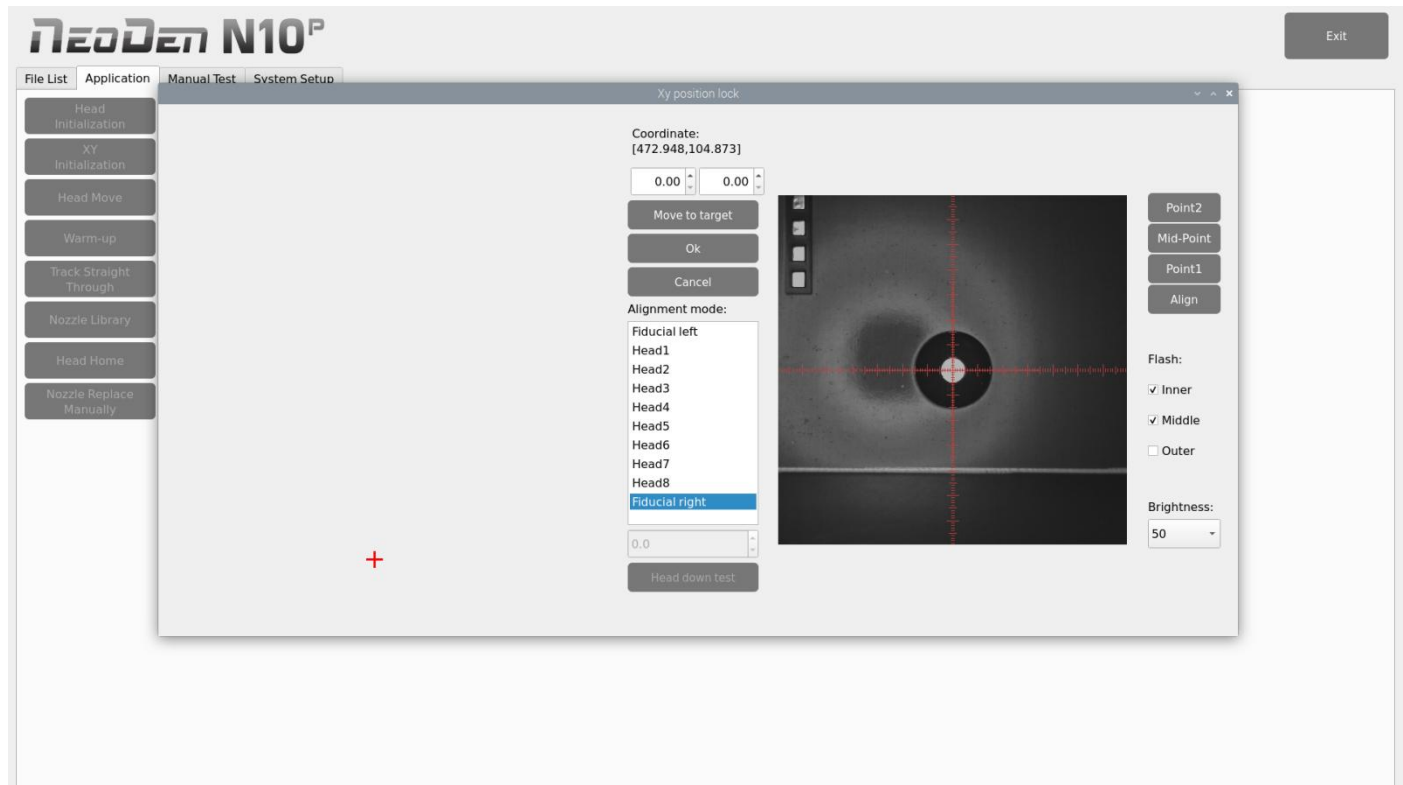
To initialize the eight heads.

2.2.2.XY Initialization

To initialize the XY axis.

2.2.3.Head Move

It's to move to the specified position or get the current coordinates. Click Head Move to enter the following interface, the left interface use the cross to select the position of the move, the mounting head will move with it.



- (1) **Coordinates:**The value of the machine coordinates to which the current cross is aligned.
- (2) **Move to target:**Select alignment mode as Head1, enter the XY coordinates in the input box, and tap the Move to target button.
- (3) **OK:**Within the lock screen, after selecting the centre position, click OK to save the data and exit.
- (4) **Cancel:**exit the current operation.
- (5) **Alignment mode:**Including Fiducial left camera, Fiducial right camera, Head 1-8, according to the actual situation to choose the alignment mode, the image on the right side for the Fiducial cameras alignment of the image presented.

Note: Some operations may be based on the Head1 to find the position, the operation at this time you can first use the camera to focus, find the centre of the target position, and then click on the Head1, and then save the position.

- (6) **Head down test:**This function allows you to measure the pick height or the place height. This function is greyed out and cannot be operated when Fiducial Left/Right Camera is selected as the alignment method.

It turns black and operable when selecting alignment mode Head1-8.

How to measure pick height: lock a proper position firstly, select a certain head,input a certain height value in the box, and then click on the **Head down test** to measure the height of the component and check if it's the correct value to pick up this component. The value in the input box is the pick height.

(Note: when testing the pick height of the component in the tape feeder, the tape feeder will not be automatically opened, you can choose to press the edge of the film above the piece of component to measure)

How to measure place height: Put one PCB on the 2nd section track mounting area and click PCB Raise to fix the PCB tightly, then pick up a component to place on the PCB board; after locking the position of the components, click to Alignment mode Head 1 (nozzle should be installed), enter the value in the input box (you can first enter a positive value), click on **Head down test**, do not let go of the mouse, you can see the current head down in which position, and then adjust the input value to avoid it too high or too low. We suggest roughly adjusted at the first tries and then fine-tuned to see what value can be adjusted to just pressure to the components, remember this value, the general place height can be subtract 0.2 from the measured value. (for example, the place height is measured as 1, then actual place height should be set as 0.8 or so) .

(7) **Point1/Point2/Mid-point:** This operation is used to select the centre position of some bigger components. for example: Alignment mode selection 'Fudicial left camera', first select the centre of the first pin of the lower left foot of the chip, click on the 'point 1', and then select the centre of the upper right foot relative to the left 1, click on the 'point 2', and then click on the 'mid- point', the machine will automatically find the center position of the component.

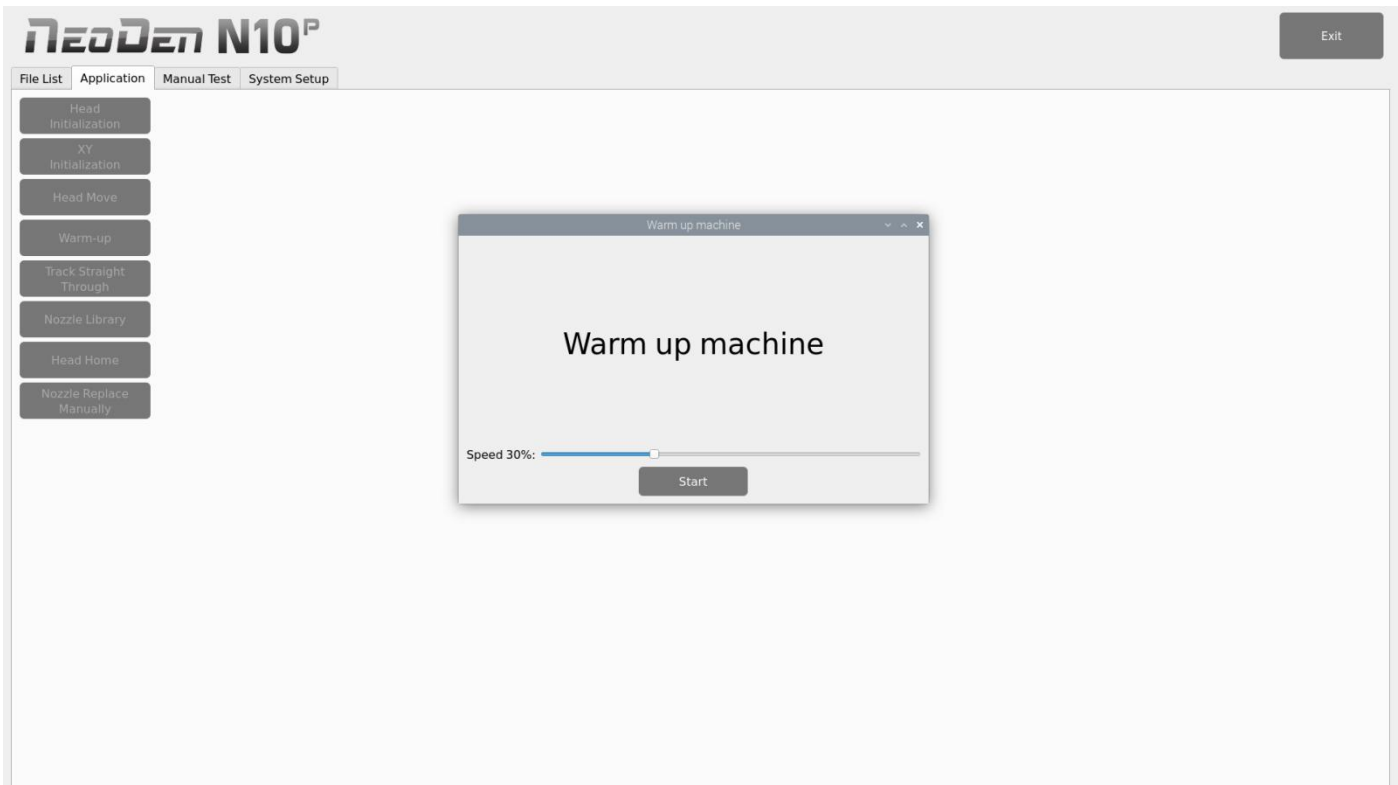
(8) **Align:**it's to align the round fiducials automatically within the field of view

(9) **Flash:**To choose different flash combination according to different types of PCBs.

(10) **Brightness:**The Brightness to recognize the component,which can be adjusted in the drop-down list.

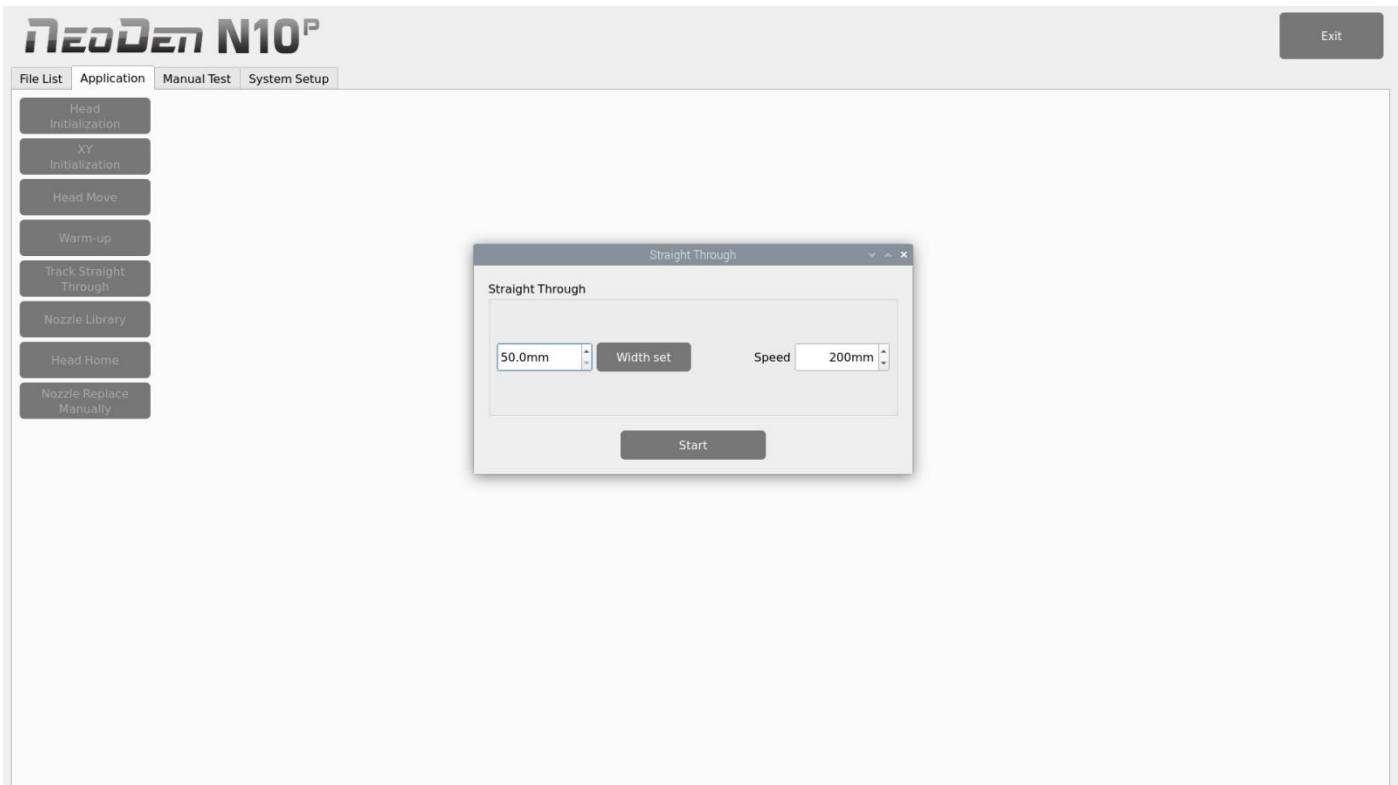
2.2.4. Warm Up

It's to preheats the drive axes after powering on. Select the speed, click the 'Start' button to start warming up the machine and timing, it will stop warming up after 10 minutes; or you could click the 'Stop' button to stop warming up the machine voluntarily. We suggest to do a machine warming up if a long time no using.



2.2.5.Track Straight Through

The following dialogue box is displayed when you select the 'Track Straight Through' submenu, indicating that the PCB is in the 'Pass' state. If the mounting head is on the top of the mounting track, it may affect the inductive sensor of the PCB, so please move the mounting head away from the top of the track firstly and then execute this command.



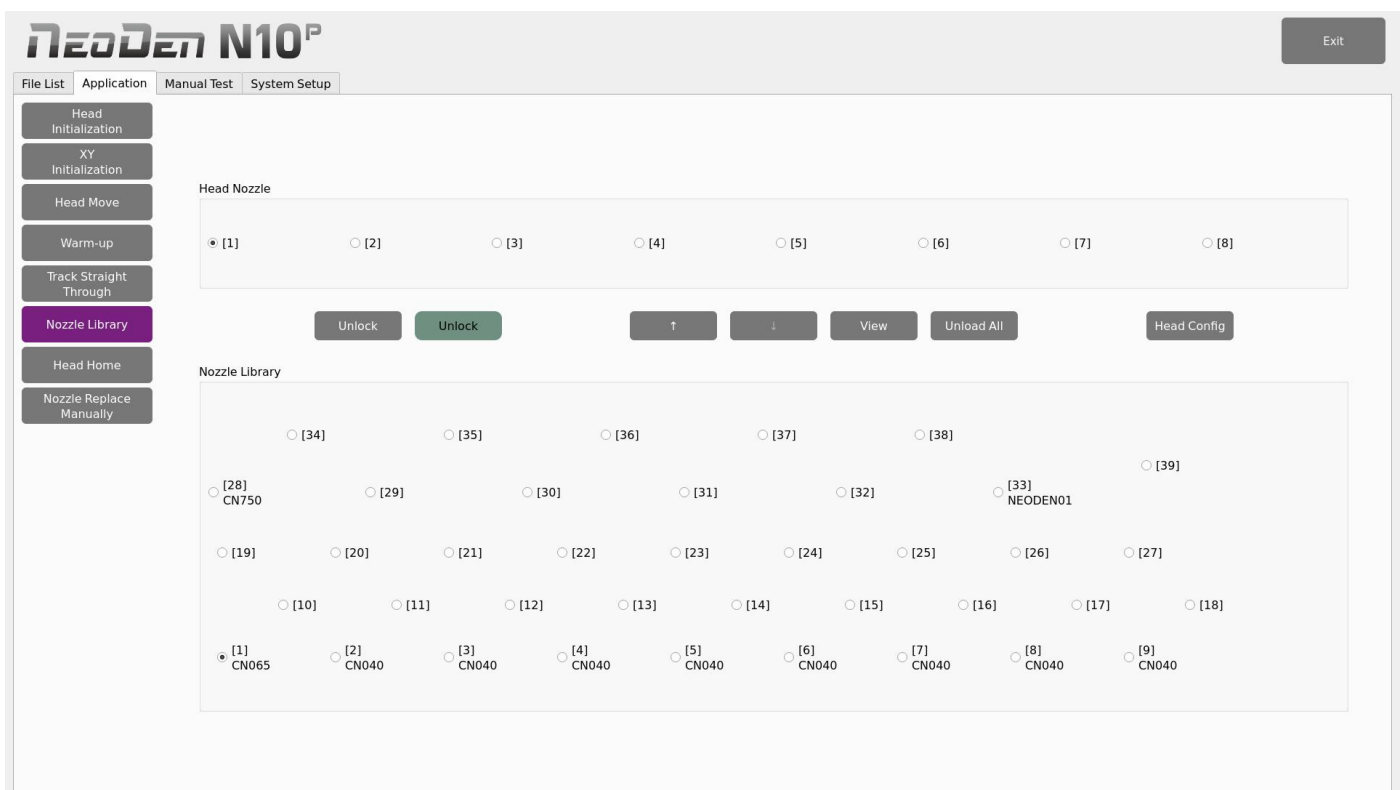
Adjust the track width, select the desired speed, tap the 'Start' button to enter the track straight-through mode; the start button changes to the close button, tap the 'Close' button to exit the track straight-through mode.

2.2.6.Nozzle Library



When making manual changes, if the nozzles recorded in the software and the actual equipment nozzles do not match, the nozzles on the head and the nozzles in the nozzle bank will collide when the software automatically changes the nozzles. When manually changing the nozzles on the device, **be sure to modify the nozzles recorded by the software so that the actual nozzles on the device are consistent with the nozzles recorded by the software.**

The following dialogue box is displayed when the 'Nozzle Library' sub menu is selected.



(1) **Head Nozzle:** The software records the assembly of nozzles on heads 1-8, and the interface information is automatically updated after the device performs automatic nozzle replacement. After manually change the nozzles on the head top, you need to select the corresponding nozzle type. In the drop down box, the space indicates that the head is empty, NEODEN01 for the Referencial nozzle, CNXXX for the standard nozzle; Small/Medium/Costom series nozzles can be user-defined nozzles, Small series nozzles are in the small size holes on the nozzle station, Mediu series in the medium-sized holes, Custom series can not be in the library of nozzles.

(2) **Nozzle Library:** The software records the assembly of nozzles in nozzle positions 1-39. When the

device performs automatic nozzle change, the interface information is automatically updated. After clicking the 'Unlock' button, manually remove or insert the nozzle by selecting the corresponding heads and scrolling down to select the nozzle type.

According to the size of the nozzle holes, 1-39 holes can be divided into three categories,


1-27 for the **small size holes**, and suit for CN020, CN030, CN040, CN065, CN100, CN110, CN140, CN220, CN400 and other Small series nozzles that user-defined;


28-38 for the **medium-sized holes** in the library, of which the 33rd library software settings can only be placed the Referencial nozzle NEODEN01, the other libraries can be placed in CN400N, CN750, and Mediu series of user-defined nozzles;

No.39 for **large-sized holes** in the library which can be put CN1100.

(3) **Unlock** :The white text is the nozzle bank unlock/lock button, click to unlock, click again to lock.

Lock: The black text is status feedback button, the green background indicates that the nozzle bank is locked, and the yellow background indicates that the nozzle bank is unlocked.

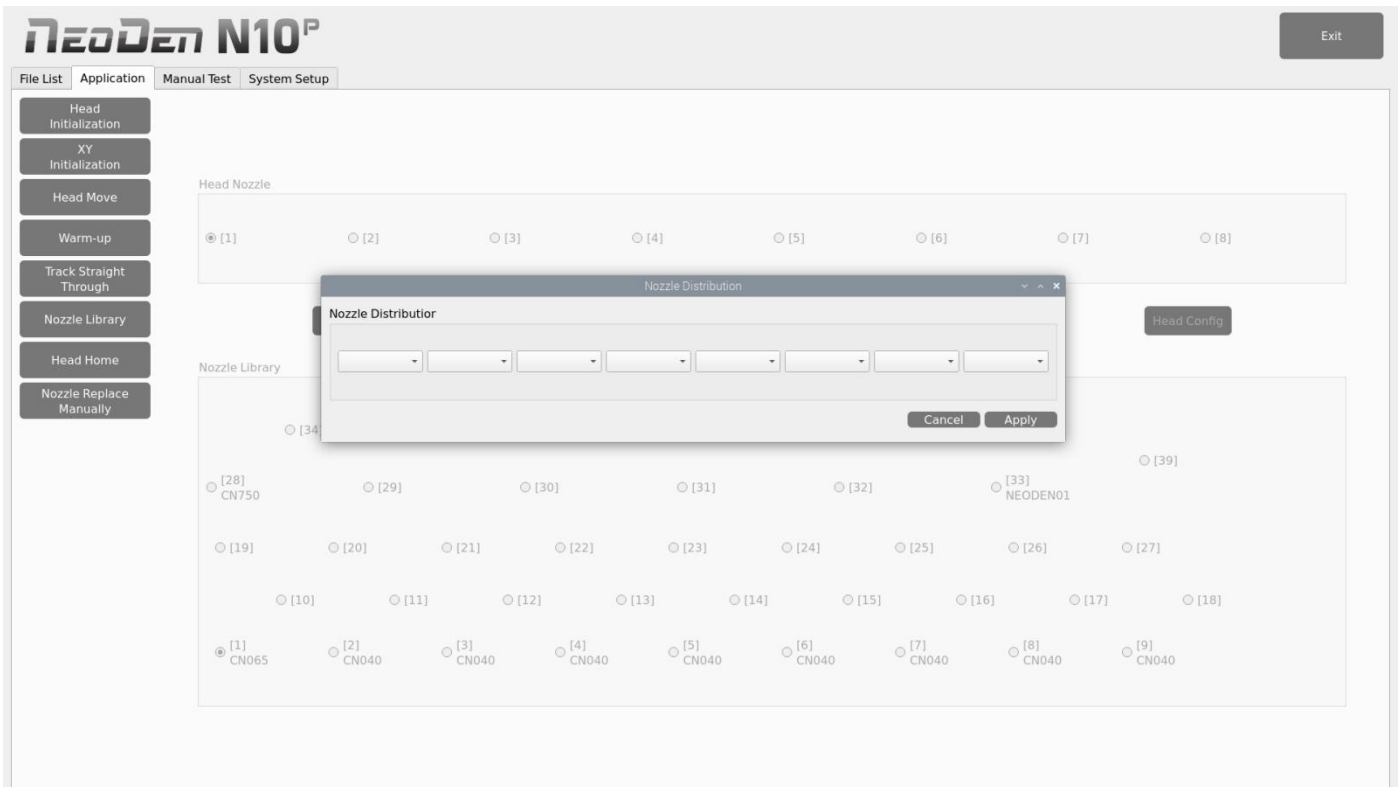
(4)  Nozzle **pickup** button. First, select the head of the nozzle you want to pick up, then select the position corresponding to the nozzle you want to pick up, and then click the Pick Up Nozzle button, and the device will automatically perform the nozzle picking action.

(5)  Nozzle **release** button. First, select the head to be put on the nozzle, and then select the bank corresponding to the nozzle to be put on, if the size of the bank does not match with the nozzle to be put on, the arrow will be shifted to grey and can't execute the action of releasing the nozzle, click on the button of releasing the nozzle, and the device will automatically execute the action of releasing the nozzle.

(6) **View**: Use the Fiducial camera to view the nozzle bank. Select the bank you want to view, click the View button, and the camera will move the corresponding bank and take a picture.

(7) **Unload all**:unload all the nozzles on the Heads into the nozzle bank, click this button and the device will automatically unload all the nozzles on the Head into the matching bank.

(8) **Head Config**:Automatically change the nozzles on the head in batch. The following dialogue box is displayed when you click on the 'Head Config' submenu.



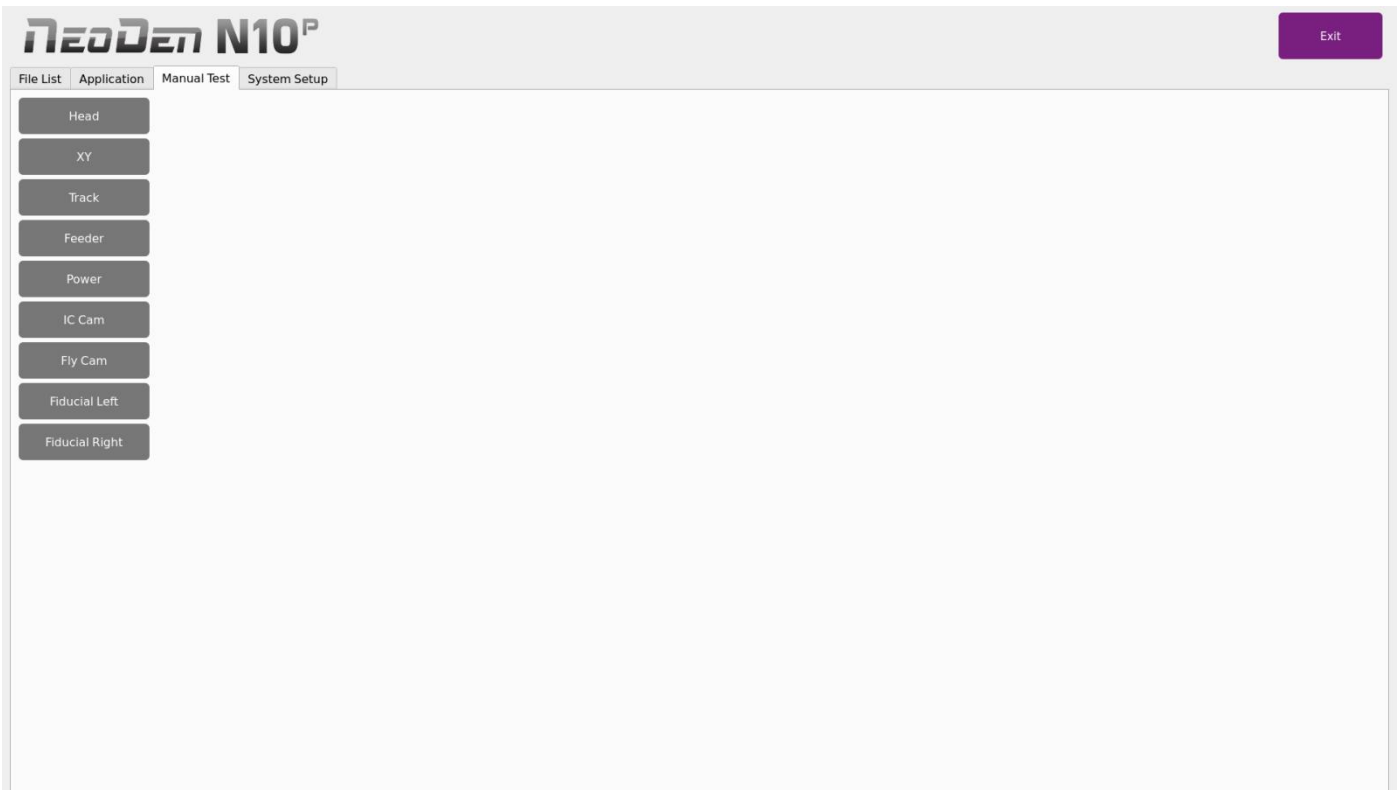
2.2.7. Head Home

The head moves to the head rest area, a position that can be changed in the factory settings.

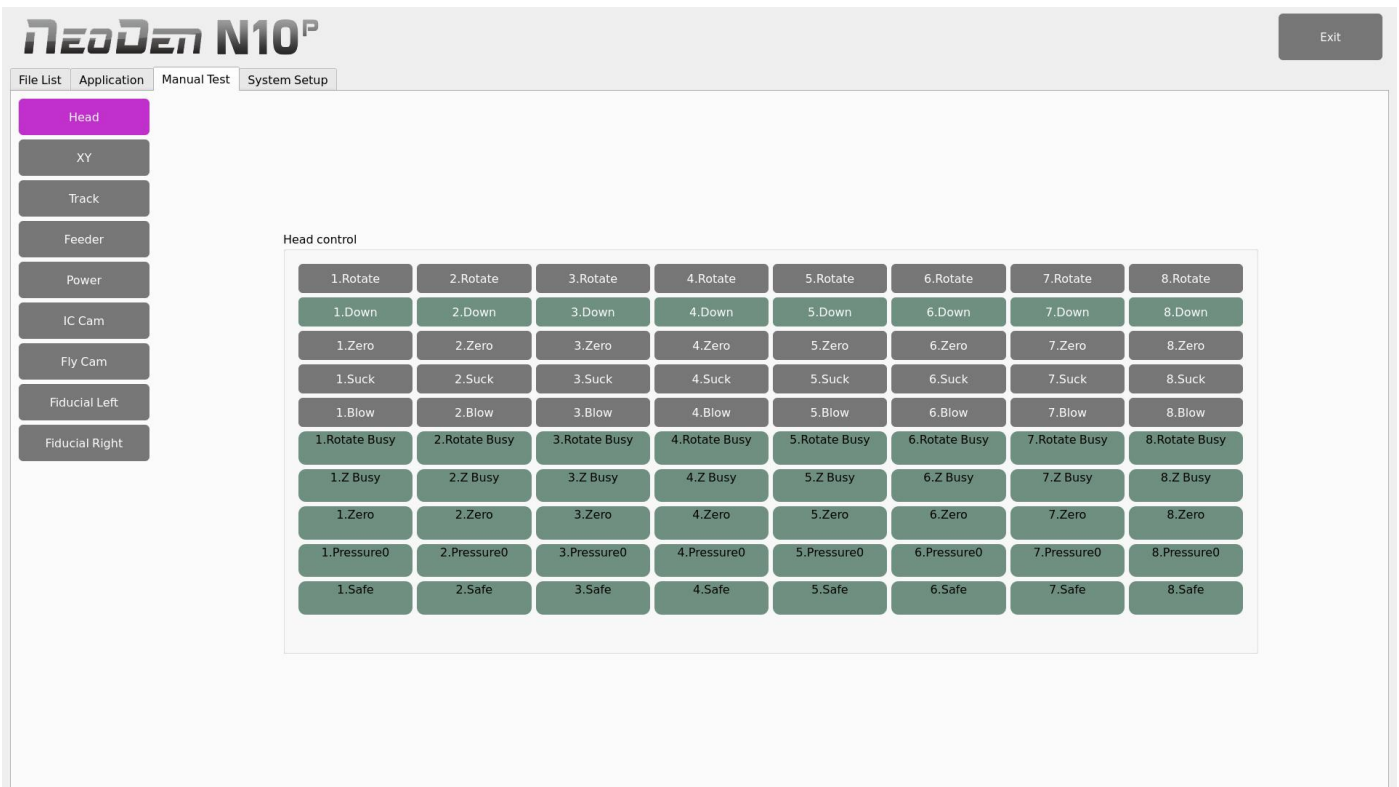
2.2.8. Nozzle Replace Manually

The head moves to an area where it is easy to change the nozzle manually, a position that can be changed in the factory settings.

2.3. Manual Test



2.3.1.Head



Test and status feedback for the functionality associated with heads 1-8. The white text are test buttons and the black text are status feedback buttons.

Take Head1 as an example

Click the '1. Rotate' button, the No.1 head will rotate, during the rotation process the status feedback '1.A Rotate Busy' turns red to indicate that the rotary motor is rotating.

Click '1.Suck' button, No.1 head will keep suction state, status feedback '1. Pressure' will show the No.1 head air pressure value, blocking the No.1 head air pressure value is less than -80, it means that the No.1 head suction function is normal. Click the '1. Suck' ' button again, the No. 1 head will close the suction.

When you click on the '1. Blow' button, the No.1 head will blow briefly and then switch off suction.

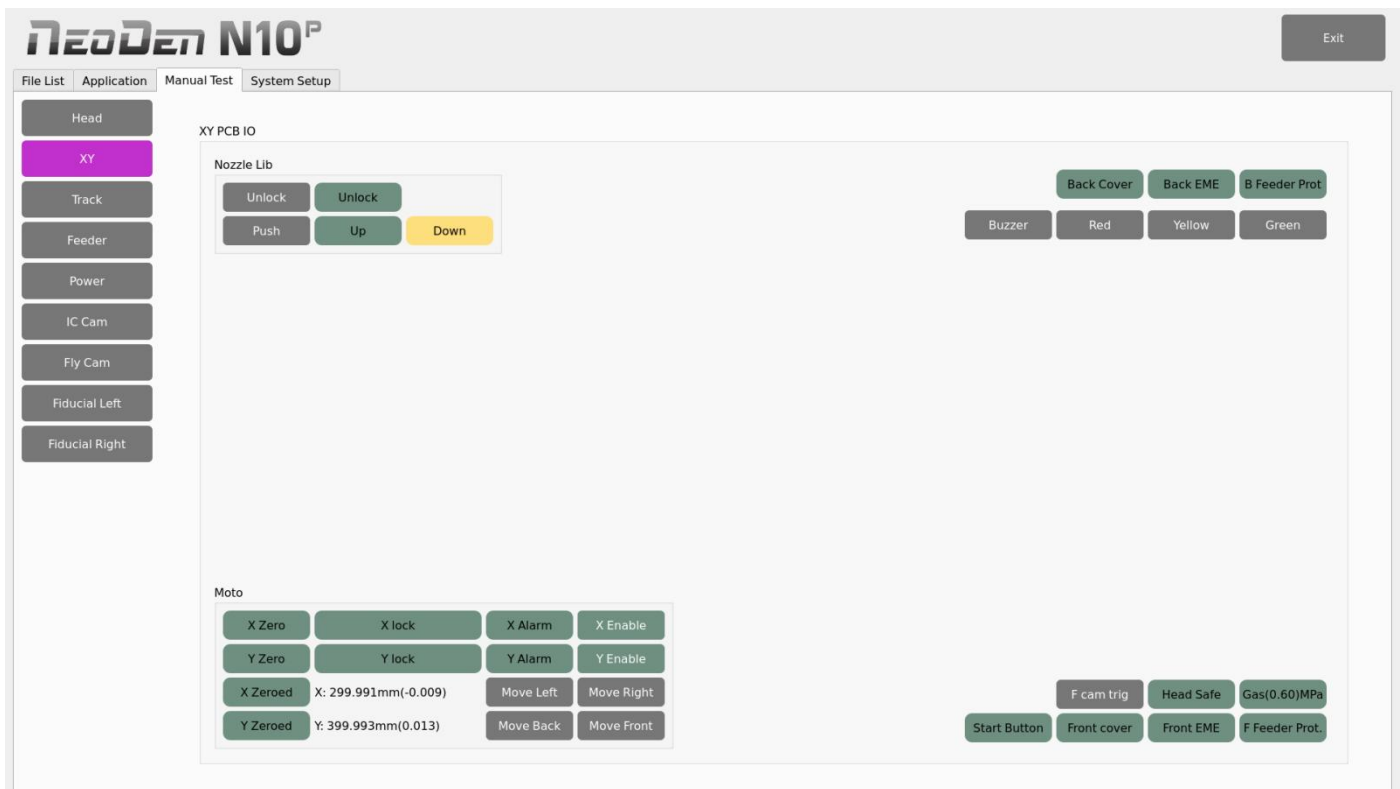
Click the '1.Down' button, the No.1 head will first lower down and then rise, and the status feedback '1.Z Busy' turns red during the movement to indicate that the Z-axis motor is running.

Click the '1.Zero' button, and the No.1 head performs Z-axis zero return.

Status feedback '1. Safe', when the height of the No.1 head is not in the safe range, it will show red, indicating unsafe.

Status feedback '1. Return to zero', when the Z-axis of the No.1 head has not returned to zero, it will display red, indicating that it has not returned to zero.

2.3.2.XY



Test and status feedback of XY control board related functions. The white text are test buttons and the black text are status feedback buttons.

XY PCB Information:

Click on the 'Unlock' button to test the unlocking and locking function of the Nozzle Lib. The green background of the status feedback 'Unlocked' indicates that the nozzle bank is locked, and the yellow background indicates that the nozzle bank is unlocked. Note that when the nozzle bank is not locked, the nozzle bank is not allowed to rise and fall; this is to prevent the nozzle from being ejected from the bank.

Tap and hold the 'Push' button to raise the nozzle bank, release the 'Push' button to lower the nozzle bank. Status feedback 'up' green background indicates that the upper limit sensor of the nozzle bank has not been triggered, red background indicates that the upper limit sensor of the nozzle bank has been triggered, the number in parentheses indicates the elapsed time in milliseconds during the rising process of the nozzle. The 'down' green background indicates that the lower limit sensor of the nozzle bank has not been triggered, the yellow background indicates that the lower limit sensor of the nozzle bank has been triggered, and the number in parentheses indicates the elapsed time in milliseconds during the nozzle descent. Note that when the lower limit sensor of the nozzle bank is not triggered, the XY axis is not allowed to move to prevent collision between the mounting head and the nozzle bank.

Click on the 'Buzzer', 'Red', 'Yellow' and 'Green' buttons to test the tri-colour lights.

Status feedback 'Back cover', green background indicates that the rear cover door is closed, yellow background indicates that the rear cover door is open.

Status feedback 'back Emergency', green background indicates that the rear emergency stop is not pressed, red background indicates that the rear emergency stop is pressed.

Status feedback 'Back Feeder Protection', a green background indicates that the rear feeder is not cocked, a red background indicates that the rear feeder is cocked or there is some other foreign object blocking the sensor.

State feedback motor 'X zero', 'Y zero', respectively, feedback corresponding to the axis of the return to zero photoelectric sensor is triggered or not, the green background indicates that the sensor is not triggered, the yellow background indicates that the sensor is triggered.

Status feedback motor 'X lock', 'Y lock', respectively, feedback corresponding to the axis drive output lock signal, the green background indicates that the drive output signal is locked, the yellow background indicates that the drive output signal is not locked.

Status feedback motor 'X alarm', 'Y alarm', respectively, feedback corresponding to the axis drive output alarm signal, the green background indicates that the drive output signal no alarm, the red background indicates that the drive output signal has alarm.

Tap and hold the 'X enable' and 'Y enable' buttons to disable the corresponding axis driver, and release the 'X enable' and 'Y enable' buttons to enable the corresponding axis driver. Release the 'X-enable' and 'Y-enable' buttons to enable the corresponding axis driver. Note that the corresponding axis can be pushed when the driver is de-energised, and there is a risk that the corresponding axis will hit the boundary when it is moved, so you need to do the 'coordinate initialization in the application program before the movement.

The status feedback motors 'X Zeroed' and 'Y Zeroed' provide feedback on whether the corresponding axes have been initialized or not, with a green background indicating that the corresponding axes have been initialized and a red background indicating that the corresponding axes have not been initialized.

The status feedback motors 'Position X:' and 'Position Y:', respectively, indicate the position in millimetres acquired by the magnetic encoder of the corresponding axis; the difference between the target position of the corresponding axis and the position of the magnetic encoder feedback is shown in parentheses.

Click 'X move Left', 'X move Right', 'Y move Back', 'Y move Front' buttons to test the XY axis moving

function.

When you click on the 'F Cam trig' button, the flash of the flying camera will flash, which means that the external trigger of the flying camera is normal, otherwise, it is abnormal.

The status feedback is 'head safe', a green background means that all 8 heads are safe, a red background means that at least 1 head is not safe.

Status feedback 'Air pressure () MPa', input air pressure display, green background indicates that the input air pressure is normal, yellow background indicates that the input air pressure is small, red background indicates that the input air pressure is too small.

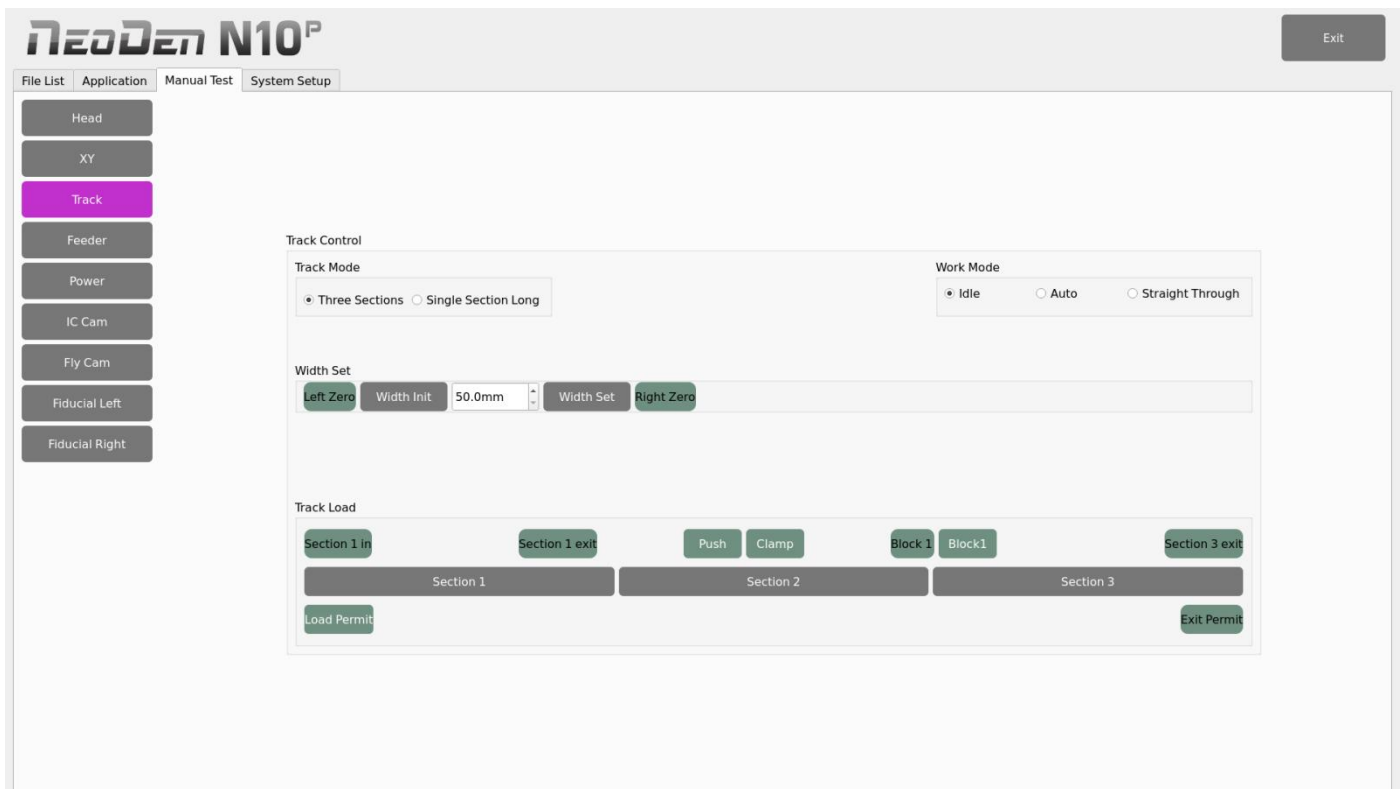
Status feedback 'Start button', green background means start button is not pressed, yellow background means start button is pressed.

Status feedback 'Front cover', green background indicates that the front cover door is closed, yellow background indicates that the front cover door is open.

Status feedback 'Front Emergency Stop', green background indicates that the rear emergency stop is not pressed, red background indicates that the front emergency stop is pressed.

Status feedback 'Front Feeder Protection.', green background indicates that the front flyer is not cocked, red background indicates that the front flyer is cocked or there is some other foreign object blocking the sensor.

2.3.3.Track



Test and status feedback of track related functions. The white text are test buttons and the black text are status feedback buttons.

Track mode can be selected from Three Sections and Single Section Long. Single Section Long for long PCBs, such as long LED strips. It needs to install the extra rails(tracks) to support long PCBs, and act as the same section of the track to move together; the extra baffle 2/3 switch and extra 2/3 sensors on the extra rails allow the long PCB to move in 2 or 3 sections. The following introduction takes the three-section track as an example.

Work Mode: Idle means that the track control board is working in idle mode, receiving software control commands and sensor status upload. **Auto** means that the track control board is working in automatic board in/out mode, automatically sends the request to feed the board command, the PCB enters the machine and then the track automatically transports it to the mounting area and clamps the board, after clicking the 'clamp' button to release the PCB, the PCB is sent to the 3-section exit, and when the next machine sends a request to feed the board, it will send the PCB out to next machine, such as the conveyor. **Straight-through**, i.e. PCB straight-through mode.

Width set: Status feedback 'left zero', 'right zero', respectively, indicates that the track left and right widening motor sensor is triggered or not, the green background indicates that the sensor is not triggered, the

yellow background indicates that the sensor is triggered.

Click the 'Width Init' button, a pop-up window will pop up to check whether there is a PCB on the track to confirm the widening initialization.

Enter the target track width and click the 'Width Set' button to adjust the track to the target width.

Track load: The status feedback 'section 1 in', 'section 1 exit', 'block 1', 'section 3 exit', respectively, indicate whether each PCB sensor is triggered or not. The green background indicates that the sensor is not triggered and the yellow background indicates that the sensor is triggered.

Click on the 'Push' button, the thimble module lifts up, click on the 'Push' button again, the thimble module falls down.

Tap the 'Clamp' button, the clamp module lifts up, tap the 'Clamp' button again, the clamp module falls down.

Tap and hold the 'Block 1' button, the block 1 lifts up the block, release the 'Block 1' button, the block 1 falls down.

Tap and hold 'Section 1', 'Section 2', 'Section 3' respectively, the corresponding track will start to feed the board, and release it, the corresponding track will stop to feed the board.

Clicking the 'Load permit' button, the device sends a signal requesting the input of boards.

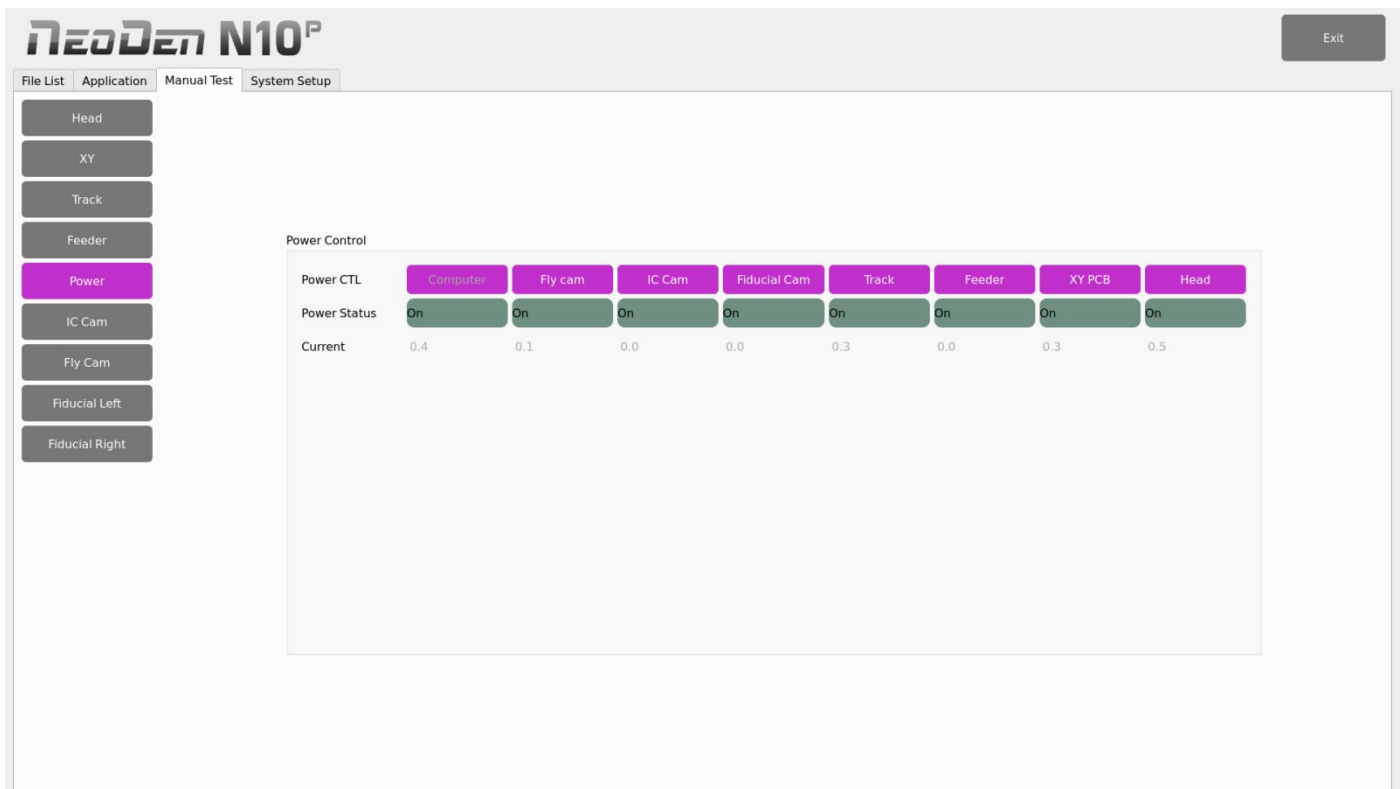
The status feedback 'Exit permit' indicates whether the next level device sends the request to feed signal or not, the green background indicates that the next level device has not sent the request to feed signal, and the yellow background indicates that the next level device is sending the request to feed signal.

2.3.4. Feeder



Install the feeders correctly with components loaded and click the corresponding feeder IDs, you can check if they could feed properly or not on this page.

2.3.5.Power



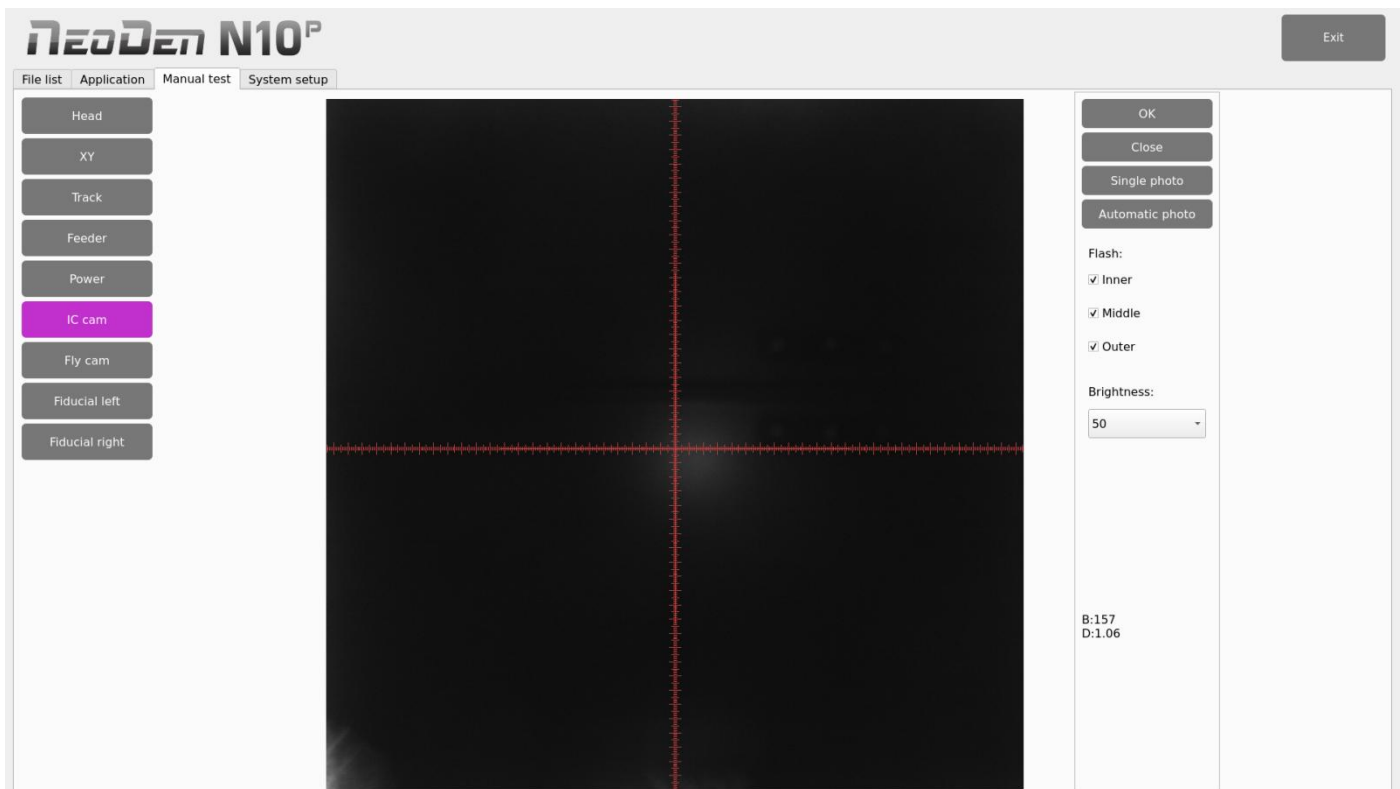
This section are reflecting the performance of the Ethernet Hub board, for each module board current detection and power control test and status feedback. The white text are test buttons and the black text are status feedback buttons.

For switch control, except for the 'Computer' button which is shielded, the corresponding module will be powered off after clicks, and the corresponding position text of the switch status will change back to 'Off' and the background will change to red, and the corresponding module will be powered on again after another click, and the corresponding position text of the switch status will change back to 'On' and the background will change to green. When the corresponding module is powered on again, the text in the corresponding position of the switch status will change to 'on' and the background will change to green.

The current level reflects the real-time power consumption of each module in amperes.

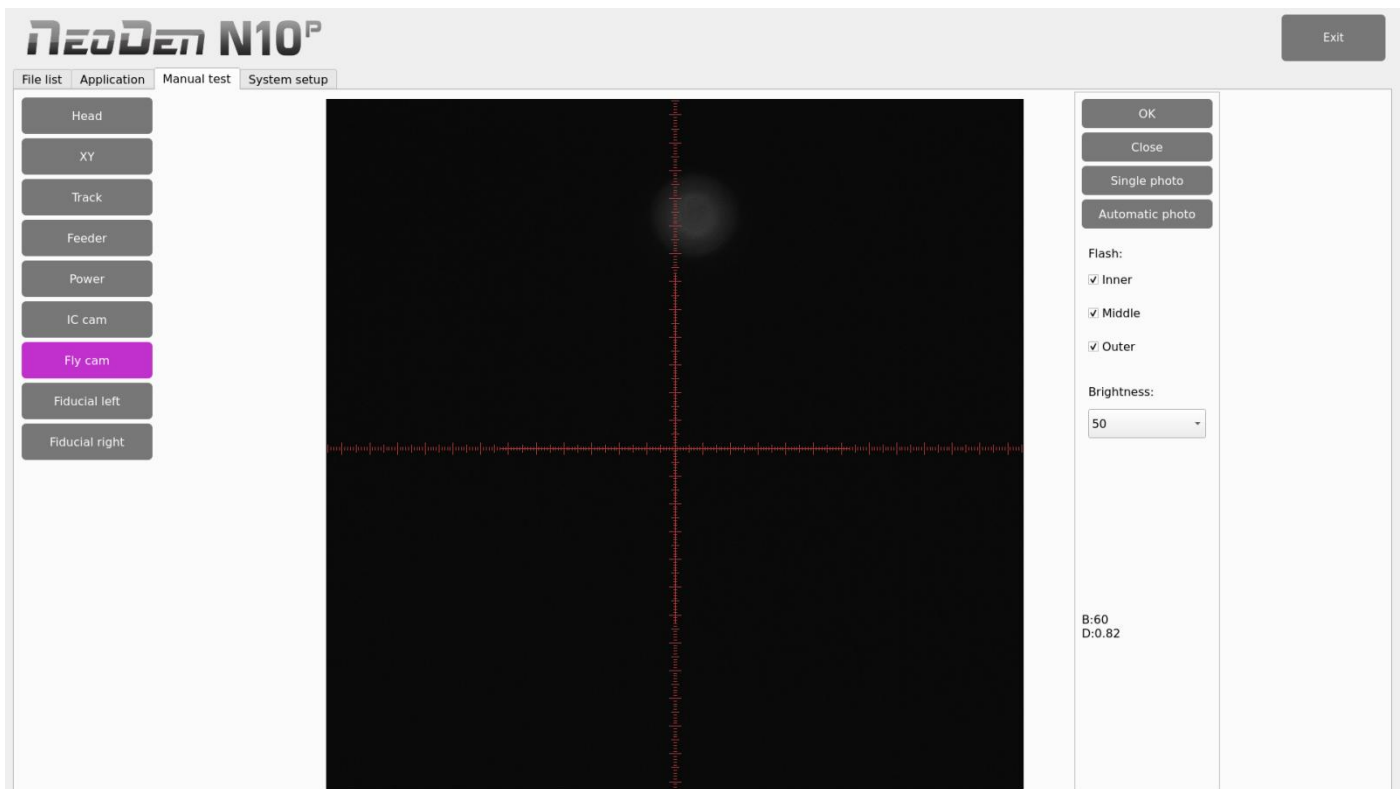
The function of this module is used for after-sale problem checking and after-sale replacement of spare parts when some modules are disconnected, which ensures safety and improves efficiency at the same time.

2.3.6.IC Camera



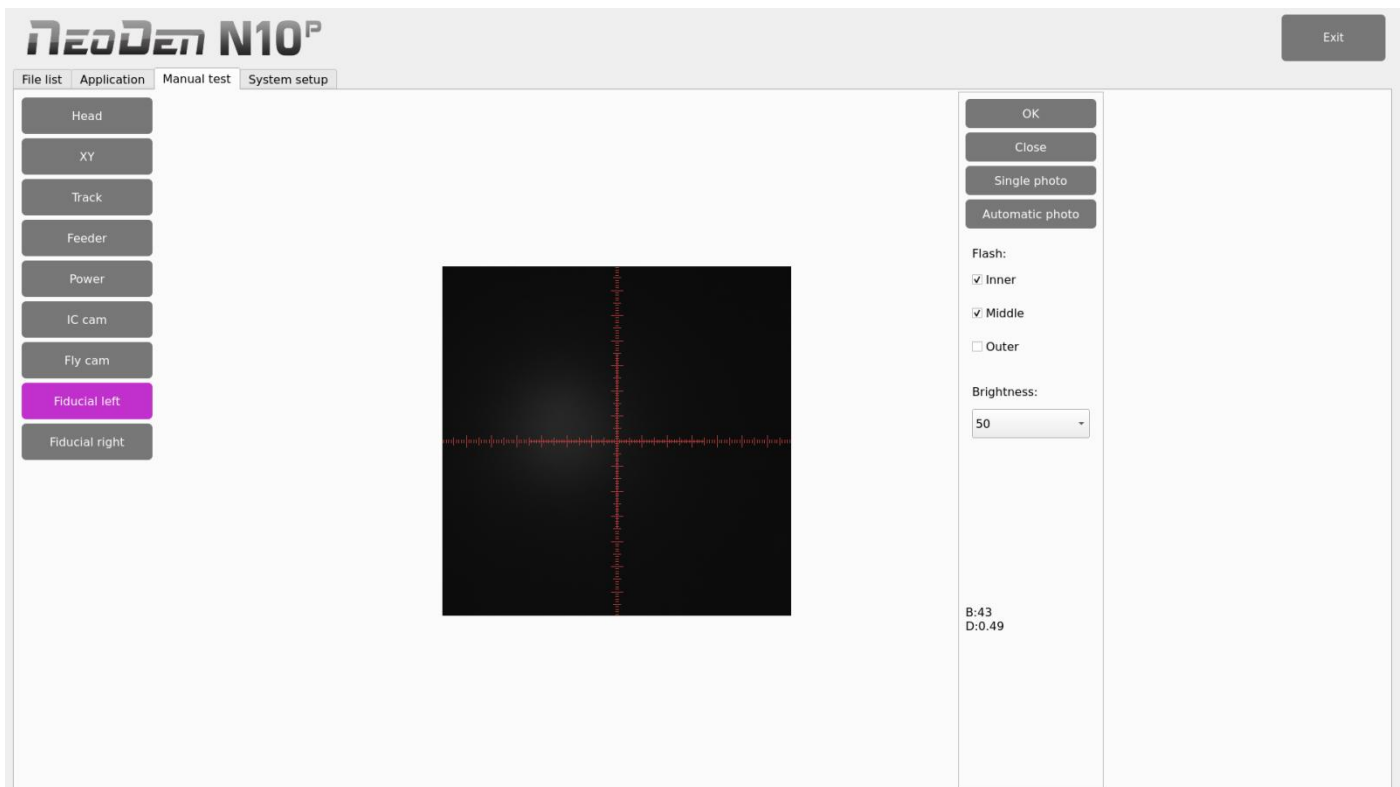
Tap this button, IC Camera will perform the photo taking action, and will display the corresponding camera interface, you can choose to take a single photo or automatic photo, as well as the flash and brightness. Note that you are not allowed to change the photo brightness during the automatic photo taking process.

2.3.7.Fly Camera



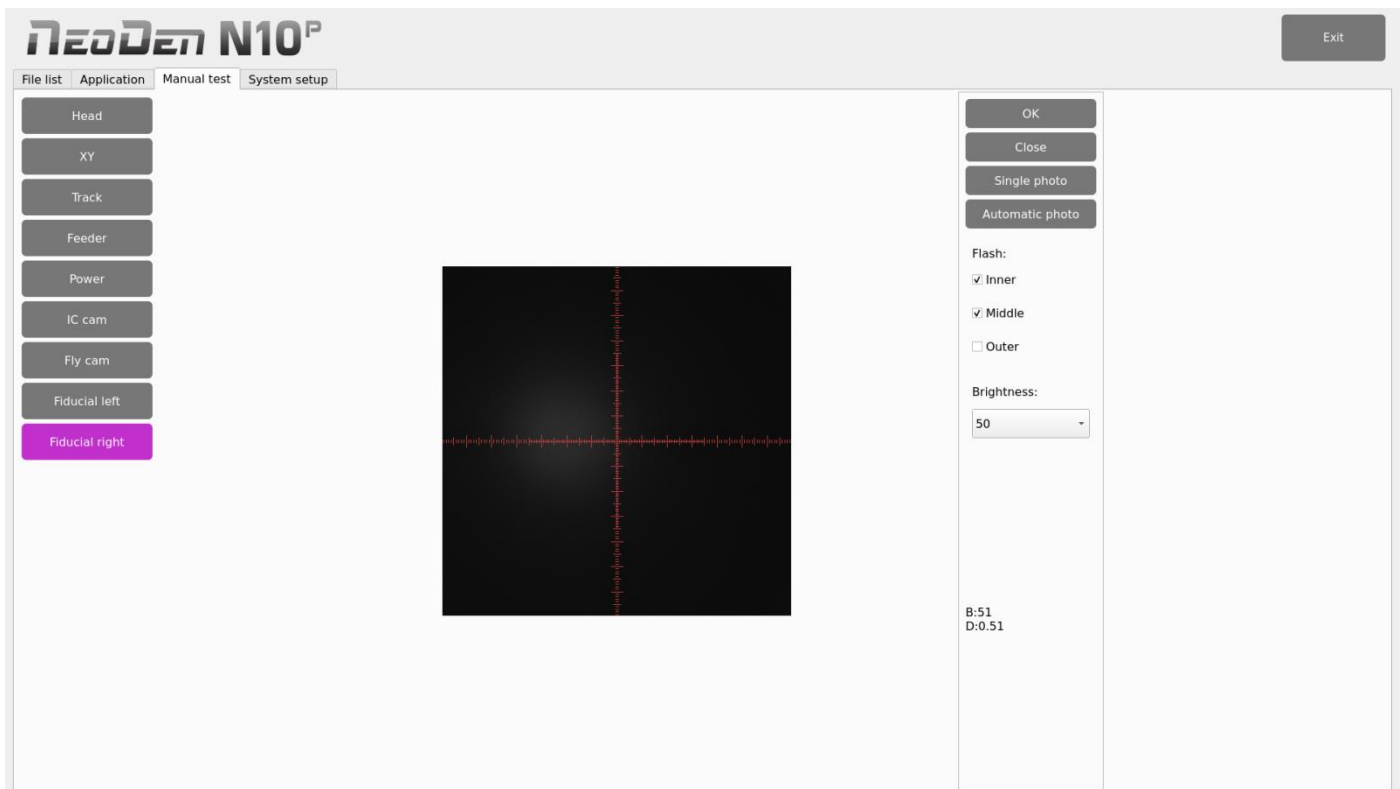
When you click this button, Flying Camera will perform the photo taking action and display the corresponding camera interface, you can choose to take a single photo or automatic photo, as well as the flash and brightness. Note that you are not allowed to change the photo brightness during the automatic photo taking process.

2.3.8. Fiducial Left Camera



Tap this button, Fiducial left camera will take photo action and will display the corresponding camera interface, you can choose single photo or automatic photo, as well as the flash and brightness. Note that you are not allowed to change the photo brightness during the automatic photo taking process.

2.3.9. Fiducial Right Camera



Tap this button, Fiducial Right Camera will take photo action and will display the corresponding camera interface, you can choose single photo or automatic photo, as well as the flash and brightness. Note that you are not allowed to change the photo brightness during the automatic photo taking process.

2.4. System Setup

NEODEN N10^P

File List Application Manual Test System Setup

Exit

Basic Position:

	X	Y	Z	XY view	Z correct
LF. cam	353.270	606.460			
Head1	317.610	606.020	0.280	View	Z correct
Head2	296.750	605.940	0.350	View	Z correct
Head3	275.610	606.030	0.440	View	Z correct
Head4	254.690	606.090	0.200	View	Z correct
Head5	233.690	606.010	0.260	View	Z correct
Head6	212.810	605.980	0.140	View	Z correct
Head7	191.700	606.120	0.260	View	Z correct
Head8	170.820	605.940	0.260	View	Z correct
RF. cam	130.750	606.740			
Fly cam	391.450	11.870		View	

Basic Parameter:

Camera Parameter:

	Brightness	Angle
LF. cam	50	0.530
RF. cam	50	-0.220
Fly cam	50	0.350
IC cam	50	-0.010

Track parameter:

Speed: 200mm

Load Wait: 30s

Other configurations:

Default Speed: 80%

Open Cover Cut Off Motors

Calibration:

- XY Linear Encoder Initialize
- Head Initialize Rough
- Fiducial Camera Initialize
- Head Z Initialize Rough
- Nozzle Initialize Rough
- Nozzle Z Initialize
- Nozzle Initialize Fine Calib
- Auto Initialize
- Time Set

Config Save

Login

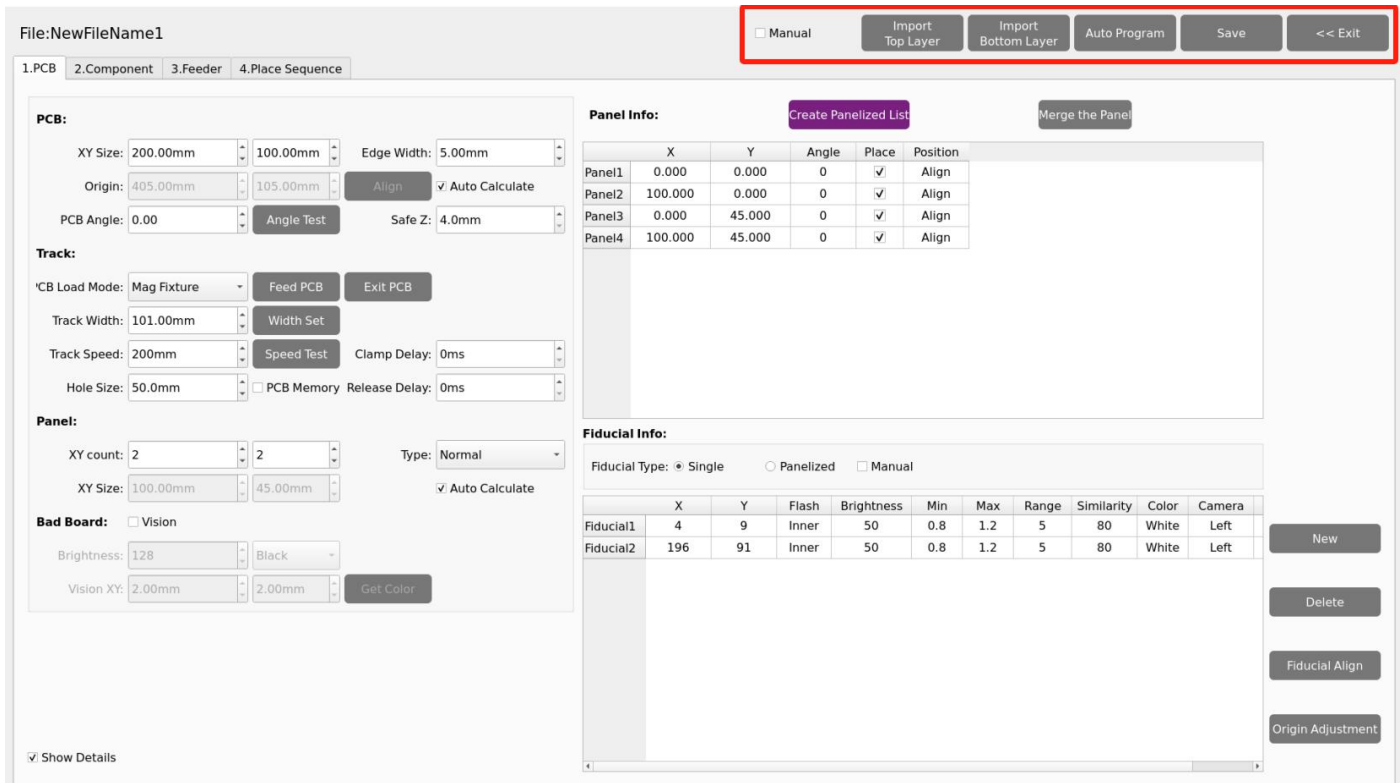
Version
N10P
v1.5.0.8 a20

The parameters in the System Setup are already set before the equipment is shipped. Do not modify them except when they need to be reset for maintenance. The meaning of each parameter and how to modify them are described in the following section 'Calibration and Setting'.

3. Programming Procedures

3.1. Programming Interfaces

Select a file and starts its programming, interfaces like below:



(1) **Manual:** When you don't have the coordinate file generated from Altium Designer, you can select this function to manually align components one by one. See more details in Chapter3.4.

(2) **Import Top layer/bottom layer:** they are used to import coordinate file which you generated from Altium Designer. Details will be introduced in Chapter3.3 Programming of 'import coordinate file'.

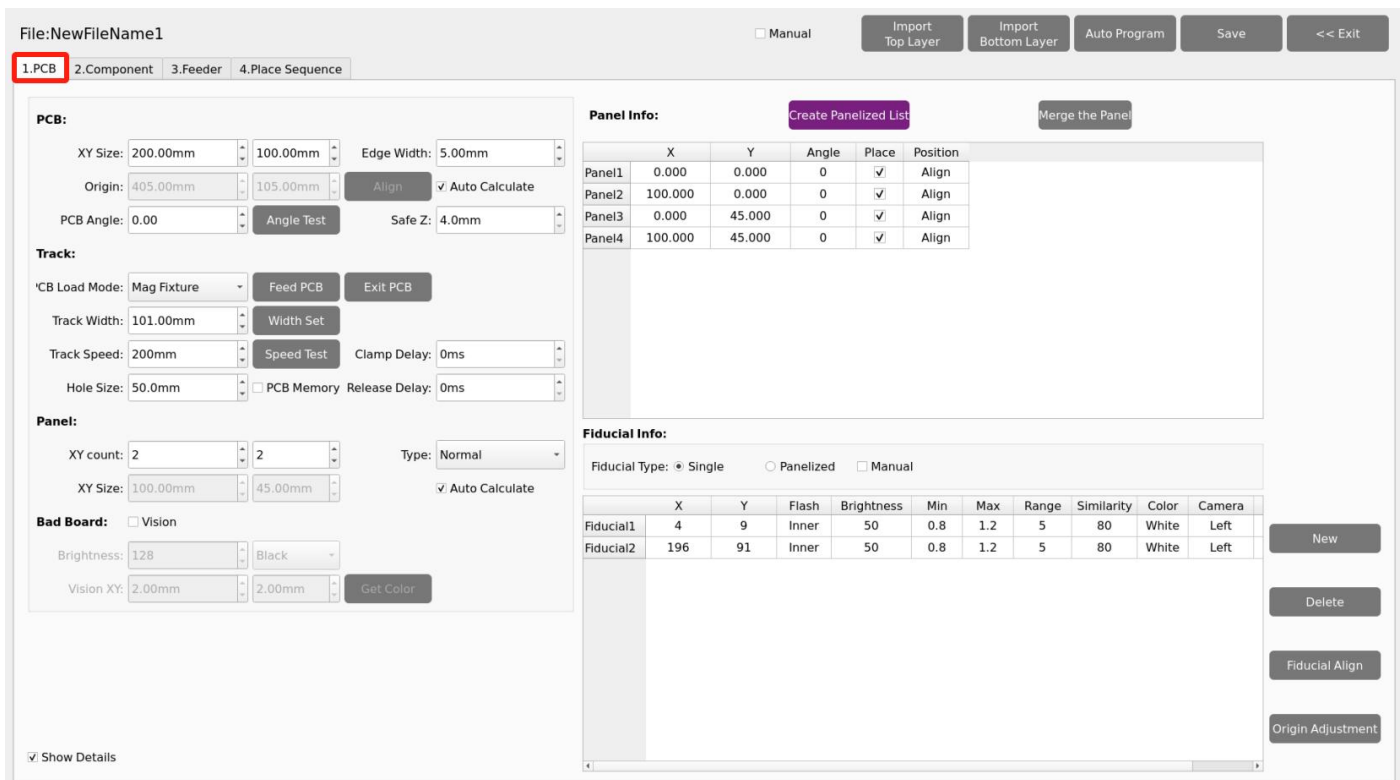
(3) **Auto program:** Machine software will automatically calculate how to arrange nozzle change, feeder assignment, optimize placement sequence to improve the efficiency. This step can be executed after component file imported. Details please turn to Chapter3.1.2 Component.

(4) **Save:** save the data under current interface.

(5) **Exit:** If the current data has been saved, click "Exit", it will exit programming and back to File list interface. If the data not saved, click "Exit", it will pop put warning message "PCB information has been modified, exit or not?", select "Yes", it means give up the current interface modification and directly back to File list interface; select "No", it will still stay at current programming interface.

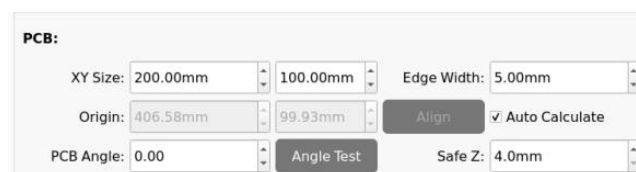
3.1.1.PCB

Select 'Show Details', the interface will change to below:



We will go through PCB, Track, Panel, Bad Board Detection, Panel Information and Fiducial Information one by one, including the buttons on the top and right side in the following chapters.

3.1.1.1. PCB



(1) **XY size:** input PCB length and width. If panelized board, please input the whole board length and width including its Edge width.

(2) **Edge width:** input the blank edge width.

(3) **Origin:** It is the calculation reference point between PCB coordinate (which you generated from Altium Designer) and Machine coordinate. In placement file, only this origin's coordinate is the Machine coordinate, others are relative coordinate to it. Select "Auto Calculate", the "Align" button will be unworkable. Machine software can calculate out Origin position from "PCB bottom right corner" in the

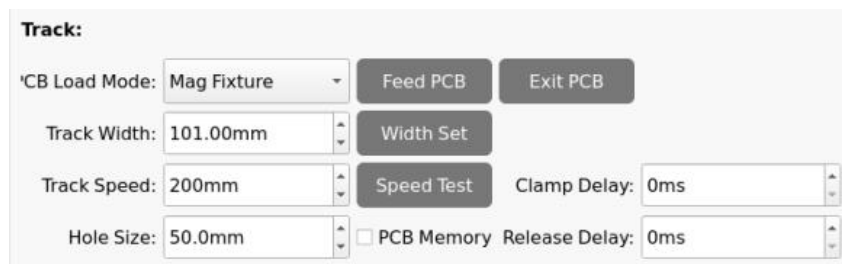
System Setup+ "PCB XY size"+"Edge width". **Notice: This automatic calculate based on default mode: rail transfer pcb from Left to Right.** If PCB is not standard rectangular, please untick "Auto Calculate", directly use "Align" button to find the PCB origin position.

(4) **PCB angle:** Under Manual programming, we need to test the PCB offset angle related to 90° or 0°, to down the offset error. Select "Manual", and now PCB in the 2nd rail working area, click "PCB angle", use Fiducial camera to find 2 points on PCB horizontal direction or 2 points on vertical direction, machine will calculate PCB angle.

Notice: If you use "Import from top/bottom layer" to import coordinates, then no need to set this.

(5) **Safe Z:** The most thick component's height. It is used to avoid component collision during nozzle head movement. Default data is 4mm.

3.1.1.2. Track



(1) PCB load mode: It has four modes: Mag fixture, Track, Long track 2 section, Long track 3 section. Please select according to actual need.

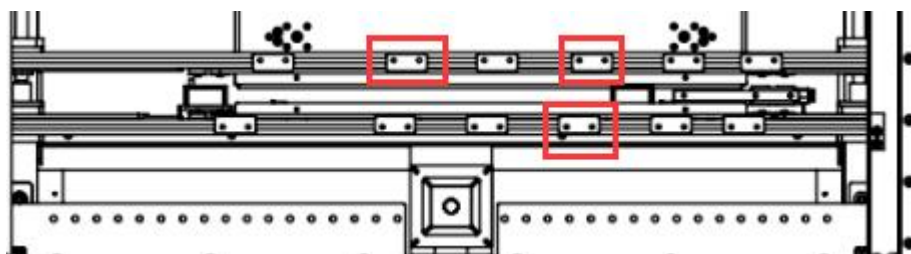
Mag fixture mode: the tack without any feed board or exit board action. If the board be fixed on track, then please click "Feed PCB" or "Exit PCB" to realize it; If the board be fixed on tray table, it need manually fix it and manually take it out.

Track mode: applicable to PCB length < 500mm. In this mode, PCB can be flexible feed or exit machine and can realize continuous mount work.

Long track 2 section mode: applicable to PCB < 800mm (optional 1.2m rail extension) or PCB < 1000mm (optional 1.5m rail extension). Separate long board into 2 sections, feed board two times and mount two times. Details by "3.5 Long PCB programming" chapter.

Long track 3 section mode: applicable to PCB < 1200mm (optional 1.2m rail extension) or PCB < 1500mm (optional 1.5m rail extension). Separate long board into 3 sections, feed board three times and mount three times. Details by "3.5 Long PCB programming" chapter.

- (2) Feed pcb: let pcb feed into machine manually.
- (3) Exit pcb: let pcb out of machine manually.
- (4) **Track width:** Machine will get the PCB width from previous "PCB XY size" add 1mm by default to make sure PCB can flexibly transport on track. User can set it manually.
- (5) **Width set:** type input the track width and click "Width set" to realize width change.
- (6) **Track speed:** track's transport speed, unit: mm/s, range: 30mm/s ~ 300mm/s.
- (7) **Speed test:** after setting the track speed, click this button as a trail to see if speed ok or not.
- (8) **Clamp delay:** After pcb in mounting area, to set its clamp waiting time. It is also the on/off switch of PCB push up. When it=0, push-up system not work; When it≠0, the push-up module starts rising, and waiting as set delay time, then clamp the PCB. Generally this data should be set according to push-up module rise the board time, such as no less than 500ms. In this way, the support pins can push-up PCB firstly and then clamp PCB well.
- (9) **Hole size:** For hollowed PCB, you can input the circuit board's hole size here. Unit: mm. This is used to avoid track sensor cannot sense the PCB while it pass on the track sensor.
- (10) **PCB memory:** After select this function, when hollowed PCB's hole is exactly at top of the track sensor, sensor will reflect there's no board but machine will reflect board still on the track, this is in case another PCB feed into machine. **Notice: once somebody take away the PCB which stay on the track, machine will still think PCB on the track, so please never manually remove the PCB.**
- (11) **Release delay:** After mounting finished, push-up module will firstly loosen the board, after the "Release delay" time, track will transport PCB. It is mainly used for PCB without process edge. If PCB not completely fall before track move forward, some components may be hit off by the track's metal sheet (below marked ones).

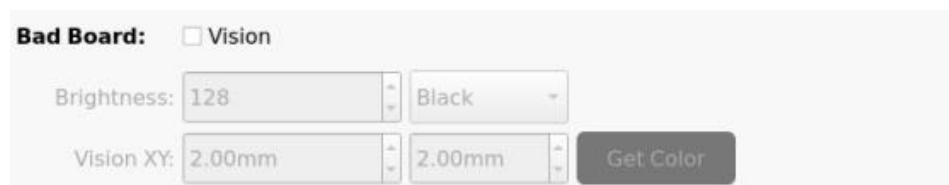


3.1.1.3. Panel



- (1) XY Count: Enter the number of pcs in the X and Y directions respectively.
- (2) Type: There are three types, Normal, Original Left Mirror Right, Original down Mirror Up; please choose the appropriate type of PCB. Normal is for the normal panelized board; the last two modes are for two types of mirror boards.
- (3) XY Size: The length and width of the panel board. After checking 'Auto Calculate', the input width is blocked, and the device automatically calculates the length and width of small boards by the inputted 'XY size' and 'Edge width', and the number of boards in the X and Y directions. You can cancel the check box of automatic calculation and fill in the length and width of the small board manually.

3.1.1.4. Bad Board

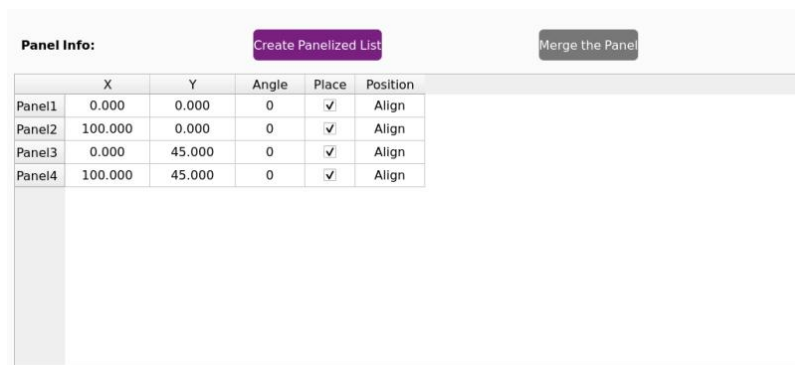


- (1) Bad board detection: unchecked by default, the corresponding parameter setting is blocked. After this function is ticked, when the file is processed, after each panelized board is swept with fiducial point, it will take a photo at the set bad board inspection position, and judge whether the patchwork board is bad board by its colour, and if it is bad board, then the panelized board will not be pasted. Note that to use this function, the fiducial point type must be panelized fiducial Point.
- (2) Brightness: The grey value of the photo, range 0-255, used in combination with the 'Black' and 'White' options at the back, select 'Black', points below the brightness threshold are bad boards; select 'White', points above the brightness threshold are bad boards; select 'Black', points above the brightness threshold are bad boards; select 'White', points above the brightness threshold are bad boards. Select 'White', the points above the brightness threshold are bad boards;
- (3) Vision XY: The location of the defective board marking can be entered manually or locked by using the 'get color' button.

(4) Get color: Finds the bad board detection location and extracts the brightness threshold. To use this button you need the following prerequisites:

1. On the lower left corner of the board where you want to detect the defective boards, use a black or white marker to mark a point with a length and width of not less than 2mm.
2. Put the marked PCB into the device, use the 'PCB Feed' button, the PCB will be sent to the mounting area and clamping.
3. Fiducial point information has been set in the current interface and use the 'Fiducial Align' button in the lower right corner of the current interface to accurately calculate the origin position.

3.1.1.5. Panel Information



Panel Info:					
	X	Y	Angle	Place	Position
Panel1	0.000	0.000	0	<input checked="" type="checkbox"/>	Align
Panel2	100.000	0.000	0	<input checked="" type="checkbox"/>	Align
Panel3	0.000	45.000	0	<input checked="" type="checkbox"/>	Align
Panel4	100.000	45.000	0	<input checked="" type="checkbox"/>	Align

- (1) Create Panelized List: Generate a list of panels according to the panel settings.
- (2) Merge the panel: Consolidate all the small PCBs into one single board file. Applicable to the situation where the machine efficiency cannot be utilized because of the small amount of components for small panels.
- (3) X/Y: origin of each pcbs
- (4) Angle: panelized angle
- (5) Place: to skip the placement if it's ticked, the default all ticked!
- (6) Position [Align]: Use Fiducial camera to lock the origin of panelized board, when the Fiducial type is panelized Fiducial, it is recommended to use this function to check the origin of panelized board only and not to modify the coordinates of the origin; when the Fiducial type is Single Fiducial, and there are overall offset in some of the PCBs, please check the button of 'Fiducial Align' in the lower right corner of the interface to accurately calculate the location of origin, and then use this function to check the coordinates of the corresponding penlized point and correct the origin coordinates by the Fiducial camera.

3.1.1.6. Fiducial Information

Fiducial Info:

Fiducial Type: Single Panelized Manual

	X	Y	Flash	Brightness	Min	Max	Range	Similarity	Color	Camera
Fiducial1	4	9	Inner	50	0.8	1.2	5	80	White	Left
Fiducial2	196	91	Inner	50	0.8	1.2	5	80	White	Left

Buttons: New, Delete, Fiducial Align, Origin Adjustment

(1) Fiducial Type: Single and Panelized.

Single Fiducial: Mainly used for single PCB or the project not demanding high precision requirements, generally need to choose 2 Fiducial points can be.

Panelized Fiducial: It is used for the projects that require high accuracy , and Fiducial point should be located on each PCB of the panelized board to make the mounting more accurate.

(2) Manual: If the Fiducial points are of poor quality and cannot be recognized, the fiducial can be aligned manually. If there is no Fiducial point on the PCB board, it can be replaced by some positioning holes or manually setting some special reference points, which need to be ticked. The default is unchecked.

(3) X/Y: If the file is imported, you can directly find out the coordinates of the Fiducial points from the PCB diagram of the circuit board and fill in the information directly.

(4) Flash: Inner Circle, Middle Circle, Outer Circle, Inner Middle, Middle and Outer, All, users can adjust according to the Fiducial point recognition by themselves

(5) Brightness: When Fiducial Point Recognition is performed, the Fiducial camera will take a picture of the brightness, and the value can be adjusted according to the actual situation.

(6) Min/Max: Specifying a range of Fiducial point sizes reduces the likelihood of other points being misidentified as Fiducial points.

(7) Range: Limit the scope of inspection of special PCBs where the presence of Fiducial points similar in shape to Fiducial points prevents identification.

(8) Similarity: Enter the roundness of the Fiducial points selected by the user, the roundness is also related to the quality of the Fiducial points, and the roundness of Fiducial points with poor quality can also be reduced appropriately.

(9) Color: white and black; choose black mode for those with holes and bright spots, choose white mode for those containing only bright spots.


(10) Camera: Fiducial camera settings can be selected from the left and right camera (the user selects the camera according to the actual situation for correction) can also be used with the default camera, if the user selects the camera can not be reached, then in the recognition of the machine will choose the appropriate camera

(11) Position [Align]: Position Lock, use Fiducial Camera to lock Fiducial Points to test whether the Fiducial Points parameters set are reasonable or not. If the file is imported, in order to prevent the introduction of errors, when the manual programming is not ticked, this function will only run to view the Fiducial points, and click the 'Save and Return' button, and will not modify the coordinate value of the Fiducial points. When manual programming is checked, you can use the Fiducial Camera to search for the desired Fiducial point and then click the 'Save Back' button to save the Fiducial point coordinates after the Fiducial is locked.

(12) Add: Click the 'Add' button to add a Fiducial point.

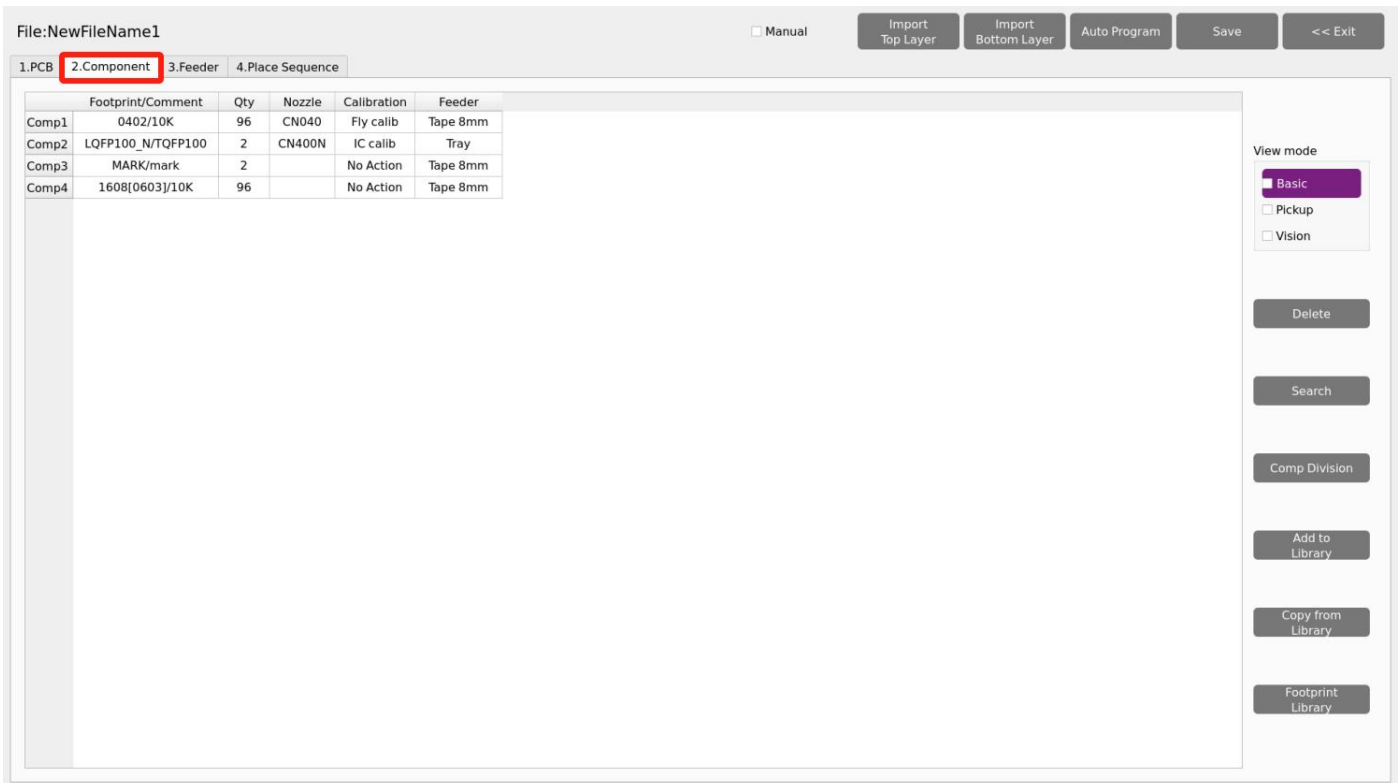
(13) Delete: to delete the selected Fiducial points.

(14) Fiducial Align: it refers to the accurate calculation of the origin and angle of the PCB currently in the mounting area through the recognition of the set Fiducial information with the Fiducial camera. Improves the accuracy of manual search for saved coordinate points.

(15) Origin Adjustment: When the PCB design software exported coordinates and  consistent, but not to the PCB lower-left corner of the vertex as the origin, increasing the complexity of our set PCB origin or can not be set. After importing the file, we can use the Fiducial points or components on the PCB to adjust the PCB origin. The target PCB has been in place, in the Fiducial 1 position, enter the Fiducial point or component coordinates, click on the 'Origin Adjustment' button, step 1, use the Fiducial camera to lock the position you want to set as the PCB origin, it is recommended that the vertex of the lower left corner of the PCB. Step 2, use Fiducial camera to lock the Fiducial point or the centre of the component whose coordinates are entered before, click 'Save and Return' button, the origin adjustment is completed.

3.1.2.Component

Click the "2. Component" button to enter the component registration interface as shown in the figure.



View mode: There are many parameters in this page, they are divided into three groups: "Basic", "Pickup" and "Vision". You can check whether to display them as needed to facilitate viewing of setting parameters.

Fixed parameters, when none of the view mode are checked, the parameters are displayed as shown in the figure.



- (1) **Footprint/Comment:** The package of the component and the specification of the component. The combination of the two determines the type of component. Software statistics, which cannot be changed by the user.
- (2) **Qty:** The number of components used in the current file. Software statistics, cannot be changed by the user.
- (3) **Nozzle:** Nozzle that matches the component footprint. User can adjust.

(4) **Calibration:** The visual correction method of components. There are four options: "No Action", "Fly Calib", "IC Calib", "IC Rotate Calib".

(a)"No Action": go straight to place the components without camera detection. Not recommend.

(b)"Fly Calib": go to fly camera for recognition, suitable for resistors and capacitors.

(c)"IC Calib": go to IC camera for recognition, suitable for ICs like SOP packages with large pitch.

(d)"IC Rotate Calib": go to IC camera for recognition, it will do re-recognition after adjusting the angle to confirm until the angle meets the requirements, suitable for precision ICs.

(5) **Feeder:** there are three types, Tape feeder,Stick feeder,Tray feeder.

(a)Tape xxmm:Feeder for tapes. The number represents the feeder tape width.

(b)Stick:Vibration feeder, suitable for tube-packed materials.

(c)Tray:Tray,suitable for IC.

Check "Basic" information and the parameters are shown in the red box in the figure below.

Comp	Footprint/Comment	Qty	Length	Width	Thickness	Nozzle	Calibration	Feeder	Feed Time
Comp1	0402/10K	96	1.000	0.500	0.350	CN040	Fly calib	Tape 8mm	50
Comp2	LQFP100_N/TQFP100	2	16.000	16.000	1.200	CN400N	IC calib	Tray	50
Comp3	MARK/mark	2	0.000	0.000	0.000		No Action	Tape 8mm	50
Comp4	1608[0603]/10K	96	0.000	0.000	0.000		No Action	Tape 8mm	50

(6) **Length/Width/Thicknes:** The dimension information of components and thickness need to be measured manually. The length and width can be obtained through 'Recognition Test'. The details are described in the "3.1.3. Feeder" section.

(7) **Feed Time:** The time required for feeding is 50ms by default. For some slow-feeding feeders, the feeding time can be increased to ensure that the feeder is in place.

Check "Pickup " information and the parameters are shown in the red box in the figure below.

Comp	Footprint/Comment	Qty	Nozzle	Pick delay	try Tim	Move Speed	Place Height	Place Delay	Place Speed	Accuracy	Calibration	Feeder
Comp1	0402/10K	96	CN040	20	3	100	0.350	20	100	<input type="checkbox"/>	Fly calib	Tape 8mm
Comp2	LQFP100_N/TQFP100	2	CN400N	30	3	40	1.200	30	40	<input checked="" type="checkbox"/>	IC calib	Tray
Comp3	MARK/mark	2		0	3	40	0.000	0	40	<input checked="" type="checkbox"/>	No Action	Tape 8mm
Comp4	1608[0603]/10K	96		0	3	40	0.000	0	40	<input checked="" type="checkbox"/>	No Action	Tape 8mm

(8) **Pick Delay:** Component picking delay, unit: ms. For special materials such as large chips, large

capacitors, 0402 resistors and capacitors, it is necessary to set a reasonable material picking delay to ensure stable material picking by the nozzle.

(9) **Retry times:** After several failed attempts, a prompt will be displayed, indicating that manual intervention is required. The default setting is 3 times, which can be changed by the user.

(10) **Move Speed:** When picking up and placing the component, the moving speed of the X-axis and Y-axis can be adjusted within the range of 10-100. For resistors and capacitors below 0402 and precision ICs, the moving speed needs to be reduced to improve the placement accuracy.

(11) **Place Height:** place height,unit mm.Generally the component thickness is reduced by 0.2mm.

(12) **Place Delay:** place delay,unit:ms.For special components such as large chips and large capacitors, a larger mounting delay should be set to increase the stability of mounting.

(13) **Place Speed:** When mounting components, the head descends at a speed that can be adjusted in the range of 10-100. Resistors and capacitors below 0402 and precision ICs need to reduce the moving speed to improve mounting accuracy.

(14) **Accuracy:** Check for high-precision mounting, uncheck for fast mounting. Precision ICs need to be mounted with high precision, and others need to be mounted with fast mounting.

Check "Vision" and the parameters are shown in the red box in the figure below.

	Footprint/Comment	Qty	Nozzle	Calibration	Exposure	Flash	Vision	rightnes	Noisy	Check	Feeder
Comp1	0402/10K	96	CN040	Fly calib	50	All	Search Rec	80	1	<input type="checkbox"/>	Tape 8mm
Comp2	LQFP100_N/TQFP100	2	CN400N	IC calib	50	All	Search Rec	80	1	<input type="checkbox"/>	Tray
Comp3	MARK/mark	2		No Action	50	All	Search Rec	0	1	<input type="checkbox"/>	Tape 8mm
Comp4	1608[0603]/10K	96		No Action	50	All	Search Rec	0	1	<input type="checkbox"/>	Tape 8mm

(15) **Exposure:** Note: The two parameters of exposure and flash need to be consistent for all materials in the flying shooting mode, so if the exposure or flash of one component is changed, all the flying shooting components will be changed accordingly.



(16) **Flash:**When correcting vision, which flashes are used when taking photos.

Note: Since the inner circle of IC camera, inner circle of Flying camera and middle circle flash are close to the lens, the nozzle surface captured is brighter. When the width of the component is less than or close to the outer diameter of the nozzle, it will affect the recognition of the component. Therefore, Flying recommends using the outer circle flash, and IC photography and IC pre-rotation should be selected according to the

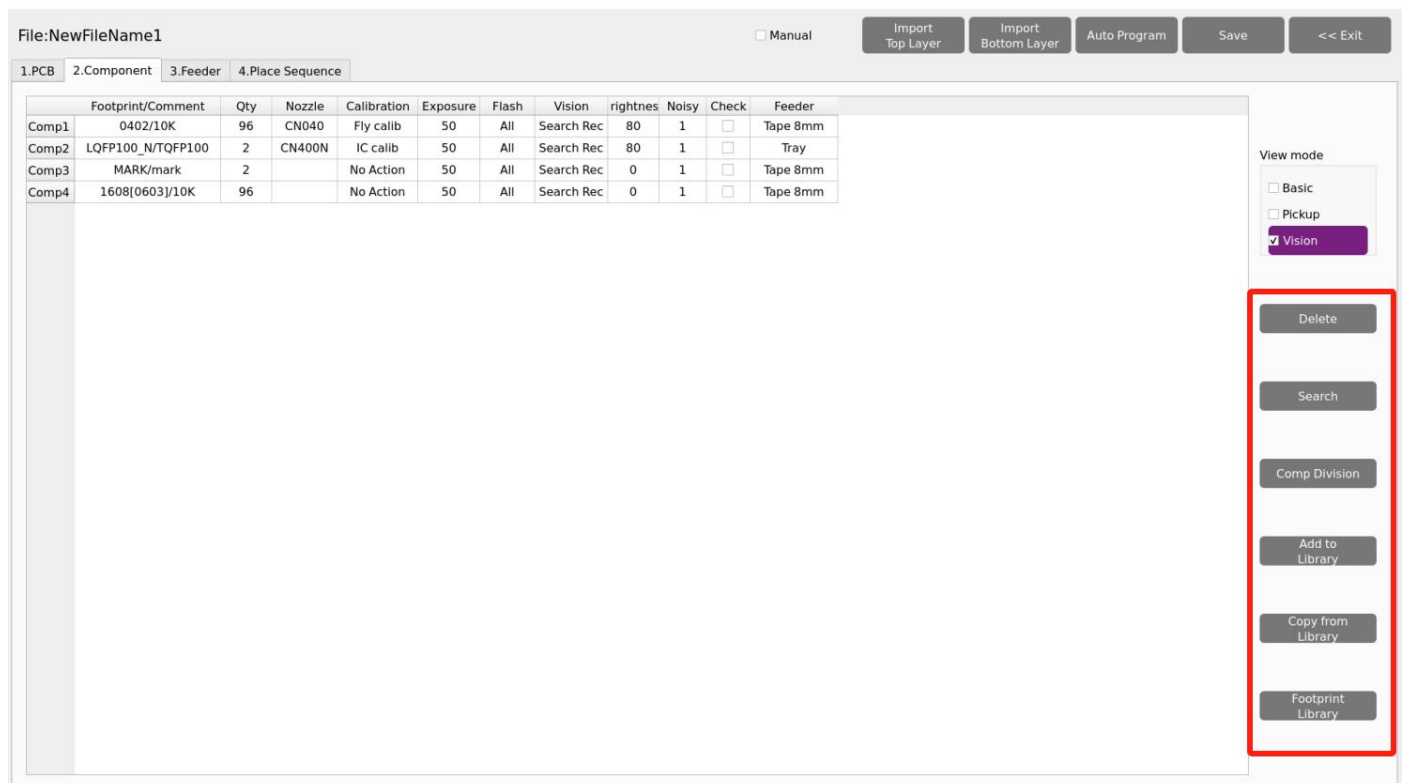
actual situation.

(17) **Vision:**The visual correction recognition algorithm currently only supports "find rectangle" and "find circle center". Except for cylindrical components, which use the "find circle center" algorithm, all other components use the "find rectangle" algorithm.

(18) **Brightness:**Brightness threshold for visual correction. Can be obtained through "Photo Detection". Specific details are described in the "3.1.3. Feeder" section.

(19) **Noisy:**De-noising. During the component recognition process, sometimes there may be bright spots or other interference points at the bottom of the component, which will cause the range of the frame to be inconsistent during each recognition process, causing material to be thrown away. Set the de-noising parameters 1-10. Note that this function should be set in conjunction with "Photo Detection".

(20) **Check:**After checking, take a photo during mounting and compare the size with the registered size of the component. If the size exceeds the allowable error range, discard the material and retake it to avoid missing mounting, vertical material, etc.



The screenshot shows the NEODEN software interface. At the top, there are buttons for "Import Top Layer", "Import Bottom Layer", "Auto Program", "Save", and "<< Exit". Below these are tabs for "1.PCB", "2.Component", "3.Feeder", and "4.Place Sequence". The main area contains a table with the following data:

	Footprint/Comment	Qty	Nozzle	Calibration	Exposure	Flash	Vision	rightnes	Noisy	Check	Feeder
Comp1	0402/10K	96	CN040	Fly calib	50	All	Search Rec	80	1	<input type="checkbox"/>	Tape 8mm
Comp2	LQFP100_N/TQFP100	2	CN400N	IC calib	50	All	Search Rec	80	1	<input type="checkbox"/>	Tray
Comp3	MARK/mark	2		No Action	50	All	Search Rec	0	1	<input type="checkbox"/>	Tape 8mm
Comp4	1608(0603)/10K	96		No Action	50	All	Search Rec	0	1	<input type="checkbox"/>	Tape 8mm

On the right side, there is a "View mode" section with radio buttons for "Basic", "Pickup", and "Vision" (which is selected). Below this is a vertical stack of buttons: "Delete", "Search", "Comp Division", "Add to Library", "Copy from Library", and "Footprint Library". A red box highlights the "Delete", "Search", "Comp Division", "Add to Library", "Copy from Library", and "Footprint Library" buttons.

Delete:Quickly delete components that do not need to be mounted. If you delete a component here, all rows of this material in the "Step" list will be deleted.

Search:Enter the component package or specification to search for components. One search can only find the nearest component containing the keyword. If the target component is not found, you can continue to

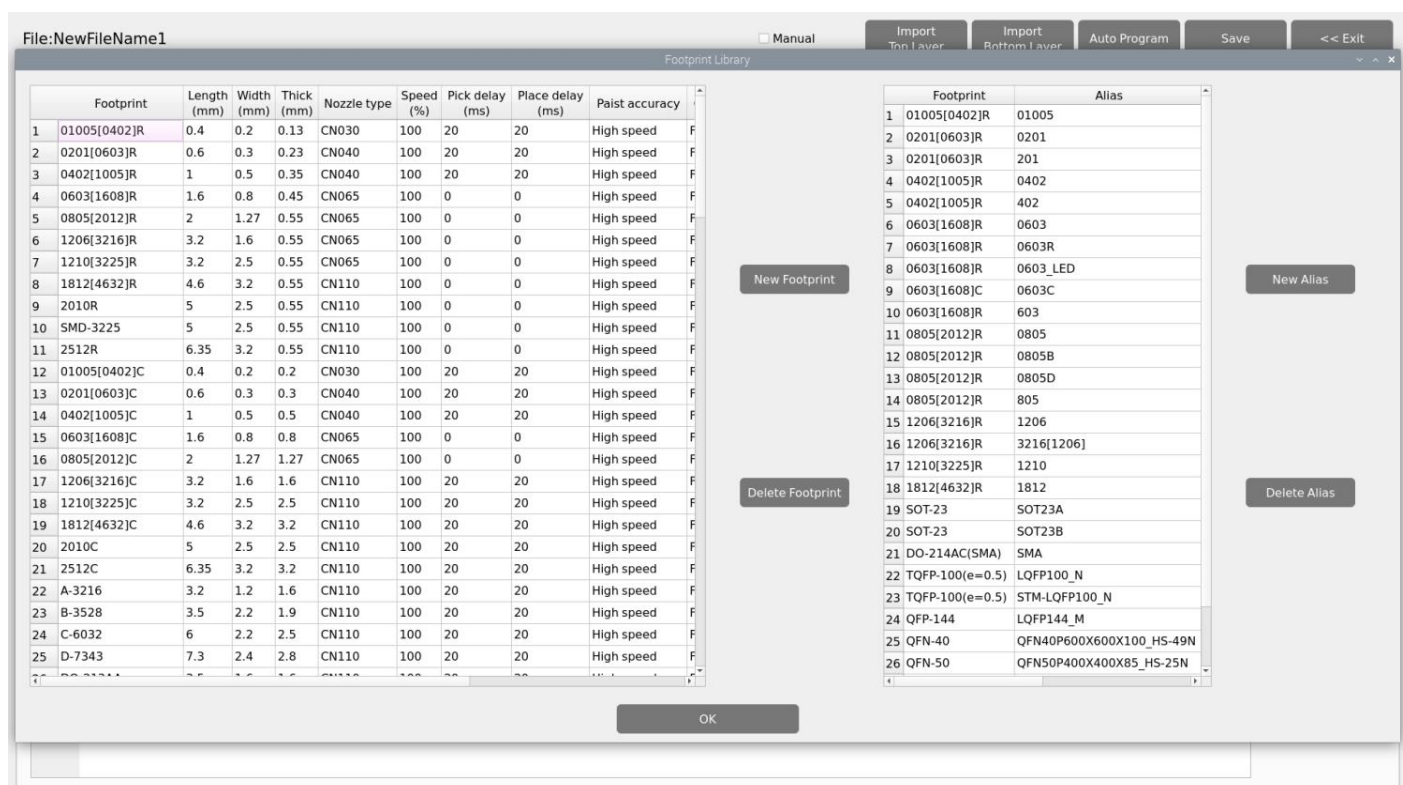
click the "Search Components" button, enter the component package or specification, and click the "OK" button to search for the next one.

Component Division: Divide a certain material into multiple types. (When the user needs to mount a lot of a certain material, use this function to divide one feeder into multiple feeders for mounting to improve efficiency.) Follow the corresponding prompt box, enter the package, specification, and the number of types (here it means how many feeders to divide it into) and fill in.

Add to Library: Add the selected component information to the footprint library. The next time you import a component with the same footprint, the parameters will be obtained directly from the footprint library.

Copy from Library: After modifying the footprint library, select the component to synchronize the package parameters with the same component in the package library to the component list.

Footprint Library: Click "Footprint Library Edit" to enter the footprint library editing interface as shown in the figure.



The footprint library records the name, length, width, thickness, nozzle type and other parameters of each footprint.

(a)New Footprint:click"new footprint",A new row will be added at the end of the footprint library list. Fill in the package name, length, width, thickness, nozzle type and other parameters.

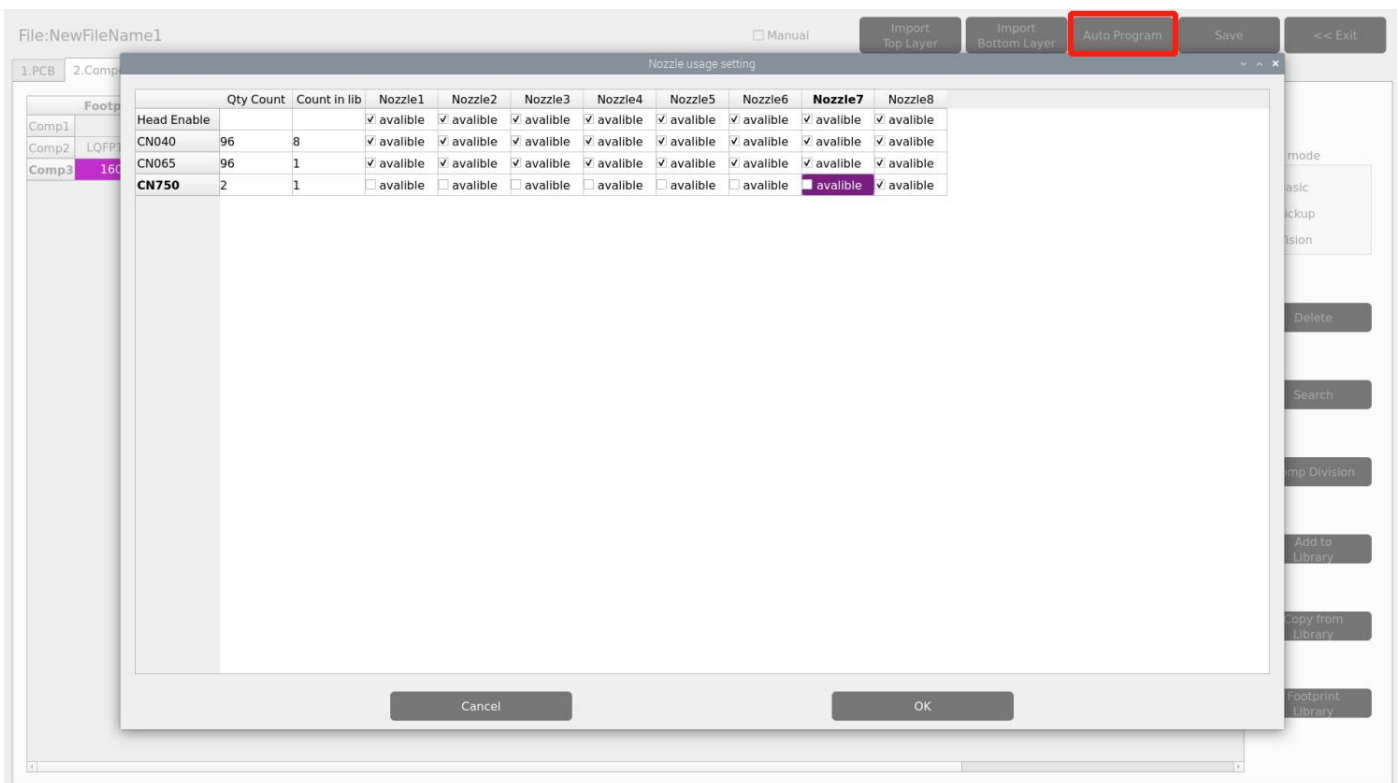
(b)Delete Footprint:Select the footprint to be deleted and click "Delete Footprint" to delete the footprint.

(c)New Alias:When the same footprint component type is different (for example, the footprint name of 0603 capacitor is 0603C, and the footprint name of 0603 resistor is 0603R) or different engineers have different naming habits, the same footprint has multiple names. The function of the same name library is to map the footprints with different names to the same footprint. Click "New Alias" to add a new row at the end of the same name library, select the footprint library in the "Alias" column, fill in other names in "Same Name" and press Enter.

(d)Delete Alias: to delete alias.

(e)OK:Save and exit.

Auto program: After the component information is registered, you can start automatic programming. After clicking the "Auto Program" button, the nozzle usage setting interface will be entered as shown in the figure.



(a) **Head Enable:**mark whether the patch 1-8 can be used. By default, it is checked. If there is a head failure, you can uncheck the corresponding head to disable it.

(b) **Qty Count:**Number of times this nozzle is used in this project.

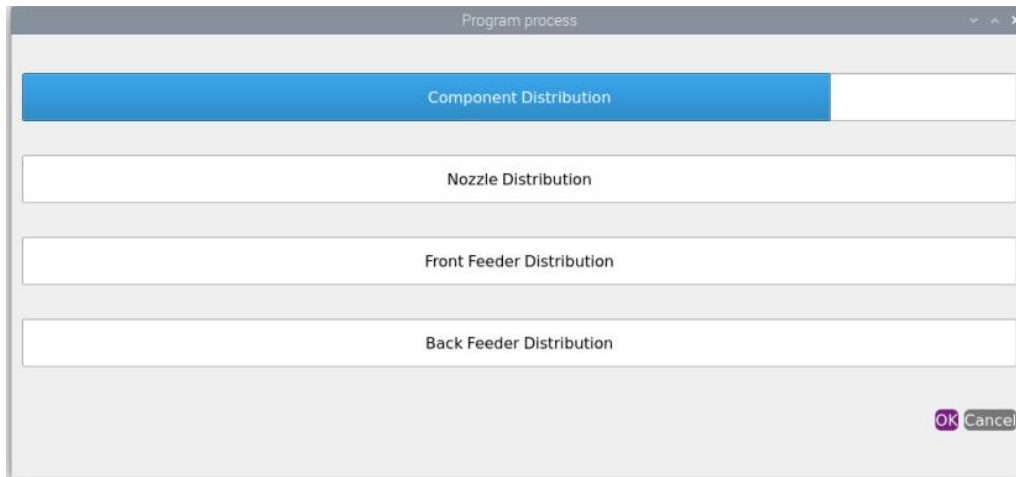
(c) **Count in library:**The number of the type of nozzle in the nozzle library.

(d) **All kinds of head nozzle enable:**Take CN040 as an example. There are 7 CN040 nozzles in the nozzle library. If there are CN040 nozzles added to the nozzle library from other places, you can choose to enable all 8 nozzles. Otherwise, only 7 of them can be selected. Avoid arranging 8 nozzles to use CN040 nozzles at

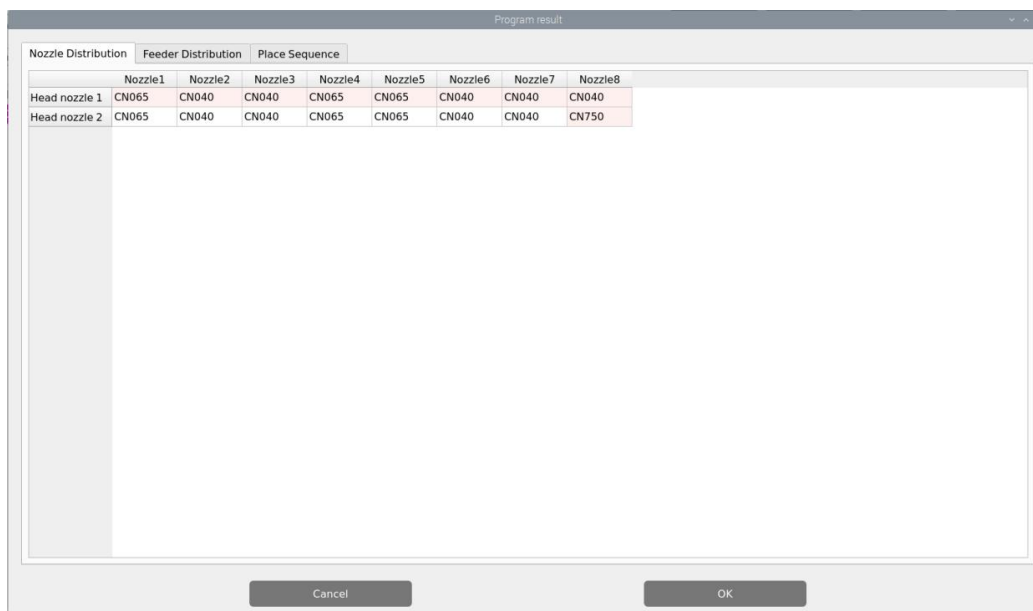
the same time during automatic programming, and processing cannot be performed if one CN040 nozzle is missing.

(e) **Cancel:**Exit automatic programming.

(f) **OK:**Confirm the nozzle usage settings, start automatic programming, and display the automatic programming progress as below picture:



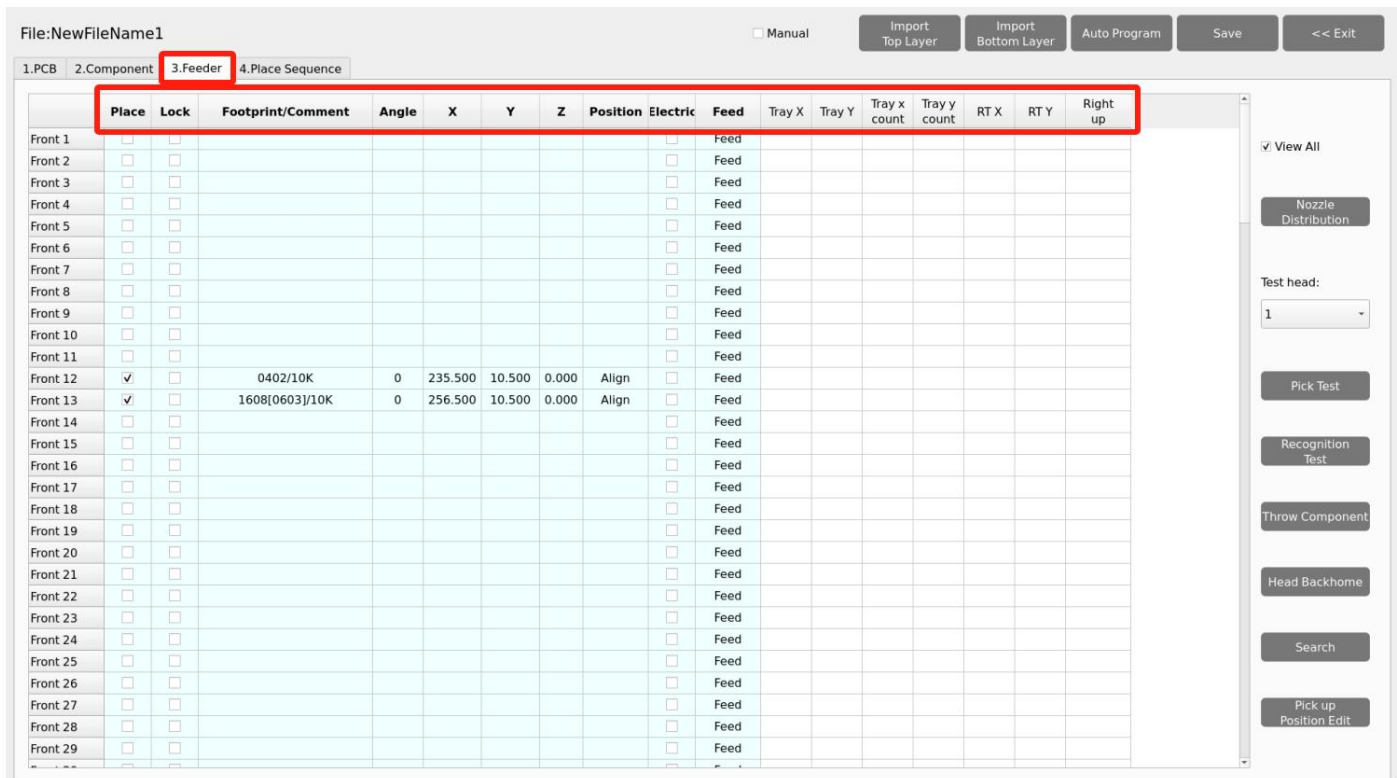
After the end, the automatic programming result interface will pop up as shown in the figure:



You can check the nozzle distribution, feeder distribution, and placement sequence. After checking, click "OK" to complete the automatic programming.

3.1.3. Feeder

Click the "3. Feeder" button to enter the feeder editing interface as shown in the figure.



- (1) **Place:** If not selected, the components of this feeder will not be mounted during processing.
- (2) **Lock:** When selected, this component is fixed to this feeder during automatic programming. Stacks 81-160 do not require and cannot be selected.
- (3) **Footprint/Comment:** The name of components. The combination of the two determines the type of component. Software statistical data cannot be changed by users.

Feeder exchange is completed in the column of "Footprint/Comment", double click the component that needs to be exchanged, such as "0402/10K", select the space , then double-click the "Footprint/Comment" column of the target feeder, select "0402/10K" , and the exchange is completed. Change all components that need to be replaced: click "Lock" for all feeders, and click "auto program", then the software will re-optimize the mounting program according to the current feeder layout.

- (4) **Angle:** The angle at which the component is stored in the feeder and the angle at which the corresponding component rotates during the installation process are shared. If it is found that the angle of a component after installation is not correct, it can be adjusted as a whole here without the need for individual adjustments during the installation process. Note that for components with polarity, attention should not only

be paid to the posture after installation, but also to the polarity.

(5) **X/Y/Z:** Pick up position (for tray materials, the position is at the center position of the component in the lower left corner of the pallet) and pick up height. The pick up position is set using the lock button under the "Position" column. The pick up height can be set based on experience, with pneumatic feeder of -0.5mm and electric reach of -1mm. When batch setting is required, the position and height can be set in the interface entered by clicking the "Batch Edit Feeding Position" button.

(6) **Position:** Position lock, use Fiducial camera to lock the pickup position. Before locking, click the "Feed" button to let feeder move once to ensure accurate positioning.

(7) **Electric:** Select it when using an electric feeder. Pneumatic feeder does not need this option. Feeders 81-160 do not require and cannot be selected.

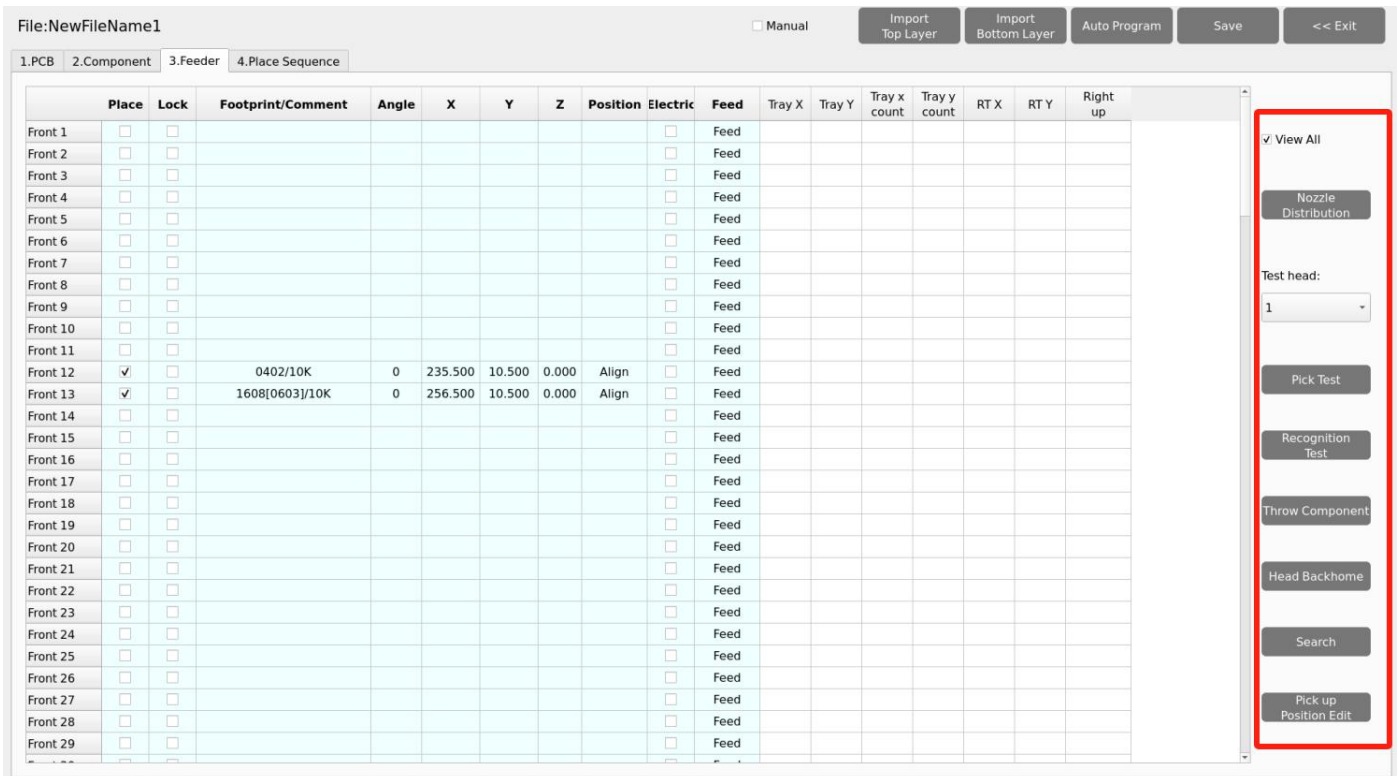
(8) **Feed:** Feeder feeding Test.

(9) **Tray X and Tray Y:** For tray components, set where to pick up the first material from the tray.

(10) **Trays X count and Y count :** Set the total **number** of columns and rows for tray component.

(11) **RT X, RT Y:** For tray components, the center position of the component in the upper right corner is combined with the center position of the component in the lower left corner and the number of rows and columns of the tray to get the pickup position of each component on the tray.

(12) **Right up:** Position lock, use the Fiducial camera to lock the center position of the material in the upper right corner of the tray.



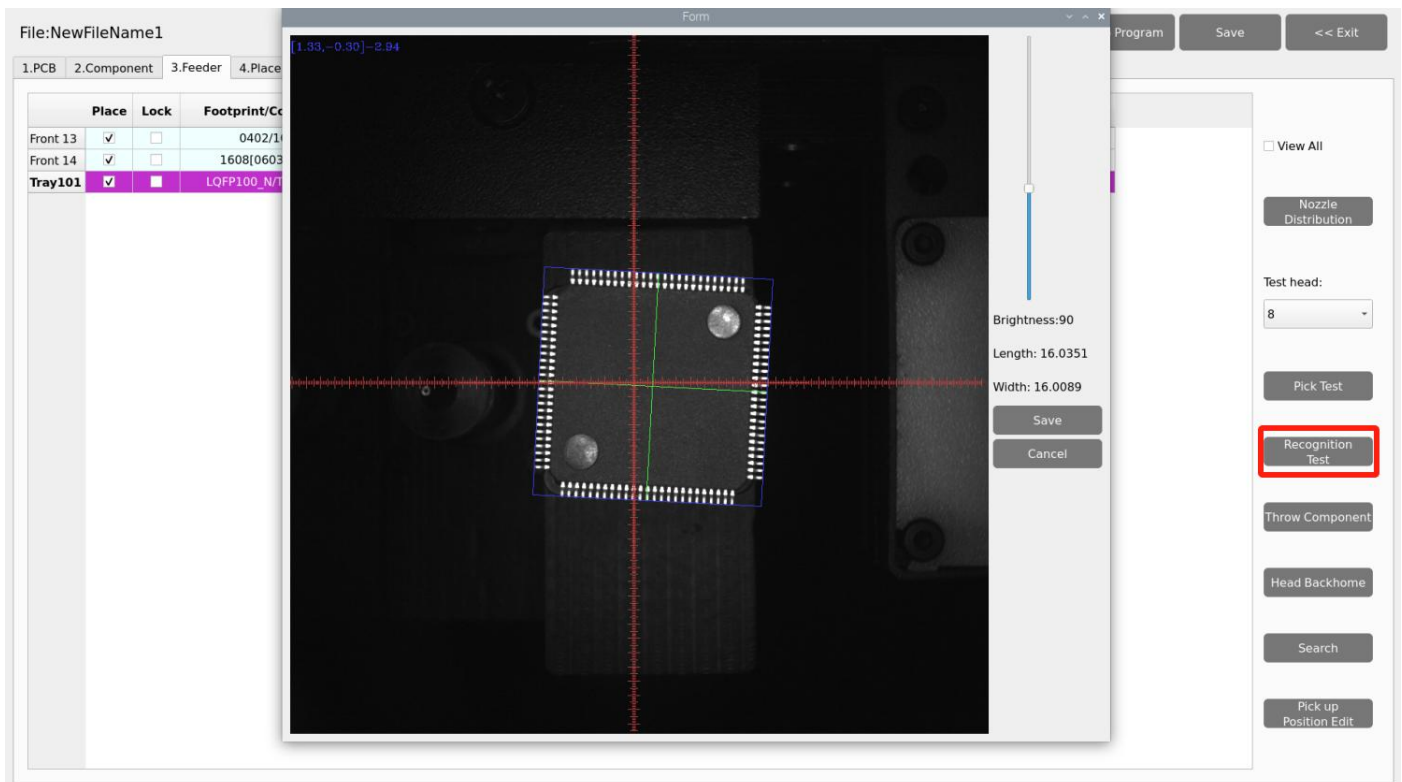
(13) **View All:** Select to display all 160 feeder positions. Among them, No. 1-33 is the front feeders, 34-80 is the back feeders, 81-100 is the vibration feeder, and 101-160 is the tray feeders. If not selected, it only shows the feeders that been applied.

(14) **Nozzle Distribution:** Operate the same as the "Nozzle Distribution" button on the nozzle library interface of the application. Adjust the nozzles on each head for pick-up test.

(15) **Test Head:** No. 1-8 are optional. Confirm the head to be used for "Pick Test", "Recognition Test", and "Throw component" tests.

(16) **Pick Test:** pick up components testing. Select the feeder to be tested from the list, then choose the test head, click "Pick up", and the device will perform the action.

(17) **Recognition Test:** After picking up component, click "recognition test" to verify whether the "Exposure", "Flash", "Brightness" and other parameters in the component are reasonable. The interface will pop out like below figure.



(a) **brightness:** Adjust the recognition brightness value up and down, and the image will show the real-time selection of components. Find the maximum and minimum values of recognition brightness that can accurately select components, and take the middle value between them to improve the stability of component recognition.

(b) **Length and width:** The length and width of component that recognized by camera.

(c) **Save:** After clicking the "save" button, exit the photo detection interface and automatically fill in the three parameters of component length, width, and brightness in the corresponding parameters of the "2. component" page.

(d) **Cancel:** Exit without saving data. If suitable device highlights cannot be found, you can modify the "Exposure", "Flash", and "Calibration" parameters in the "2. Components" interface, and then click "Recognition Test" again to view.

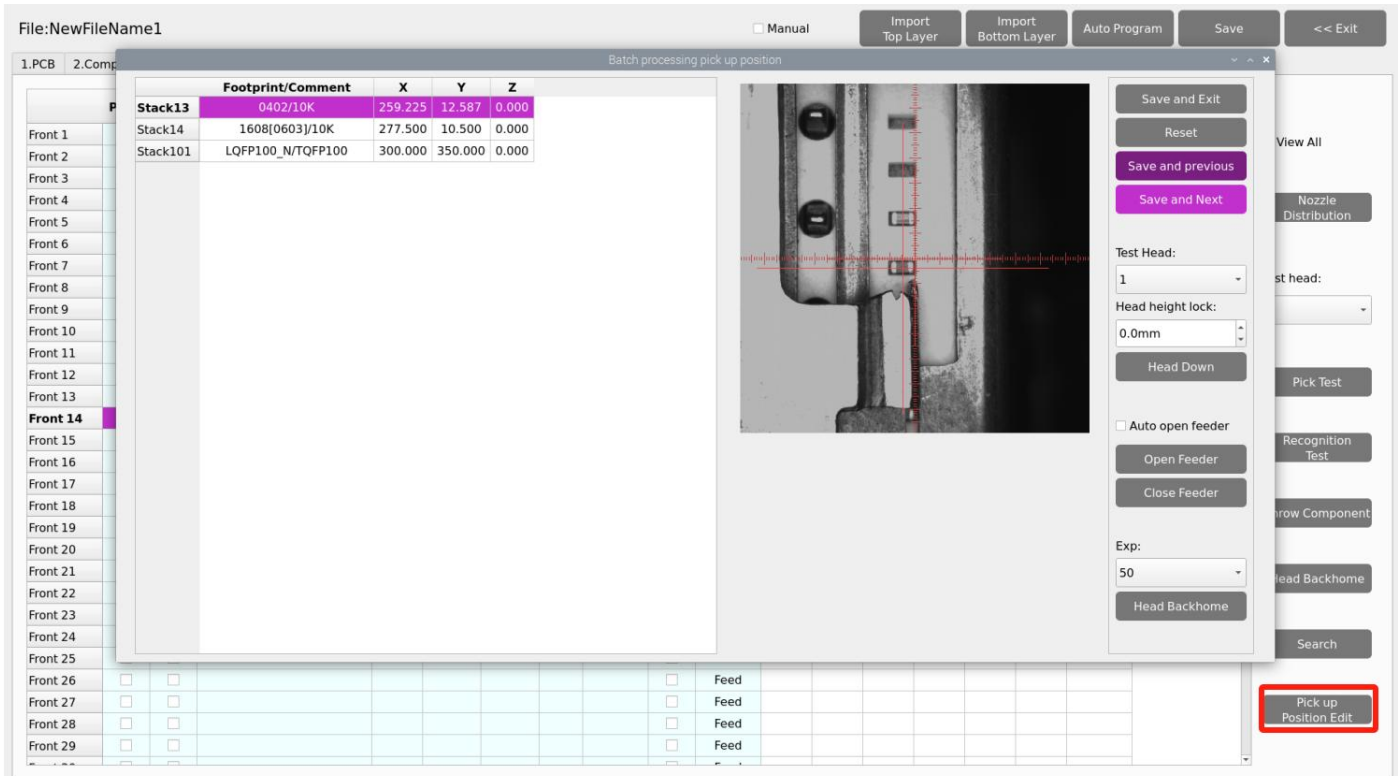
(18) **Throw Component:** After completing the photo test, throw the material into the material throwing box.

(19) **Head Backhome:** When the head has returned to the resting position and the feeder needs to be adjusted, click this button to let the head return to the middle of the device for adjustment of the feeder.

(20) **Search:** Enter component package or specifications to search. Only the nearest component that containing keywords can be found in one search. If the target component is not found, you can continue to click the "Search" button, enter the component package or specification, and click the "OK" button to search

for the next one.

(21) **Pick up Position Edit:** Click this button to enter the batch processing interface for pick-up position and height, as shown in the figure:



The interface is divided into three parts: left, middle, and right. On the left is the stack list, in the middle is a photo taken by Fiducial camera, and on the right is the option buttons.

Followings are the option buttons on the right side:

- (a) **Save and exit:** Save data and exit the batch processing interface.
- (b) **Reset:** After clicking "Reset" and then "Save and Exit", all stack data will be reset to default data.

Note that this is not the last saved data, please use this function with caution.

(c) **Save and previous:** Save the data and automatically jump to the previous stack used in the current file.

(d) **Save and Next:** Save the data and automatically jump to the current file for use in the next stack.

(e) **Test Head:** Choose a mounting head to test the pick-up height.

(f) **Head height lock:** automatically obtains the value of Z in the list.

(g) **Head Down:** Click the "Head Down" button when feeder is turned on, to align the selected head with the current stack and descend to the height in the "Head Height lock" input box. Observe whether the height is appropriate. If not, adjust the height value and click the button again until it is appropriate.

(h) **Auto open feeder:** When selected and clicked "Save and Next", feeder will automatically open.

(i) **Open feeder:** Open feeder.

(j) **Close Feeder:** Close feeder.

(k) **Exposure:** Adjust the brightness of the Fiducial camera's aerial photography.

(l) **Head backhome:** When the head has returned to the resting position and the feeder needs to be adjusted, click this button to let the head return to the middle of the device for adjustment of the feeder.

Operations of how to edit pick up positions:

Use the "nozzle distribution" to nozzles CN065 and below on head 1 and head 8 for pick-up height adjustment. Click the "Pick up Position Edit" button to enter the interface for batch processing of component pick-up location and height. Click "auto open feeder", users can select from a certain feeder to set (starting from the first allocated feeder by default). The current feeder location will be displayed in the middle of the page (the current cross is the default value). Click the mouse and use the new red cross to select the component center (usually located at the edge of the tablet if feeder is closed). Select the appropriate head, and click "Nozzle Down", adjust the height, then click "Save and Next" until all operations are completed. At this time, the buzzer will sound to prompt. Click "Save and Exit" to exit. And the setting of the pickup location is completed. **Note that the tray feeder can only set the center position of the component in the lower left corner here. When returning to the "3. Feeder" interface, it is necessary to set the center position of the component in the upper right corner and related parameters of the tray.**

3.1.4. Place Sequence

Click the "4. Place Sequence" button to enter the step editing interface as shown in the figure.

Place	Feeder ID	Footprint	Comment	Designator	Head	X	Y	Angle	Nozzle Distribution	
1	✓	12	0402	10K	R22	1	24.950	22.050	-45.000	CN040+CN065+CN065+CN065+CN040+CN040+CN040+CN
2	✓	13	1608[0603]	10K	R44	2	22.850	16.370	-75.000	
3	✓	13	1608[0603]	10K	R48	3	30.630	24.150	-15.000	
4	✓	13	1608[0603]	10K	R36	4	9.370	29.850	-15.000	
5	✓	12	0402	10K	R18	5	18.190	20.240	75.000	
6	✓	12	0402	10K	R17	6	16.500	20.940	60.000	
7	✓	12	0402	10K	R24	7	26.760	25.190	-15.000	
8	✓	13	1608[0603]	10K	R43	8	20.000	16.000	-90.000	
9	✓	12	0402	10K	R14	1	13.240	25.190	15.000	
10	✓	13	1608[0603]	10K	R37	2	9.000	27.000	0.000	
11	✓	13	1608[0603]	10K	R25	3	31.000	27.000	0.000	
12	✓	13	1608[0603]	10K	R28_2	4	27.780	79.780	45.000	
13	✓	12	0402	10K	R7	5	20.000	34.000	90.000	
14	✓	12	0402	10K	R20	6	21.810	20.240	-75.000	
15	✓	12	0402	10K	R8	7	18.190	33.760	-75.000	
16	✓	13	1608[0603]	10K	R26_2	8	30.630	74.850	15.000	
17	✓	12	0402	10K	R11	1	13.940	30.500	-30.000	
18	✓	13	1608[0603]	10K	R42	2	17.150	16.370	75.000	
19	✓	13	1608[0603]	10K	R27	3	29.530	32.500	30.000	
20	✓	13	1608[0603]	10K	R34	4	12.220	34.780	-45.000	
21	✓	12	0402	10K	R19	5	20.000	20.000	-90.000	
22	✓	12	0402	10K	R3	6	26.060	30.500	30.000	
23	✓	12	0402	10K	R4_2	7	24.950	76.950	45.000	
24	✓	13	1608[0603]	10K	R27_3	8	170.470	67.500	30.000	
25	✓	12	0402	10K	R3_2	1	26.060	75.500	30.000	
26	✓	13	1608[0603]	10K	R39	2	10.470	21.500	30.000	
27	✓	13	1608[0603]	10K	R38_2	3	9.370	69.150	15.000	
28	✓	13	1608[0603]	10K	R33_3	4	185.500	63.470	-60.000	
29	✓	12	0402	10K	R13_2	5	13.000	72.000	0.000	
30	✓	12	0402	10K	R7_2	6	20.000	79.000	90.000	

- (1) **Place:** If not checked, this component will be skipped during processing;
- (2) **Feeder ID:** feeder ID of the component;
- (3) **Footprint:** footprint of the component
- (4) **Comment:** the value of the component
- (5) **Designator:** the designator of the component
- (6) **Head:** head# of the component
- (7) **X/Y:** X, Y coordinate on the PCB board.
- (8) **Angle:** the angle of the component on the PCB board.
- (9) **Nozzle Distribution:** the current step has data indicating that before mounting the component, the nozzle needs to be changed according to the current nozzle configuration. Double-click the cell where the nozzle change scheme needs to be changed, such as the nozzle scheme cell in step 2, and the nozzle head allocation interface will appear as shown in the figure.

File:NewFileName1 Manual Import Top Layer Import Bottom Layer Auto Program Save << Exit

1.PCB 2.Component 3.Feeder 4.Place Sequence

Place	Feeder ID	Footprint	Comment	Designator	Head	X	Y	Angle	Nozzle Distribution	
1	✓	12	0402	10K	R22	1	24.950	22.050	-45.000	CN040+CN065+CN065+CN065+CN040+CN040+CN
2	✓	13	1608[0603]	10K	R44	2	22.850	16.370	-75.000	
3	✓	13	1608[0603]	10K						
4	✓	13	1608[0603]	10K						
5	✓	12	0402	10K						
6	✓	12	0402	10K						
7	✓	12	0402	10K						
8	✓	13	1608[0603]	10K						
9	✓	12	0402	10K						
10	✓	13	1608[0603]	10K						
11	✓	13	1608[0603]	10K	R25	3	31.000	27.000	0.000	
12	✓	13	1608[0603]	10K	R28_2	4	27.780	79.780	45.000	
13	✓	12	0402	10K	R7	5	20.000	34.000	90.000	
14	✓	12	0402	10K	R20	6	21.810	20.240	-75.000	
15	✓	12	0402	10K	R8	7	18.190	33.760	-75.000	
16	✓	13	1608[0603]	10K	R26_2	8	30.630	74.850	15.000	
17	✓	12	0402	10K	R11	1	13.940	30.500	-30.000	
18	✓	13	1608[0603]	10K	R42	2	17.150	16.370	75.000	
19	✓	13	1608[0603]	10K	R27	3	29.530	32.500	30.000	
20	✓	13	1608[0603]	10K	R34	4	12.220	34.780	-45.000	
21	✓	12	0402	10K	R19	5	20.000	20.000	-90.000	
22	✓	12	0402	10K	R3	6	26.060	30.500	30.000	
23	✓	12	0402	10K	R4_2	7	24.950	76.950	45.000	
24	✓	13	1608[0603]	10K	R27_3	8	170.470	67.500	30.000	
25	✓	12	0402	10K	R3_2	1	26.060	75.500	30.000	
26	✓	13	1608[0603]	10K	R39	2	10.470	21.500	30.000	
27	✓	13	1608[0603]	10K	R38_2	3	9.370	69.150	15.000	
28	✓	13	1608[0603]	10K	R33_3	4	185.500	63.470	-60.000	
29	✓	12	0402	10K	R13_2	5	13.000	72.000	0.000	
30	✓	12	0402	10K	R7_2	6	20.000	79.000	90.000	

Simultaneously Pick

New

Delete

Move Up

Move Down

Search Designator

Batch Adjustment

Component Summary

Batch Create

For each head, you can select the nozzle model to be replaced in the drop-down box.

(a) **OK:** Click the "OK" button to exit and fill the selected nozzle solution.

(b) **Clear:** Click the "Clear" button to exit and clear the nozzle solution.

(c) **Cancel:** Click the "Cancel" button to exit.

(d) **Apply:** Click the "Apply" button, and the device will automatically put the original nozzle on the head that needs to be replaced into the matching storage location and pick up the target nozzle.

(10) **Align:** after tick "Manual" , use the Fiducial camera to align the placement position of the component in the current step. Prerequisite: First, in the "1.PCB" interface, use the "Fiducial Align" button to accurately calculate the origin position.

File:NewFileName1 Manual Import Top Layer Import Bottom Layer Auto Program Save << Exit

1.PCB 2.Component 3.Feeder 4.Place Sequence

Place	Feeder ID	Footprint	Comment	Designator	Head	X	Y	Angle	Nozzle Distribution	
1	✓	12	0402	10K	R22	1	24.950	22.050	-45.000	CN040+CN065+CN065+CN040+CN040+CN040+CN
2	✓	13	1608[0603]	10K	R44	2	22.850	16.370	-75.000	
3	✓	13	1608[0603]	10K						
4	✓	13	1608[0603]	10K						
5	✓	12	0402	10K						
6	✓	12	0402	10K						
7	✓	12	0402	10K						
8	✓	13	1608[0603]	10K						
9	✓	12	0402	10K						
10	✓	13	1608[0603]	10K						
11	✓	13	1608[0603]	10K	R25	3	31.000	27.000	0.000	
12	✓	13	1608[0603]	10K	R28_2	4	27.780	79.780	45.000	
13	✓	12	0402	10K	R7	5	20.000	34.000	90.000	
14	✓	12	0402	10K	R20	6	21.810	20.240	-75.000	
15	✓	12	0402	10K	R8	7	18.190	33.760	-75.000	
16	✓	13	1608[0603]	10K	R26_2	8	30.630	74.850	15.000	
17	✓	12	0402	10K	R11	1	13.940	30.500	-30.000	
18	✓	13	1608[0603]	10K	R42	2	17.150	16.370	75.000	
19	✓	13	1608[0603]	10K	R27	3	29.530	32.500	30.000	
20	✓	13	1608[0603]	10K	R34	4	12.220	34.780	-45.000	
21	✓	12	0402	10K	R19	5	20.000	20.000	-90.000	
22	✓	12	0402	10K	R3	6	26.060	30.500	30.000	
23	✓	12	0402	10K	R4_2	7	24.950	76.950	45.000	
24	✓	13	1608[0603]	10K	R27_3	8	170.470	67.500	30.000	
25	✓	12	0402	10K	R3_2	1	26.060	75.500	30.000	
26	✓	13	1608[0603]	10K	R39	2	10.470	21.500	30.000	
27	✓	13	1608[0603]	10K	R38_2	3	9.370	69.150	15.000	
28	✓	13	1608[0603]	10K	R33_3	4	185.500	63.470	-60.000	
29	✓	12	0402	10K	R13_2	5	13.000	72.000	0.000	
30	✓	12	0402	10K	R7_2	6	20.000	79.000	90.000	

Nozzle Distributor

OK Clear Cancel Apply

Simultaneously Pick

New

Delete

Move Up

Move Down

Search Designator

Batch Adjustment

Component Summary

Batch Create

(11) **Simultaneously pick**: it's selected for multi-heads picking simultaneously.

(12) **New**:add new sequence

(13) **Delete**:delete the selected sequence.

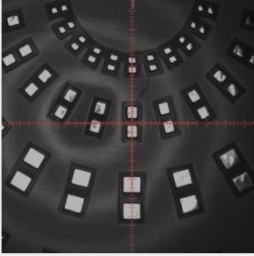
(14) **Move up**:move the selected line up one row.

(15) **Move down**: move the selected line down one row.

(16) **Search Designator**: input the designator, and find out the related sequence.

(17) **Batch Adjustment**:batch adjust each component placement position. Prerequisite: the target PCB has been placed in the mounting area. Click the "Batch Adjustment" button, the device will automatically scan the Fiducial points on the PCB and enter the batch adjustment interface as shown in the figure.

Sequence	Footprint/Comment	Designator	X	Y	Angle
Sequence1	0402/10K	R24	26.760	25.190	-15.000
Sequence2	0402/10K	R23	26.060	23.500	-30.000
Sequence3	0402/10K	R22	24.950	22.050	-45.000
Sequence4	1608[0603]/10K	R45	25.500	17.470	-60.000
Sequence5	0402/10K	R21	23.500	20.940	-60.000
Sequence6	0402/10K	R20	21.810	20.240	-75.000
Sequence7	0402/10K	R19	20.000	20.000	-90.000
Sequence8	0402/10K	R18	18.190	20.240	75.000
Sequence9	0402/10K	R17	16.500	20.940	60.000
Sequence10	0402/10K	R16	15.050	22.050	45.000
Sequence11	0402/10K	R15	13.940	23.500	30.000
Sequence12	0402/10K	R14	13.240	25.190	15.000
Sequence13	0402/10K	R13	13.000	27.000	0.000
Sequence14	0402/10K	R12	13.240	28.810	-15.000
Sequence15	0402/10K	R11	13.940	30.500	-30.000
Sequence16	0402/10K	R10	15.050	31.950	-45.000
Sequence17	0402/10K	R9	16.500	33.060	-60.000
Sequence18	0402/10K	R8	18.190	33.760	-75.000
Sequence19	0402/10K	R7	20.000	34.000	90.000
Sequence20	0402/10K	R6	21.810	33.760	75.000
Sequence21	0402/10K	R5	23.500	33.060	60.000
Sequence22	0402/10K	R4	24.950	31.950	45.000
Sequence23	0402/10K	R3	26.060	30.500	30.000
Sequence24	0402/10K	R2	26.760	28.810	15.000
Sequence25	0402/10K	R1	27.000	27.000	0.000
Sequence26	0402/10K	R1_2	27.000	72.000	0.000
Sequence27	0402/10K	R2_2	26.760	73.810	15.000
Sequence28	0402/10K	R3_2	26.060	75.500	30.000
Sequence29	0402/10K	R4_2	24.950	76.950	45.000



Cam Param:

Flash Inner Middle Outer

Brightness 20

Close

Reset

Previous

Next

The interface is divided into three parts: left, middle and right. The left side is the sequence list, the middle is the photo taken by Fiducial camera, and the right side is the button. The user can choose which row in the step list, and the step selected before entering the batch adjustment interface is selected by default. In the middle, the brightness and flash of Fiducial camera can be modified.

(a) Close:save and exit.

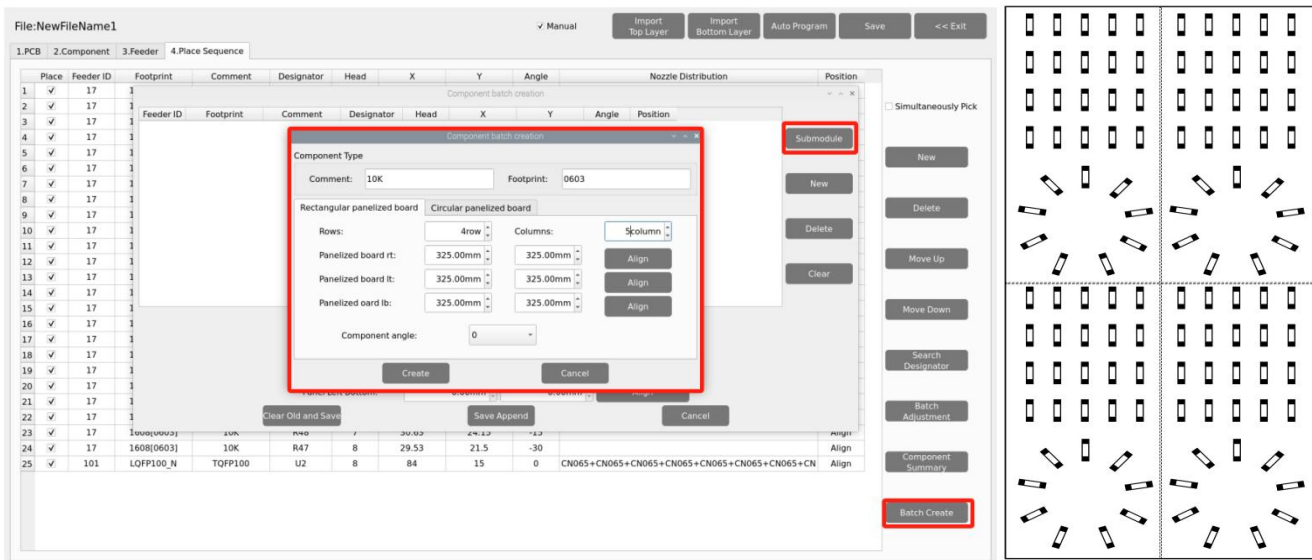
(b) Reset: The X, Y, and angle parameters in the sequence list are reset to the data before entering the batch adjustment interface.

(c) Previous:Automatically jump to the previous step, and the Fiducial camera locks the corresponding coordinates in the step.

(d) Next: Automatically jump to the next step, and the Fiducial camera locks the corresponding coordinates in the step.

(18) **Component Summary:** Synchronize the "2. Component" and "3. Feeder" interfaces with the added or deleted steps and the installation component classification summary. Note that it is used for manual programming.

(19) **Batch Create:** need to select "Manual" firstly,click "Batch create " button,to enter the "component batch creation" interface in figure:

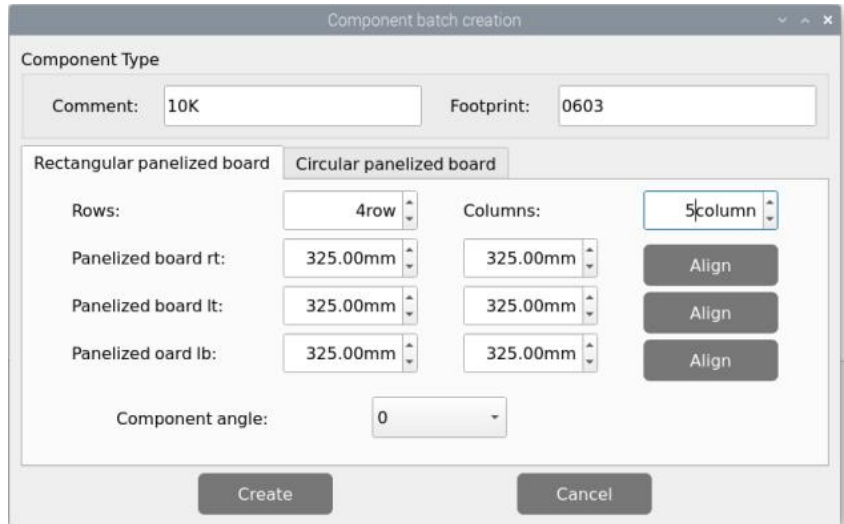
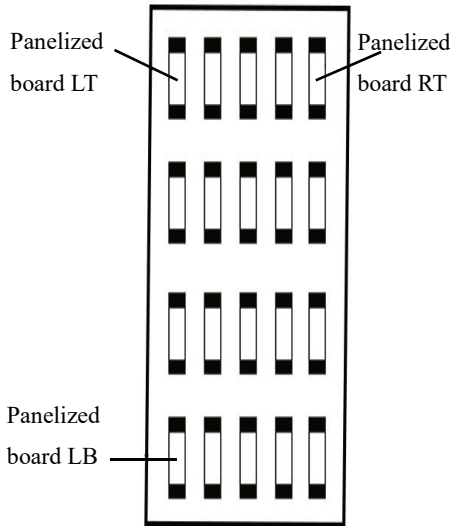


This function is suitable for PCBs with regular and relatively simple component layout. We can see the above picture which has a rectangular block and a circular block to form a small panel. We call such panel as submodule. We can generate the whole panel board through creating a submodule. Two ways to generate submodules: rectangle and circle.

(a) The way to generate rectangle panel: Click: "submodule", below dialogue will pop up. Please fill in

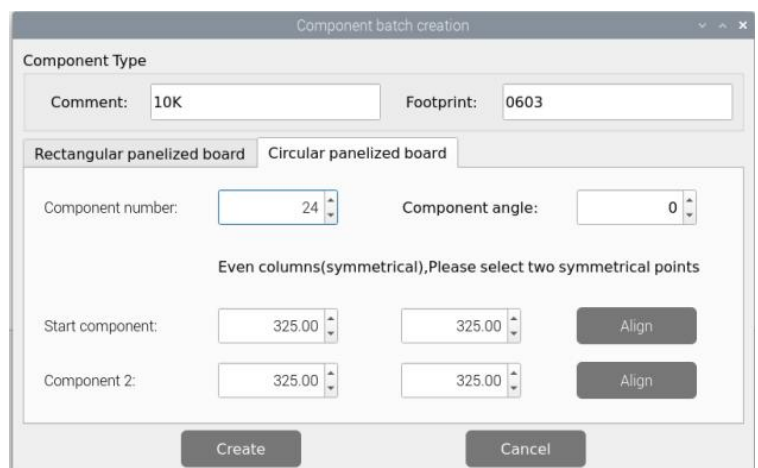
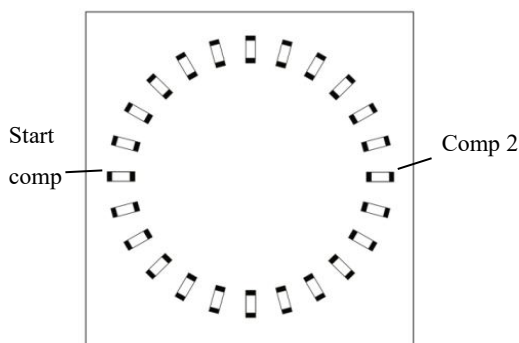
specification and footprint of component. We can see the panel has four rows and five columns. Fill in 4 rows and 5 columns in the dialogue, and align the three components (right top, left top, left bottom). The component degree will be based on actual situation.

Click "create", the machine will generate all the coordinate automatically..



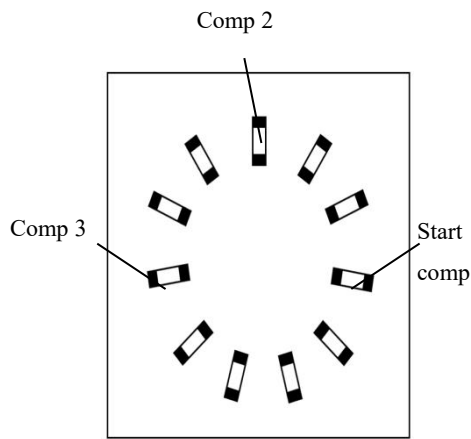
(b) The way to generate circle panel

- 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.



- When the quantity of component is odd: the component type will be the same. We can see that the panel has 9 components , as 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 in turn. Click 'create' to generate 9

components' coordinate in circle panel.



Component batch creation

Component Type

Comment: 10K Footprint: 0603

Rectangular panelized board Circular panelized board

Component number: 9 Component angle: 0

Odd columns(asymmetrical), please select three points

Start component: 325.00 325.00 Align

Component 2: 325.00 325.00 Align

Component 3: 325.00 325.00 Align

Create Cancel

All components setting on this files list, like: nozzle selecting, stack setting, the location of pick components, adjustment setting, and others components' setting need to be finished here, components generated by the above method will be reflected in the component list in the figure below in an overlaid form.

Component batch creation

	Feeder ID	Footprint	Comment	Designator	Head	X	Y	Angle	Position
Comp1		0603	10K			-106.580	225.070	-180.000	Align
Comp2		0603	10K			-105.728	218.600	-165.000	Align
Comp3		0603	10K			-103.231	212.570	-150.000	Align
Comp4		0603	10K			-99.258	207.392	-135.000	Align
Comp5		0603	10K			-94.080	203.419	-120.000	Align
Comp6		0603	10K			-88.050	200.922	-105.000	Align
Comp7		0603	10K			-81.580	200.070	-90.000	Align
Comp8		0603	10K			-75.110	200.922	-75.000	Align
Comp9		0603	10K			-69.080	203.419	-60.000	Align
Comp10		0603	10K			-63.902	207.392	-45.000	Align
Comp11		0603	10K			-59.929	212.570	-30.000	Align
Comp12		0603	10K			-57.432	218.600	-15.000	Align

Sub-M row: 2row Sub-M column: 2column

Panel Right Top: 0.00mm 0.00mm Align

Panel Left Top: 0.00mm 0.00mm Align

Panel Left Bottom: 0.00mm 0.00mm Align

















Clear Old and Save Save Append Cancel

Submodule New Delete Clear

Then set the number of rows and columns of sub-modules contained in the PCB board, align the positions of right top, left top, left bottom, click the "Clear Old and Save" button to clear the old coordinates and create new coordinates; click " Save Append", to insert the newly generated coordinates into the list of old coordinates.

3.2. Nozzle Information

Table1-1 Nozzle

Type	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
Model	CN020	CN030	CN040	CN065	CN100	CN110	CN140	CN220
Illustration								
Outer Diameter	0.5mm	0.6mm	0.75mm	1.2mm	1.8mm	1.9mm	2.2mm	3.6mm
Inner Diameter	0.16mm	0.28mm	0.38mm	0.65mm	1.0mm	1.1mm	1.4mm	2.2mm
Type	Regular	Regular	Regular	Special	Special	Special	Special	Special
Model	CN400/ CN400N	CN750	CN1100	YX01	YX02	YX03	YX04	YX05
Illustration								
Outer Diameter	6.0mm	9.0mm	12.7mm					
Inner Diameter	4.0mm	7.5mm	11mm					


The nozzle disc diameter are all the same, except CN400 which is 9.8mm and CN400N disc diameter which is 13.4mm.

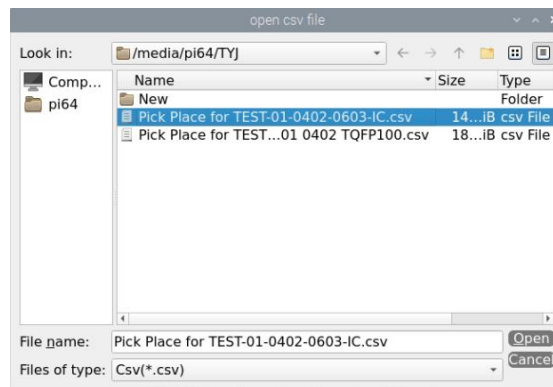
Notice: YX03, YX04 or other specially customized nozzle cannot be put into Nozzle Library. When you need to work with special nozzles, please manually install them on machine and at the same time must remark "Custom" in software for related nozzle head. This is to avoid machine drop them into Nozzle Library and broken nozzle and machine.

Table 1-2 **Size comparison of Nozzles**

Model	Recommendation (Imperial system)
CN020	01005
CN030	0201
CN040	0402 (optimal)
CN065	0402 ,0603 etc.
CN100	0805 ,diode , 1206 , 1210 etc.
CN110	0805 ,diode , 1206 , 1210 etc.
CN140	1206 , 1210 , 1812 ,2010 ,SOT23 ,5050, etc.
CN220	SOP series ICs ,SOT89 ,SOT223 ,SOT252, etc.
CN400/ CN400N	ICs from 5 to 12mm
CN750	ICs from 12to 24mm
CN1100	ICs bigger than 24mm
YX01	3528series 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

3.3. Programming of "Import coordinate file"

- (1) Generate coordinate file from PCB design software, make sure X,Y  is same to the direction of PCB feeding into machine. Save the file in USB disk.
- (2) Create a new file and name it, click "Edit" to start programming.
- (3) Under "**1.PCB**" interface, set the PCB length and width, adjust track width, click "Feed PCB" make sure the board in stand by status. Setting the PCB origin, Panel information etc. Insert USB disk onto machine, import the current programming's layer coordinate file. You'll see a window pop out, select the correct file, click "Open", data will be automatically imported into Component List. Turn to the "1.PCB" interface to set fiducial information.



- (4) Click "**2.Component**", you can see the imported data will be sorted and match with footprint library: the well-matched component length/width can be got from footprint library, the non-matched components length/width will show 0, nozzle will show null like below Component3 &4. If there's fiducial information in the list such as Component4, you can delete it. For the non-matched components parameter, Length, Width, Brightness can be easily got from "Photo Test" and you can fill into them later.

1.PCB 2.Component 3.Feeder 4.Place Sequence									
	Footprint/Comment	Qty	Length	Width	Thickness	Nozzle	Calibration	Feeder	Feed Time
Comp1	0402/10K	96	1.000	0.500	0.350	CN040	Fly calib	Tape 8mm	50
Comp2	LQFP100_N/TQFP100	2	16.000	16.000	1.200	CN400N	IC calib	Tray	50
Comp3	MARK/mark	2	0.000	0.000	0.000		No Action	Tape 8mm	50
Comp4	1608[0603]/10K	96	0.000	0.000	0.000		No Action	Tape 8mm	50

- (5) Click "**3.Feeder**" for feeder setting. If any component reel need to be fixed on specified feeder position, please firstly confirm this component's feeder ID and tick it, then this feeder position will be clocked. After that, click "Auto Program", set nozzle information and start automatic programming. Once "Auto Program" finished, please turn back to "Feeder" interface for a whole check, if you would like to adjust some

feeders ID, you can tick on and lock them, then click "Auto Program" again for a second program. After all feeders set well, please install tape reel on related feeder ID. Use the "Pick up" to set each feeder pick up position and pick up height. After tape feeders setting, please also finish the tray feeder information, with the help of Pick test and "Photo Test" to recognize related parameters.

Turn back to "Component" interface, select those non-matched components, click "Add to Library" and they will be saved in library for future use, save a lot of work.

(6) Click "**4. Place Sequence**", you can see the well set information. If you need several nozzle head pick up components at the same time, please select "Simultaneously Pick", other information not suggested to modify.

3.4. Programming Manually

(1) Create a new file and name it, click "Edit" to start programming. Select the "Manual" mode.

(2) Under "**1.PCB**" interface, set the PCB length and width, adjust track width, click "Feed PCB" make sure the board in stand by status. Click "Angle Test" to set PCB angle on the track. Setting the PCB origin, Panel information and fiducial information.

(3) Click "**4. Place Sequence**", in the operation sequence interface, click "New" or "Batch Create" to create components.

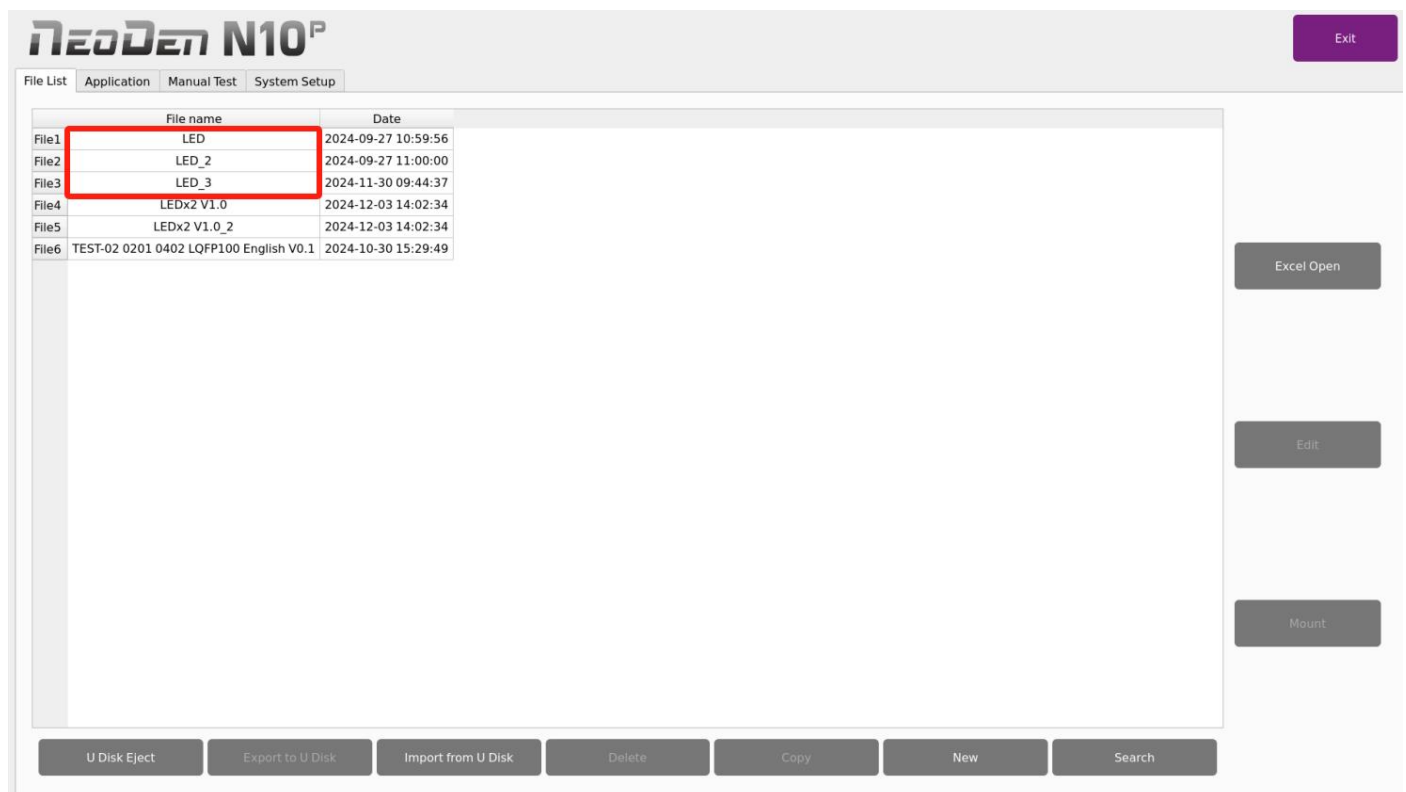
(a) If component variety is less and user can quickly arrange its feeder distribution, nozzle change and placement sequence, then please directly fill into feeder ID, footprint, comment (specification), nozzle head number, position, angle etc., also please program the nozzle change part. Click "Component Summary", all data will be imported into sequence list and component list. If any components not get matched information from Footprint Library, please manually fill into their info. Turn to "Feeder" interface, please install feeders on the well set feeder ID, click "Pick up Position Edit", set each feeder pick position and pick height, after that please also finish the tray feeder information. Click "Pick Test" and "Recognition Test" to adjust parameters, save them and all programming finished.

(b) If component in a great variety, we sincerely use Auto Program as assistance. That is, after fill in the footprint, comment (specification), position, angle etc. in Step interface, click "Component Summary", all data will be imported into sequence list and component list. The following steps will be same as the Step (4) (5) (6) in Chapter 3.3 "Programming of Import coordinate file".

3.5. Long LED Board Programming Guide

Before editing working file for long board, make sure N10P has been fitted with the 1.2 meter or 1.5 meter rail extensions.

Base on the length of board, divide it into two modes, "Long Track 2" and "Long Track 3". The "Long Track 2" mode divides a long board into 2 sections, therefore it requires to make 2 working files. The "Long Track 3" mode divides a long board into 3 sections and requires to make 3 working files. And the naming requirements are as follows (take 3 sections as an example): add an underscore(English format) + ordinal number after the 2nd and 3rd file name. Please make sure there is no space in file names.



After the file editing is completed, select the first file(e.g. LED)and then click"Mount", the machine will automatically load these 3 working files in one task.

(a) Import File Programming

1) Divide the long board into 3 sections via PCB design software, then export 3 coordinates files respectively.

2) Edit the 1st section of the file with the same method of importing coordinate file. Please pay attention that the physical length of the 1st board should be same as the 0,0 origin point in PCB design software. It is recommended to set the origin point in a more easy to found place (When the job is switched

to another machine, it's convenient to relocate the origin point and a slight adjustment of the origin point will be fine).

3) Copy the edited working file of 1st section, rename it to meet the rules of the 2nd section. Enter the edit interface, click "Eject PCB", the 1st section of the PCB will exit from the mounting area, the 2nd section will be fed. In the Feeder editing interface, click "Lock" for all used feeders before importing the coordinate file of 2nd section (to avoid repeated edits of the same feed data), other operations are same as those for 1st section.

4) The editing method of the 3rd section is the same as that of the 2nd section.

(b) Manual Programming

1) Edit the 1st section file as manual programming guide.

2) Copy the edited working file of 1st section, rename it to meet the rules of the 2nd section. Enter the edit interface, click "Eject PCB", the 1st section of the PCB will exit from the mounting area, the 2nd section will be fed. In the Feeder editing interface, click "Lock" for all used feeders before importing the coordinate file of 2nd section (to avoid repeated edits of the same feed data), other operations are same as manual programming guide.

3) The editing method of the 3rd section is the same as that of the 2nd section.

4. Mounting Interface

Select the file you want to mount, click "Mount" to enter this interface:

The screenshot shows the NEODEN mounting interface. At the top left, a file selection window displays "File:NewFileName1 Count1". Below this, a table lists mounting steps. The table has columns for "Place", "Footprint/Comment", "Designator", "Feeder ID", "Head", and "Nozzle Distribution". The first two rows are highlighted in purple, indicating they are selected. The "Feeder" field is set to "1608[0603]/10K". On the right side, there are control buttons: "<< Exit", "Start", "Step(Enter)", "Stop(T)", "Config", "File Edit", "Feed PCB", and "Exit PCB". A speed control slider is also visible, set to 80%.

Place	Footprint/Comment	Designator	Feeder ID	Head	Nozzle Distribution
17	1608[0603]/10K	R44	17	1	CN065+CN065+CN065+CN065+CN0
101	LQFP100_N/TQFP100	R43	17	2	
2	1608[0603]/10K	R42	17	3	
3	1608[0603]/10K	R41	17	4	
4	1608[0603]/10K	R40	17	5	
5	1608[0603]/10K	R36	17	6	
6	1608[0603]/10K	R35	17	7	
7	1608[0603]/10K	R34	17	8	
8	1608[0603]/10K	R33	17	1	
9	1608[0603]/10K	R32	17	2	
10	1608[0603]/10K	R39	17	3	
11	1608[0603]/10K	R28	17	4	
12	1608[0603]/10K	R27	17	5	
13	1608[0603]/10K	R26	17	6	
14	1608[0603]/10K	R25	17	7	
15	1608[0603]/10K	R31	17	8	
16	1608[0603]/10K	R30	17	1	
17	1608[0603]/10K	R29	17	2	
18	1608[0603]/10K	R38	17	3	
19	1608[0603]/10K	R37	17	4	
20	1608[0603]/10K	R46	17	5	

(1) **File:**the current working file's name, the Count refers to the section qty of a board, standard board has 1 section, long boards will have 2 or 3 section.

(2) **Feeder:**the activated feeder in current working file. After uncheck in front of"Place", all steps related with this feeder will be skipped.

(3) **Section:**refers to the working section of a board, standard board has 1 section, long boards will have 2 or 3 section.

(a) **Panel:**it shows panel quantities, uncheck in front of"Place", all steps related with this panel will be skipped. Once it is ticked, the background color turns purple.

(b) **Sequence:**it shows all the mounting steps, uncheck in front of"Place"to skip corresponding step and it turns purple. Note: after click "Start", the machine starts from the selected row to start mounting(e.g. it starts from Panel #1 and Step #3 in above photo).

File:NewFileName1 Count1

Section 1

Feeder:	Place	Footprint/Comment	Panel:	Place	Sequence:	Place	Footprint/Comment	Designator	Feeder ID	Head	Nozzle Distribution
17	<input checked="" type="checkbox"/>	1608{0603}/10K	1	<input checked="" type="checkbox"/>	1	<input checked="" type="checkbox"/>	1608{0603}/10K	R44	17	1	CN065+CN065+CN065+CN065+CN065+CN065
101	<input checked="" type="checkbox"/>	LQFP100_N/TQFP100			2	<input checked="" type="checkbox"/>	1608{0603}/10K	R43	17	2	
					3	<input checked="" type="checkbox"/>	1608{0603}/10K	R42	17	3	
					4	<input checked="" type="checkbox"/>	1608{0603}/10K	R41	17	4	
					5	<input checked="" type="checkbox"/>	1608{0603}/10K	R40	17	5	
					6	<input checked="" type="checkbox"/>	1608{0603}/10K	R36	17	6	
					7	<input checked="" type="checkbox"/>	1608{0603}/10K	R35	17	7	
					8	<input checked="" type="checkbox"/>	1608{0603}/10K	R34	17	8	
					9	<input checked="" type="checkbox"/>	1608{0603}/10K	R33	17	1	
					10	<input checked="" type="checkbox"/>	1608{0603}/10K	R32	17	2	
					11	<input checked="" type="checkbox"/>	1608{0603}/10K	R39	17	3	
					12	<input checked="" type="checkbox"/>	1608{0603}/10K	R28	17	4	
					13	<input checked="" type="checkbox"/>	1608{0603}/10K	R27	17	5	
					14	<input checked="" type="checkbox"/>	1608{0603}/10K	R26	17	6	
					15	<input checked="" type="checkbox"/>	1608{0603}/10K	R25	17	7	
					16	<input checked="" type="checkbox"/>	1608{0603}/10K	R31	17	8	
					17	<input checked="" type="checkbox"/>	1608{0603}/10K	R30	17	1	
					18	<input checked="" type="checkbox"/>	1608{0603}/10K	R29	17	2	
					19	<input checked="" type="checkbox"/>	1608{0603}/10K	R38	17	3	
					20	<input checked="" type="checkbox"/>	1608{0603}/10K	R37	17	4	
					21	<input checked="" type="checkbox"/>	1608{0603}/10K	R46	17	5	

Speed(80%):

Throw : 0 Rate: 0%

Log:

Version: N10P
v1.5.0.8 a20

<< Exit

Prev Next View • Standard Sequence Selected Feeder Selected

Display 1 Display 2 Display 3 Display 4 Display 5 Display 6 Display 7 Display 8

(4) **Version:**the current machine model and software version(v1.5.0.8.a20 is the actual version when this manual made).

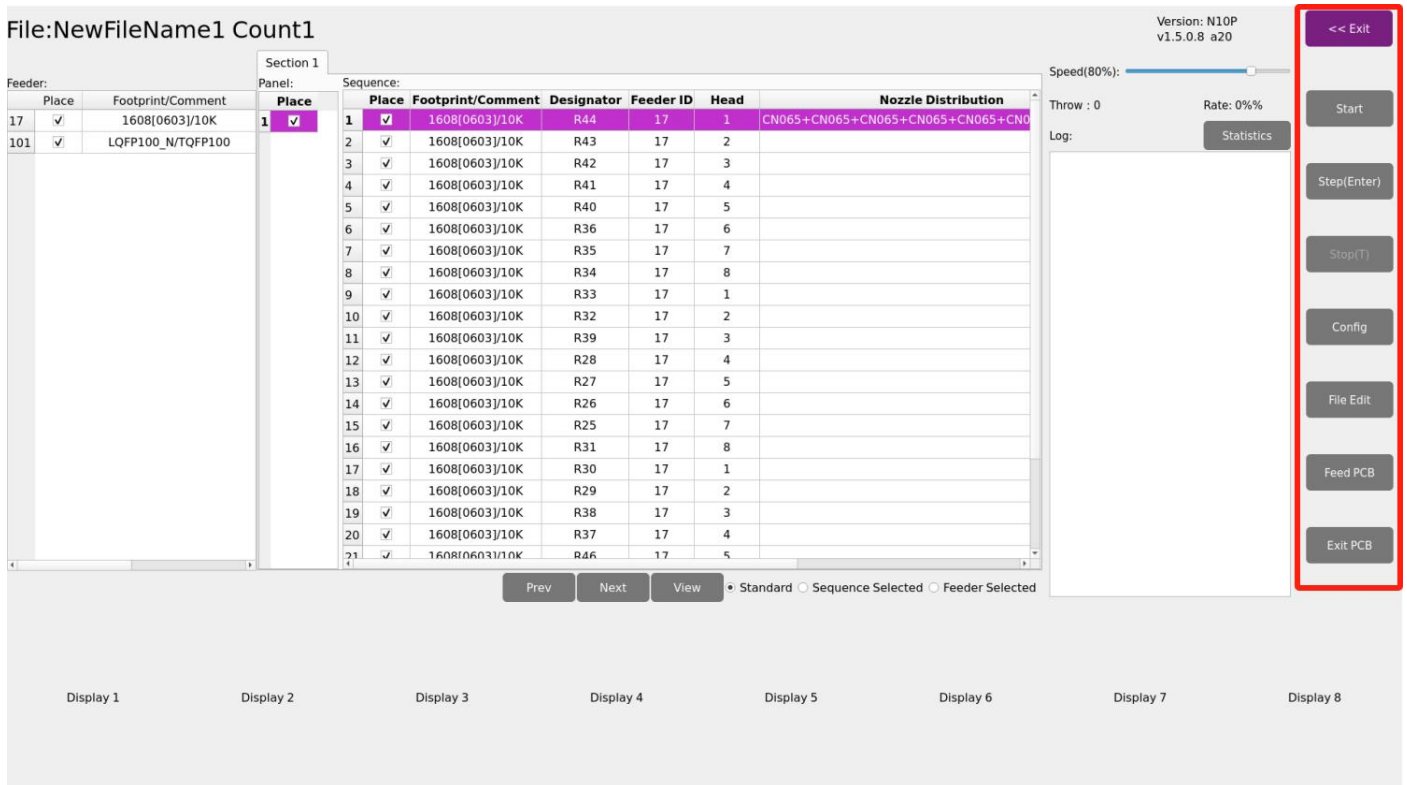
(5) **Speed:**placement speed, maximum value is 100, which can be adjusted manually. **If 1 of the safety doors is open, the speed will turn 20 and can't be adjusted. If a higher speed wants to be achieved, please close all safety doors.**

(6) **Throw:**the thrown components quantity

(7) **Throw rate:**the percentage of thrown components quantity

(8) **Statistics:**data of thrown components. There are two groups of data, one is thrown component qty of each feeder, the other is that of each head. This helps to diagnose the reason of throwing components.

(9) **Log:**the time taken to mount each PCB, the component mounted per hour, and how many PCBs are currently assembled.



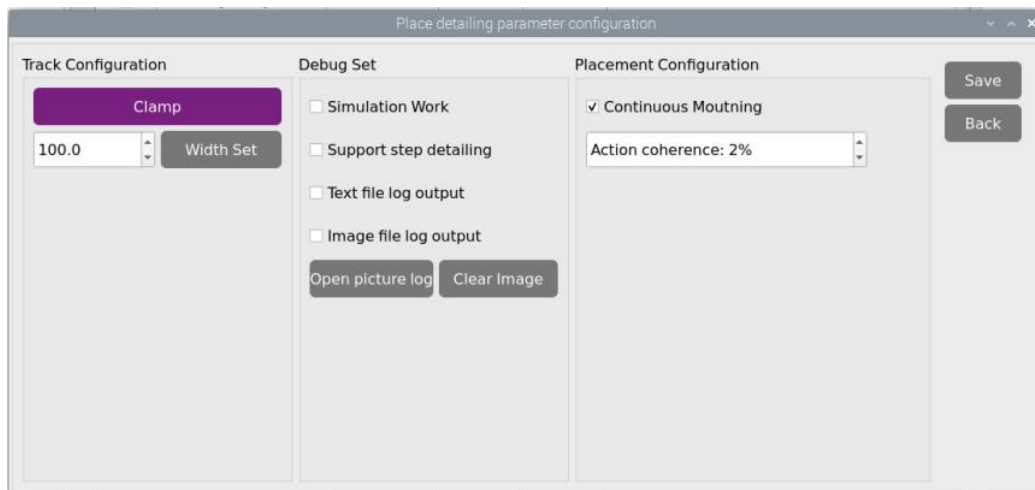
(10) **Exit:**exit this mount interface. Click "Stop"before exiting from mounting process.

(11) **Start:**click Start to mount. It turns "Pause"when it's under mounting status.

(12) **Step(Enter):**click once to perform one step

(13) **Stop:**click to stop the mounting process

(14) **Config:**click to enter the interface of Mount detail parameter configuration



(a) **Clamp:**Controls the rise and fall of the clamping cylinder.

(b) **Width set:**enter the target width to adjust the rails.

(c) **Simulation work:** check it and go back to Mount interface, once click "Mount", it will start dry run.

(d) **Support step detailing:**after ticking it, it will divide an action into several single steps.

(e) **Text file log output:**After checking the box, a log will be generated in the folder

"/home/pi64/smt/Log" with the same name as the working file after each PCB is assembled.

(d) Image file log output:When checked, the photos of the fiducials and the recognized components will be saved during mounting. The same working file will only keep the image from the latest working file, the previous ones will be covered.

(e) Open picture log:open the folder of image log to review them.

(f) Clear image:delete all image logs and text file logs

(g)Continuous mounting:the default setting is to check it, otherwise the working file won't continued to mount PCB under rail mode.

(h)Action coherence:The coherence of each action during operation, the larger the number, the higher the efficiency, however the precision of the mounting will be reduced. The default setting is 2%, and the maximum is 100%

(15) File Edit:under Pause or Stop status, click "Edit" button to enter editing interface.

We suggest you revise feeder pickup position only.

(16) Feed PCB:Manually feed PCB

(17) Eject PCB:Manually eject PCB

File:NewFileName1 Count1

Version: N10P v1.5.0.8 a20

Speed(80%):

Throw : 0 Rate: 0% Log:

Feeder:	Place	Footprint/Comment	Panel:	Place	Sequence:	Place	Footprint/Comment	Designator	Feeder ID	Head	Nozzle Distribution
17	<input checked="" type="checkbox"/>	1608[0603]/10K	1	<input checked="" type="checkbox"/>	1	<input checked="" type="checkbox"/>	1608[0603]/10K	R44	17	1	CN065+CN065+CN065+CN065+CN065+CN065
101	<input checked="" type="checkbox"/>	LQFP100_N/TQFP100			2	<input checked="" type="checkbox"/>	1608[0603]/10K	R43	17	2	
					3	<input checked="" type="checkbox"/>	1608[0603]/10K	R42	17	3	
					4	<input checked="" type="checkbox"/>	1608[0603]/10K	R41	17	4	
					5	<input checked="" type="checkbox"/>	1608[0603]/10K	R40	17	5	
					6	<input checked="" type="checkbox"/>	1608[0603]/10K	R36	17	6	
					7	<input checked="" type="checkbox"/>	1608[0603]/10K	R35	17	7	
					8	<input checked="" type="checkbox"/>	1608[0603]/10K	R34	17	8	
					9	<input checked="" type="checkbox"/>	1608[0603]/10K	R33	17	1	
					10	<input checked="" type="checkbox"/>	1608[0603]/10K	R32	17	2	
					11	<input checked="" type="checkbox"/>	1608[0603]/10K	R39	17	3	
					12	<input checked="" type="checkbox"/>	1608[0603]/10K	R28	17	4	
					13	<input checked="" type="checkbox"/>	1608[0603]/10K	R27	17	5	
					14	<input checked="" type="checkbox"/>	1608[0603]/10K	R26	17	6	
					15	<input checked="" type="checkbox"/>	1608[0603]/10K	R25	17	7	
					16	<input checked="" type="checkbox"/>	1608[0603]/10K	R31	17	8	
					17	<input checked="" type="checkbox"/>	1608[0603]/10K	R30	17	1	
					18	<input checked="" type="checkbox"/>	1608[0603]/10K	R29	17	2	
					19	<input checked="" type="checkbox"/>	1608[0603]/10K	R38	17	3	
					20	<input checked="" type="checkbox"/>	1608[0603]/10K	R37	17	4	
					21	<input checked="" type="checkbox"/>	1608[0603]/10K	R46	17	5	

Standard
 Sequence Selected
 Feeder Selected

Display 1 Display 2 Display 3 Display 4 Display 5 Display 6 Display 7 Display 8

(18) Standard:the default setting is check, except all the unchecked feeders and steps, other steps will be mounted.

(19) Sequence Selection:after check this option, all the checked "Place" will turn unchecked, after that you

can select the steps you want. This is used when any components are missed or to test the rotation of component.

(20) **Feeder Selection:**after check it, all the checked "Place" will turn unchecked, after that you can select the feeders you want. This is used when any feeders ran out of component and need to replenish them.

(21) **Previous:**review the previous component.

(22) **Next:**review the next component

(23) **View:**after finishing mounting, user can select the components in step list to review them. Photo 1-8 will display the current component's placement effect.

5. First Trial and Test

5.1. 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.

5.2. First production test

Load a programming file, test the file to pick and place components on one PCB.

5.3. Component Inspection

Inspection items

- ① Check if the specification, direction, polarity of components is aligned with what they should be.
- ② Whether the components are damaged or the pins are distorted.
- ③ 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 standards

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.

If there is any issue of specification, direction and polarity, please follow process file to amend.

1. If the specification, direction and polarity of the components are checked to be wrong, the correction procedure should be carried out in accordance with the process files.

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

- ④ The nozzle was blocked and need cleaning;
- ⑤ The nozzle is damaged or has a crack, which might cause air leakage;
- ⑥ The size issue of nozzle is inappropriate, which would cause air leakage or insufficient suction;
- ⑦ Insufficient air pressure or blockage of the air circuit, check whether the air circuit is leaking.

Frequently throwing components. Some suggestions are listed below:

- ① Incorrect image processing, images should be retaken;
- 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.

5.4. Continuous SMT production

Follow the SOP to start production:

Notes: Do not touch the surface of board to avoid damaging the printed solder paste.

- When the error message occurs, please check out and solve it a.s.a.p.
- Once reloading the component during production, pay attention to the model, specification, polarity and direction of components.
- Clear the reject box timely to avoid wasted materials stacked too high to damage the mount head

6. 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.

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.

Basic Position:

	X	Y	Z	XY view	Z correct
LF. cam	353.270	606.460			
Head1	317.610	606.020	0.280	View	Z correct
Head2	296.750	605.940	0.350	View	Z correct
Head3	275.610	606.030	0.440	View	Z correct
Head4	254.690	606.090	0.200	View	Z correct
Head5	233.690	606.010	0.260	View	Z correct
Head6	212.810	605.980	0.140	View	Z correct
Head7	191.700	606.120	0.260	View	Z correct
Head8	170.820	605.940	0.260	View	Z correct
RF. cam	130.750	606.740			
Fly cam	391.450	11.870		View	

	X	Y	Position
Nozzle Lib Fiducial	147.377	588.910	Align
Front Feeder First	4.500	10.500	Align
Back Feeder First	2.500	708.500	Align
Tray Position	425.000	515.000	Align
Trash Box	390.000	600.000	Align
PCB Bottom Right Corner	606.580	94.930	Align
Head Idle	300.000	400.000	Align
Nozzle Replace Manually	570.000	100.000	Align

Camera Parameter:

	Brightness	Angle
LF. cam	50	0.530
RF. cam	50	-0.220
Fly cam	50	0.350
IC cam	50	-0.010

Track parameter:

Speed: 200mm
Load Wait: 30s

Other configurations

Default Speed: 80%
Open Cover Cut Off Motors

Calibration

Fiducial Camera Initialize
Nozzle Z Initialize
Nozzle Initialize Fine Callb

Exit
Config Save
Login
Change Password
Chinese
Version: N10P v1.5.0.8 a20

(1) Basis position:

The upper part is the position parameters of the device camera and head, which are automatically calibrated and generated. Do not modify them manually.

The screenshot displays the NEODEN N10P software interface with the following sections:

- Basic Position:** A table listing coordinates for various components.

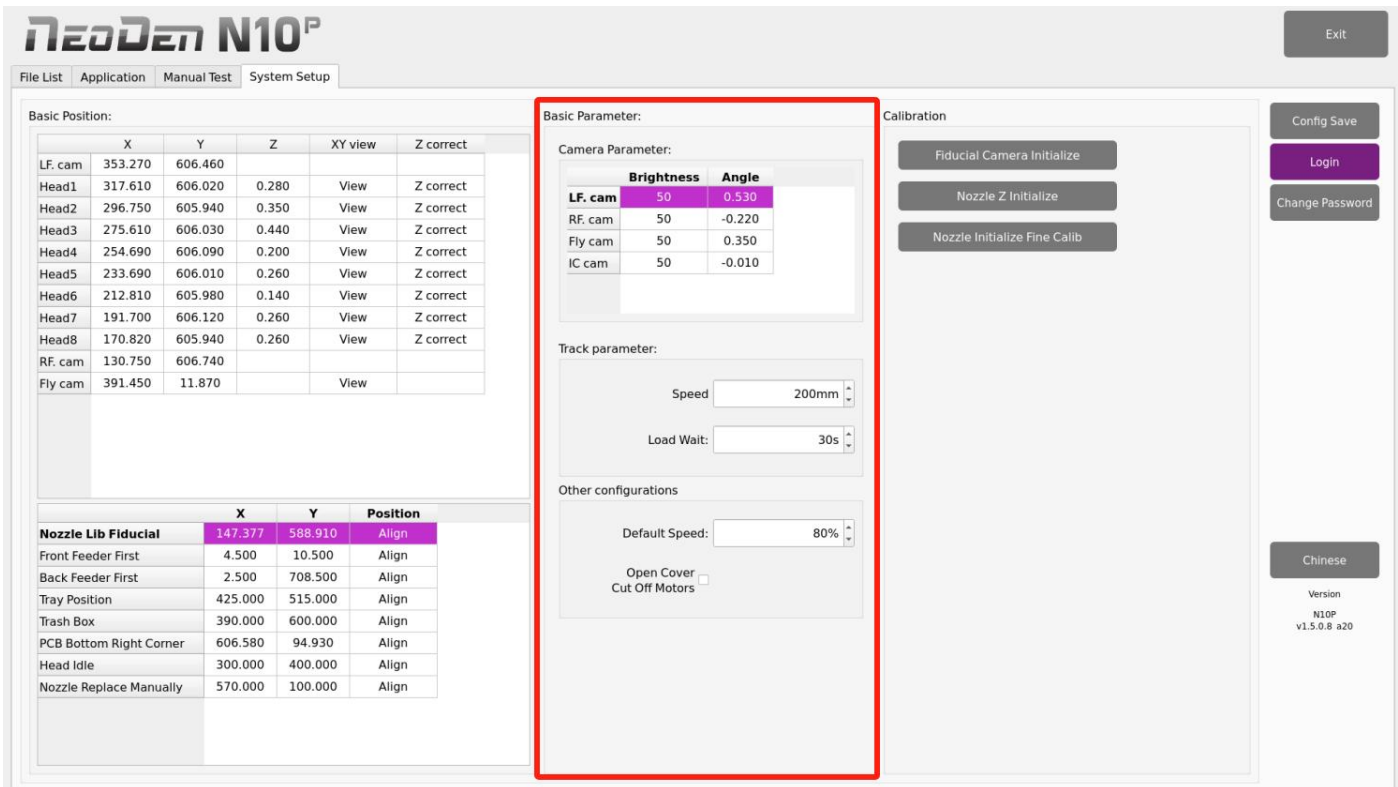
	X	Y	Z	XY view	Z correct
LF. cam	353.270	606.460			
Head1	317.610	606.020	0.280	View	Z correct
Head2	296.750	605.940	0.350	View	Z correct
Head3	275.610	606.030	0.440	View	Z correct
Head4	254.690	606.090	0.200	View	Z correct
Head5	233.690	606.010	0.260	View	Z correct
Head6	212.810	605.980	0.140	View	Z correct
Head7	191.700	606.120	0.260	View	Z correct
Head8	170.820	605.940	0.260	View	Z correct
RF. cam	130.750	606.740			
Fly cam	391.450	11.870		View	
- Basic Parameter:**
 - Camera Parameter:**

	Brightness	Angle
LF. cam	50	0.530
RF. cam	50	-0.220
Fly cam	50	0.350
IC cam	50	-0.010
 - Track parameter:**
 - Speed: 200mm
 - Load Wait: 30s
 - Other configurations:**
 - Default Speed: 80%
 - Open Cover:
 - Cut Off Motors:
- Calibration:**
 - Fiducial Camera Initialize
 - Nozzle Z Initialize
 - Nozzle Initialize Fine Calib
- User Interface Elements:**
 - Exit button
 - Config Save button
 - Login button
 - Change Password button
 - Chinese language selector
 - Version: N10P v1.5.0.8 a20

A red box highlights a table in the bottom left corner of the interface:

	X	Y	Position
Nozzle Lib Fiducial	147.377	588.910	Align
Front Feeder First	4.500	10.500	Align
Back Feeder First	2.500	708.500	Align
Tray Position	425.000	515.000	Align
Trash Box	390.000	600.000	Align
PCB Bottom Right Corner	606.580	94.930	Align
Head Idle	300.000	400.000	Align
Nozzle Replace Manually	570.000	100.000	Align

- (a) Nozzle lib fiducial: After the power on the machine and coordinates are initialized, the Fiducial camera takes pictures and recognizes them, and no manual modification is required.
- (b) Front feeder first: The pick up position after the No. 1 feeder slot is equipped with the 8mm feeder. The default pick up position of the front 33 feeder slots are calculated based on this position. If the default pick up position of the front feeders have large deviation from the actual position (based on the 8mm feeder), the user can modify it.
- (c) Back feeder first: The pick up position after the No. 34 feeder slot is equipped with the 8mm feeder. The default pick up position of the back 47 feeder slots are calculated based on this position. If the default pick up position of the front feeders have large deviation from the actual position (based on the 8mm feeder), the user can modify it.
- (d) Tray position: The default position of the bottom left corner of the tray. User modifiable.
- (e) Trash Box: Trash box position. User modifiable.
- (f) PCB bottom right corner: The position of the lower bottom corner of the rectangular PCB after it is loaded into the board. Used to automatically calculate the PCB origin. User modifiable.
- (g) Head idle: The position of the head when waiting for the board to be loaded. User modifiable.
- (h) Nozzle Replace manually: The position of the nozzle when manually changing the nozzle. User modifiable.



(2) Basis Parameter

(a) Camera Parameter:

Brightness: The default brightness of each camera, which can be modified by the user.

Angle: The angle of each camera, which is automatically measured and generated, please do not modify it.

(b) Track Parameter:

Speed: default speed of track movement.

Load wait: when continuous placement is performed in track mode, the waiting time for board entry is in seconds. User-modifiable.

(c) Other configurations:

Default speed: user-modifiable.

Open cover cut off motors: ticked, when the front cover or rear cover is opened during processing, the processing will be suspended; unticked, when the front cover or rear cover is opened during processing, the speed will be changed to 20.

Pressure alarm, hidden by default, visible to factory users after login, ticked by default, when the air pressure is too low, the processing will be suspended. Unticked, the air pressure is too low and no processing is done, which is used for factory aging test.

NEODEN N10^P Exit

File List Application Manual Test System Setup

Basic Position:

	X	Y	Z	XY view	Z correct
LF. cam	353.270	606.460			
Head1	317.610	606.020	0.280	View	Z correct
Head2	296.750	605.940	0.350	View	Z correct
Head3	275.610	606.030	0.440	View	Z correct
Head4	254.690	606.090	0.200	View	Z correct
Head5	233.690	606.010	0.260	View	Z correct
Head6	212.810	605.980	0.140	View	Z correct
Head7	191.700	606.120	0.260	View	Z correct
Head8	170.820	605.940	0.260	View	Z correct
RF. cam	130.750	606.740			
Fly cam	391.450	11.870		View	

	X	Y	Position
Nozzle Lib Fiducial	147.377	588.910	Align
Front Feeder First	4.500	10.500	Align
Back Feeder First	2.500	708.500	Align
Tray Position	425.000	515.000	Align
Trash Box	390.000	600.000	Align
PCB Bottom Right Corner	606.580	94.930	Align
Head Idle	300.000	400.000	Align
Nozzle Replace Manually	570.000	100.000	Align

Basic Parameter:

Camera Parameter:

	Brightness	Angle
LF. cam	50	0.530
RF. cam	50	-0.220
Fly cam	50	0.350
IC cam	50	-0.010

Track parameter:

Speed: 200mm

Load Wait: 30s

Other configurations

Default Speed: 80%

Open Cover

Cut Off Motors

Calibration

XY Linear Encoder Initialize

Fiducial Camera Initialize

Nozzle Z Initialize

Nozzle Initialize Fine Calib

Time Set

Config Save

Login

Change Password

Chinese

Version
N10P
v1.5.0.8 a20

(3) Calibrations:

Before calibration and setting, need to put the calibration nozzle-CN065 nozzle into the nozzle library. Prepare the calibration sheet (with SN code corresponding to the device, do not mix them).

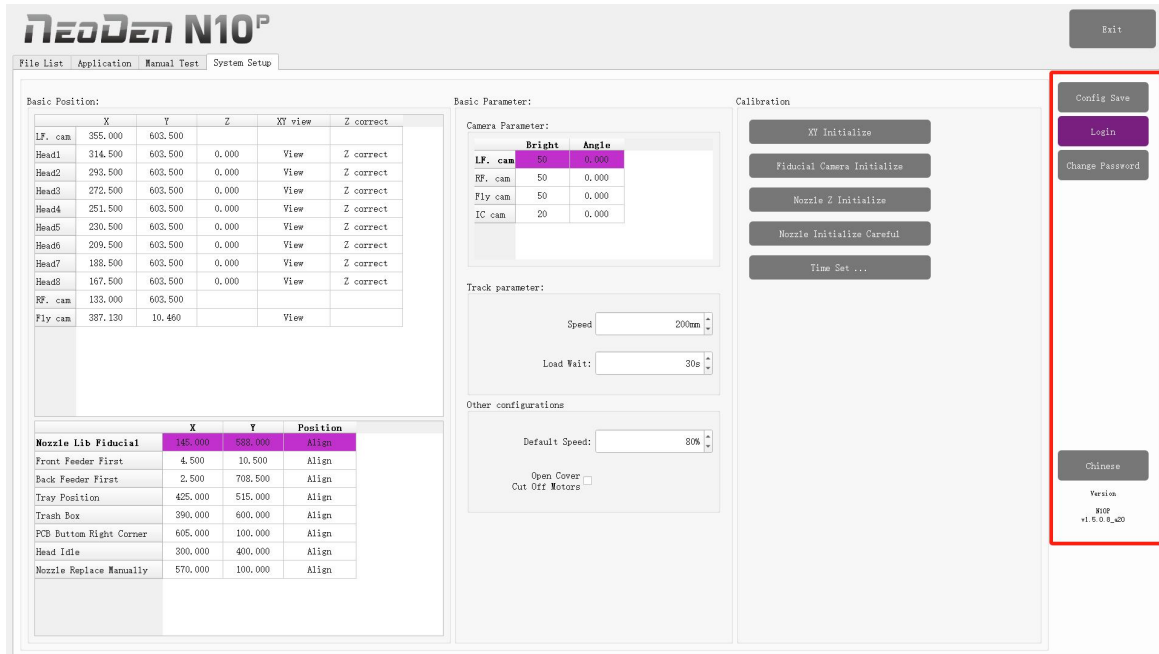
- (a) XY Linear Encoder Initialize: After clicking, the device automatically collects magnetic grating data and establishes a relationship table between drive data and magnetic grating data.
- (b) Fiducial Camera initialize: Put the calibration sheet on the IC camera and make the bottom left corner of the calibration sheet close to the bottom left corner of the inner hole of the IC camera, see below figure. After clicking, the device automatically takes a photo to calculate the positional relationship between the cameras.



- (c) Nozzle Z initialize: The heads No. 1-8 takes CN065 from the nozzle library in turn and turn on the suction to touch the upper surface of the track edge to obtain the Z-axis deviation value.
- (d) Nozzle initialize Fine Calib: The heads No. 1-8 goes to the nozzle library to take the calibration

nozzles and take photos for identification, and automatically obtain the positional relationship between each head and the IC camera and the flying camera.

Other settings will only be used when replacing accessories or in other special circumstances. Please proceed under the guidance of after-sales engineers.



(4) Config save: After modifying the parameters, click this button to save.

(5) Login: To prevent the factory settings from being misoperated, the factory settings interface is grayed out and cannot be operated. If want to modify it, must first log in as an Operator, Administrator, or Factory User.

Different users can adjust different calibration and settings.

<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 10px;"> <p>Fiducial Camera Initialize</p> <p>Nozzle Z Initialize</p> <p>Nozzle Initialize Fine Calib</p> </div> <p>Operator</p>	<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 10px;"> <p>XY Linear Encoder Initialize</p> <p>Fiducial Camera Initialize</p> <p>Nozzle Z Initialize</p> <p>Nozzle Initialize Fine Calib</p> <p>Time Set</p> </div> <p>Administrators</p>	<div style="border: 1px solid #ccc; padding: 5px;"> <p>XY Linear Encoder Initialize</p> <p>Head Initialize Rough</p> <p>Fiducial Camera Initialize</p> <p>Head Z Initialize Rough</p> <p>Nozzle Initialize Rough</p> <p>Nozzle Z Initialize</p> <p>Nozzle Initialize Fine Calib</p> <p>Auto Initialize</p> <p>Time Set</p> <p>PLC Soft Update</p> </div> <p>Factory User</p>
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(6) **Change password:** (Before the administrator logs in, the password change button is not visible) To change the password, the administrator needs to log in, click Change Password, and a prompt window will pop up. You need to enter the administrator password first. After entering the correct password, enter the new password according to the prompt window. When the password change success window appears, the operation is completed.

(7) **Current version:** The software current version.

(8) **English:** This machine supports Chinese and English. Click English and enter the authorization code to switch to English mode.

7. Analysis of Common Problems

Problems	Presumed causes	Countermeasure
Raspberry Pi can't enter system	<ol style="list-style-type: none"> SD card loose connection SD card damaged 	<ol style="list-style-type: none"> Re-insert the SD card Use a backup SD card
Feeders feed abnormal	<ol style="list-style-type: none"> The solenoid is damaged. Air leakage from air tubing Ventilation pin is damaged The feeding rate is not adjusted correctly Feeder is damaged Incorrectly installed the tape reel feeder and jammed reels resulting in abnormal feeds Feeders are not peeled 	<ol style="list-style-type: none"> If the abnormal situation of the feeders exchange when exchange the feeder solenoids, then replacement of the feeder solenoid valve Replace air tubing or re-insert Change another ventilation pin Adjust the feeding rate Change another good one Adjustment of the reel Reinstall the feeder
The components flip or stand when picking up	<ol style="list-style-type: none"> Unreasonable setting of pick-up height Pick-up position deviation 	<ol style="list-style-type: none"> Adjust the pick-up height Re-calibrate pick-up position
Abnormal rotation of nozzle	20 Motor Abnormal	If exchanging the 20 motor, the phenomenon exchanges and replacing the 20 motor, then the 20 motor need to be replaced. Please contact our after-sales service.
Fiducial cameras (left and right) cannot take pictures	<ol style="list-style-type: none"> PCB inside camera is damaged Poor contact with the camera's network cable 	Need to provide relevant video for replacement. Please contact our after-sales service.
Fly/IC Cameras cannot take pictures	<ol style="list-style-type: none"> The cable is broken. Network not available The camera is broken. 	Need to provide relevant video for replacement. Please contact our after-sales service.
Insecure placement head, XY movement failure	1.Unsafe placement head condition	<ol style="list-style-type: none"> Please contact our after-sales service and provide photos of the prompt box and current head status, etc. Click Head Initialization and then XY Initialization on the Manual Test screen.
Indicates that the machine has not returned to zero or that the drive has been de-energized.	<ol style="list-style-type: none"> Safety protection Driver error Emergency stops have been pushed 	<ol style="list-style-type: none"> Enter the manual test, XY interface, and check if there is a red background in the front and rear feeder protection and placement head safety status feedback. If the head can be pushed, check the error reported on the servo drive, re-plug the plugs

		<p>on the drive, and then open it again when the emergency stop is pressed, the common errors reported are 21.0 (servo motor coding line related) and 16.0 (return to zero sensor related)</p> <ol style="list-style-type: none"> 3. Press and release the emergency stop, then click on the coordinates initialize. 4. Please contact our after-sales service.
The nozzle can't suck and blow.	1.The solenoid is damaged.	Interchangeable the solenoids, if phenomenon interchangeable, then please contact the company after-sales replacement solenoid valve
Throwing material when mounting	<ol style="list-style-type: none"> 1. Failure to pick up material 2. Wrong pickup position causes not picking up the material. 3. Incorrect pickup height results in no pickup or pickup of vertical material. 	<ol style="list-style-type: none"> 1. Adjusting the parameter information of feeder setting
Precision issues	<ol style="list-style-type: none"> 1. Recognition error, check for interference spots on the nozzle or head 2. Fiducial camera position change 3. Inaccurate nozzle center position 	<ol style="list-style-type: none"> 1. Replace the nozzle and blacken the interference point 2. Reference camera calibration 3. Fine calibration of nozzles
Fiducial point not found, prompts Fiducial point auto-recognition failure	<ol style="list-style-type: none"> 1. Incorrect origin point setting 2. Can't find the Fiducial spot. There's interference. 	<ol style="list-style-type: none"> 1. Resetting the position of origin point 2. Setting Fiducial point parameters in the file edit PCB interface
Header movement does not correspond to actual coordinates	<ol style="list-style-type: none"> 1. XY magnetic grid data abnormality 2. Abnormal magnetic grid ruler or magnetic grid reading head 	<ol style="list-style-type: none"> 1. First XY initialization, initialization is normal, click on the factory settings, click on the XY grid initialization, after doing so, click on the configuration to save 2. Manually test the XY interface, press the emergency stop button, and manually push the head to observe whether the XY axis coordinates are changing normally. If the data is abnormal, the corresponding magnetic grid reading head or magnetic grid ruler needs to be replaced

8. Maintenance

8.1. Take effective measures to reduce /avoid malfunction

8.1.1.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.

8.1.2.Requirements for operator

① 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.

② 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.

③ 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.

8.1.3.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.

① It needs to check whether the components package is matched with related feeder.

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

- ③ After programming, operator must double check the component number, placement position, and angle are correct for each placement step.
- ④ Operator must check the first finished PCB of each file. If any problem, please find solutions such as revise program to solve it.
- ⑤ To check the placement position misaligned or not, component loss problem in regular work. Find reason in time and solve it.
- ⑥ Set 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.

8.2. Device Maintenance

Arrange regular inspection and maintenance system.

8.2.1. Daily Inspection

	Items
Items check before power on	<ul style="list-style-type: none"> ① Temperature& Moisture: Temperature 20°C~26°C, humidity 45~70% ② Indoor environment: Air clean without aggregate air. ③ No clutters within the placement area and keep rails clean. ④ No spots on cameras and keep lens clean. ⑤ No obstacles around the head nozzles ⑥ Checking if nozzles are dirty, distorted; If so, please clean or change the nozzle. ⑦ Checking if feeders are correctly installed in stacks and confirm no clutters on stack. ⑧ Checking the connection of air connector and air hose ⑨ Checking air pressure.
Items check after power on	<ul style="list-style-type: none"> ① Checking if the monitor display normally after system start up. ② Checking if emergency button can work normally or not. ③ Checking if placement head can move back to the origin. ④ Checking if there's abnormal noise while placement head move. ⑤ Checking all nozzles vacuum pressure. ⑥ Checking if PCB moving on rails smoothly or not; Sensor workable or not. ⑦ Checking if the board has been well fixed by magnetic bar and pins.

8.2.2.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

8.2.3.Maintenance of Screw Rods and Guide Rails

8.3. Cleaning and greasing of X-axis screw rods and guide rails (monthly)



Maintenance tools: microfiber cloth, grease injector, grease

How to do:

Step1. Go to application interface, click on the placement head movement to move the head towards the front camera, and move the head as far to the right as possible.

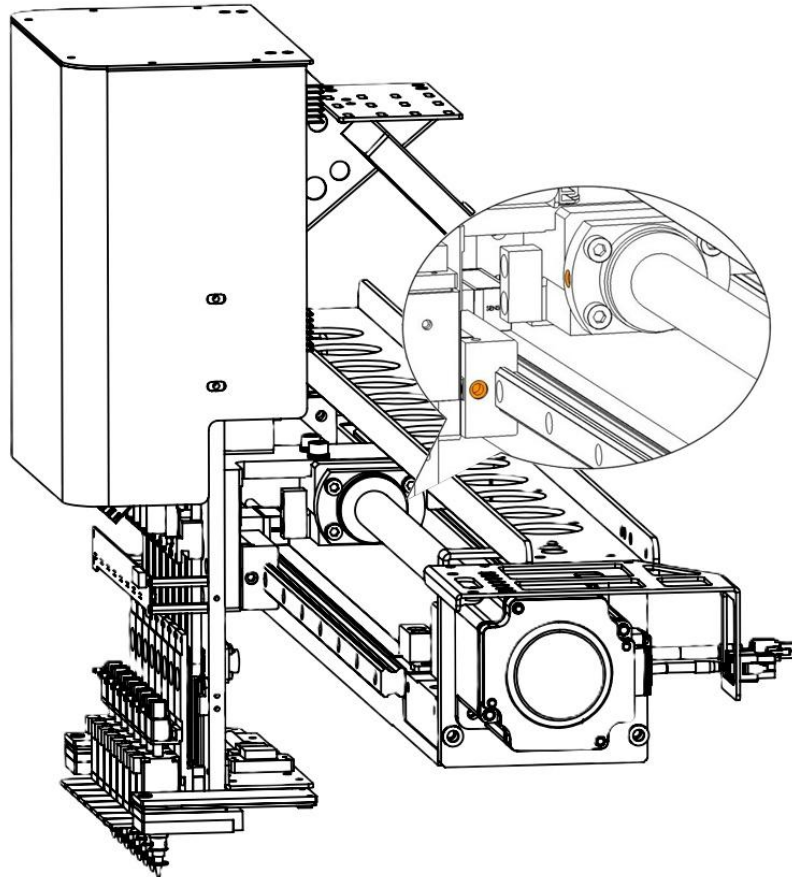
Step2. Use a microfiber cloth to clean the X-axis guide rail and screw rod.

Step3. Use a grease injector to fill the X-axis guide rail grease holes with grease.

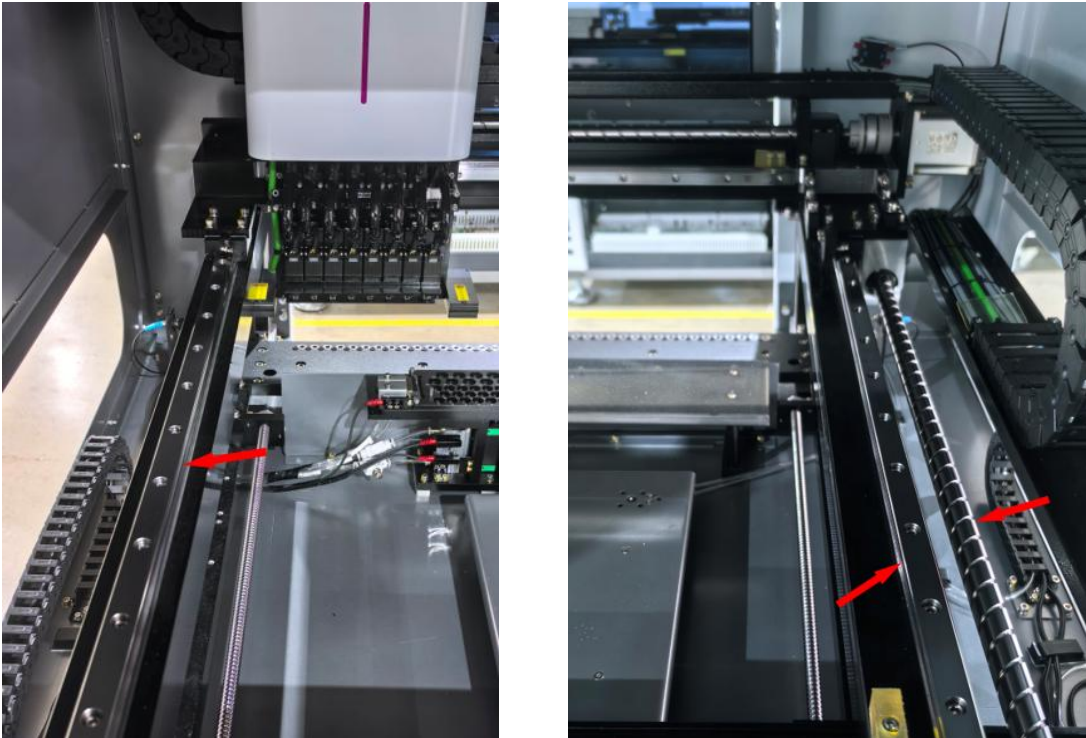
Step4. Use a grease injector to fill the nut grease holes of the X-axis screws with grease.

Step5. To go application interface, click the placement head to move, and move the head back and forth along the left and right directions 3-4 times.

The mentioned holes are as below:



8.4. Cleaning and greasing of Y-axis screw rods and guide rails (monthly)



Maintenance tools: microfiber cloth, grease injector, grease

How to do:

Step1. Go to application interface, click on the placement head movement to move the head towards the back camera

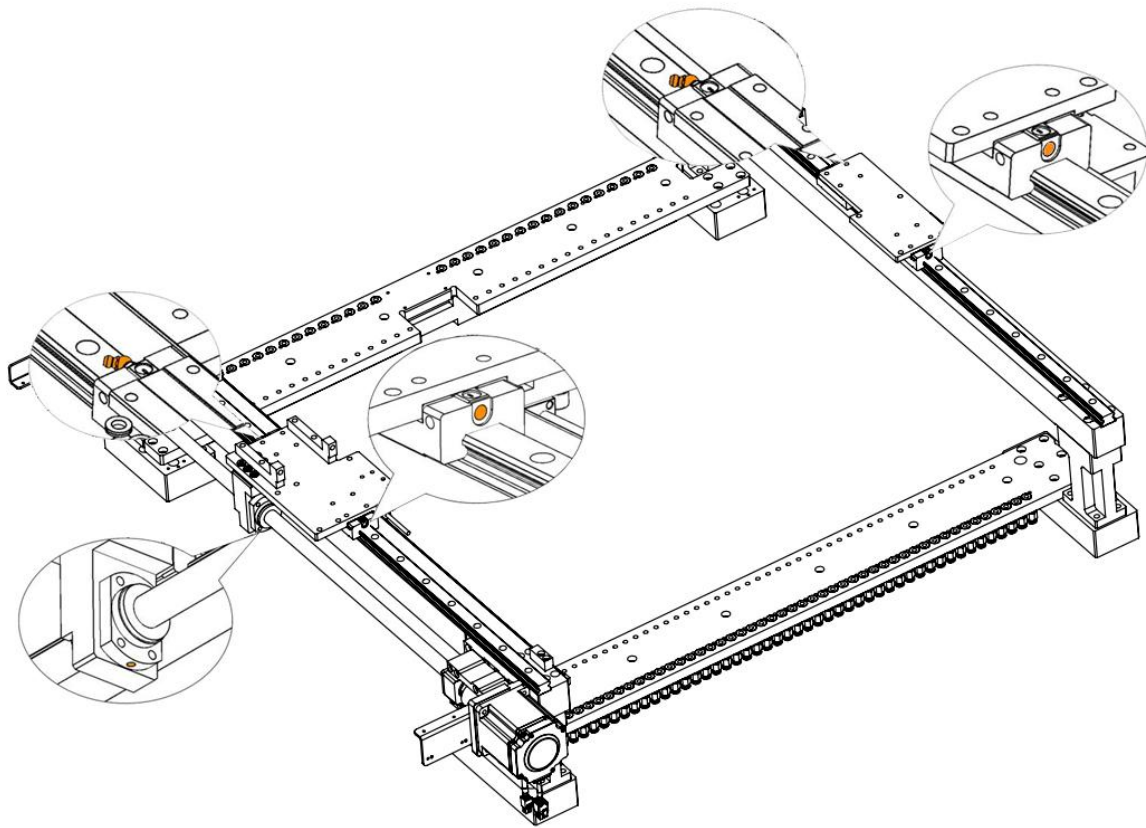
Step2. Use a microfiber cloth to clean the left and right sides of the Y-axis guide rail and screws.

Step3. Use a grease injector to inject grease into the guide rail grease holes on the left and right sides of the Y-axis.

Step4. Use a grease injector to fill the nut grease holes of the Y-axis screw with grease.

Step5. Go to application interface, click the head to move, the head along the front and back direction to move back and forth 3-4 times.

The mentioned holes are as below:



8.5. Maintenance on Screw Rods and Linear Rails

Clean and lubricate the screw rods and linear rails once every six months to one year.

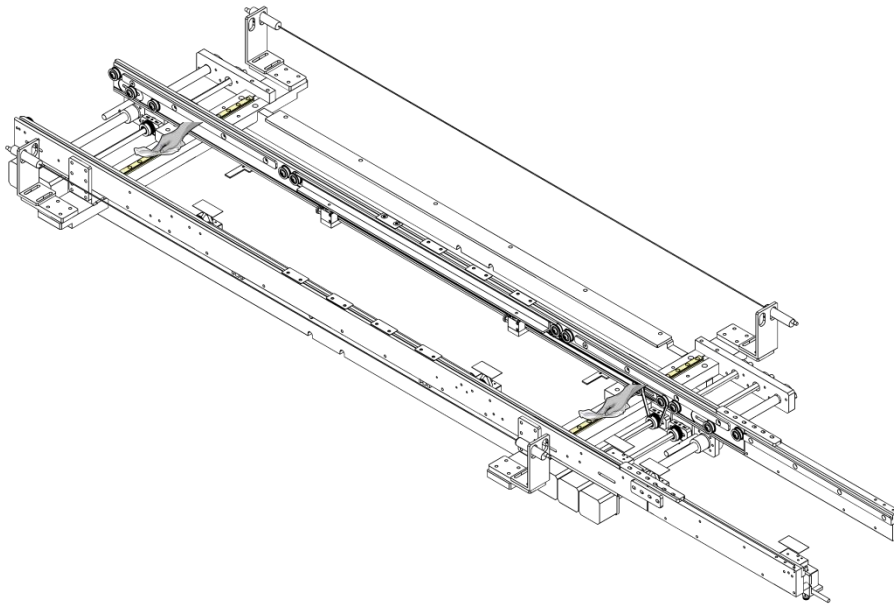
Maintenance tools: microfiber cloth, brush, oil lubricator, grease, anti-rust oil, cross screwdriver

Operation method:

Step 1. Go to manual test interface, click XY Move, and move the placement head towards the rear camera.

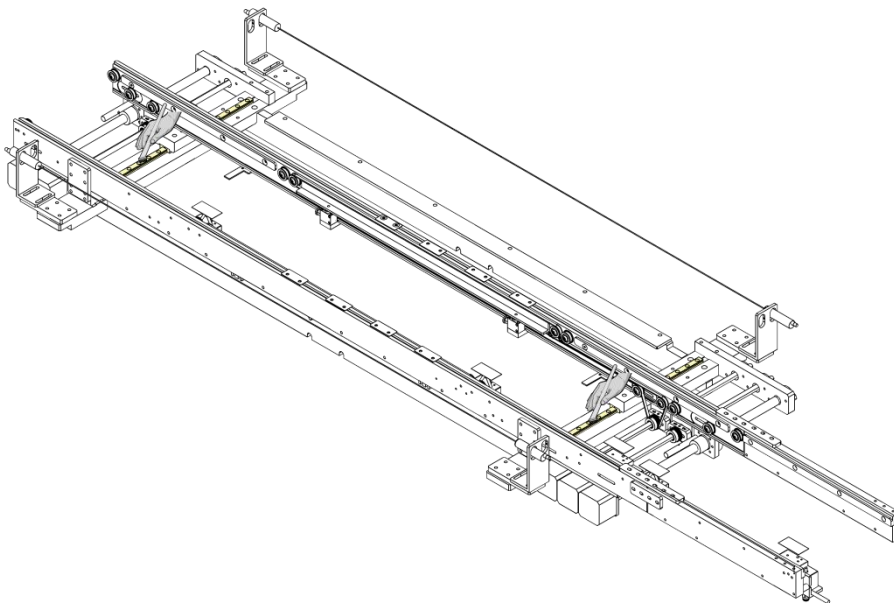
Step 2. Use a cross screwdriver to remove the IC tray holder and the pad under the IC tray holder. After removal, click on the manual test interface to enter the maximum value of '450' in the Y direction, and click the track width adjustment button.

Step 3. Use a microfiber cloth to remove dust and other impurities from the screw rods and linear rails in the board entry area, work area, and board exit area.



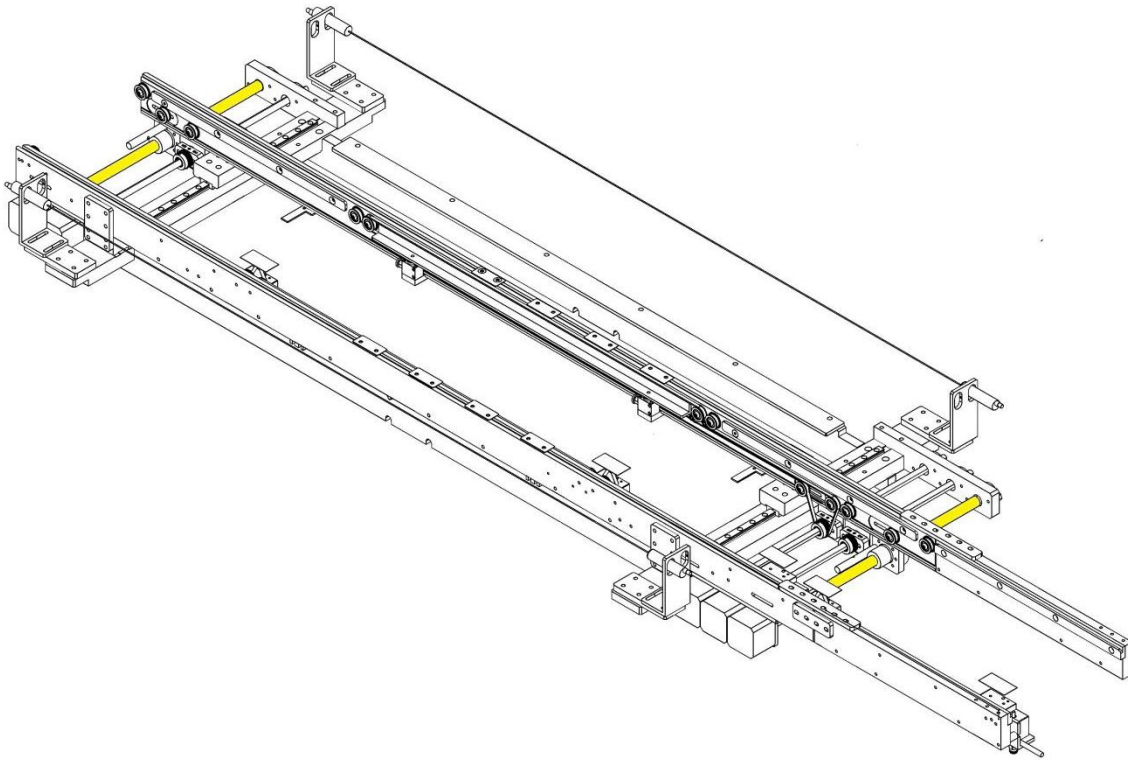
Step 4. Use a brush to apply grease on the screw rods in the board entry area, work area, and board exit area.

Step 5. Use a brush to apply anti-rust oil on the linear rails in the board entry area, work area, and board exit area.



Step6. Use the oil lubricator to inject grease into the nut oil filling holes of the screw rods in the board entry area, work area, and board exit area.

Step7. In order to make the grease evenly distributed throughout, return the track to zero and then adjust it to the maximum width of 450mm, back and forth 3-4 times.



1. Use the oil lubricator to inject grease using the specified method.
2. When the operating environment of the equipment is not good, please check the oil filling status at any time and fill it with oil.
3. When cleaning and oiling, you can press the emergency stop or ensure that no one is operating the machine nearby to ensure the safety of personnel.

Dear users, the above is NeoDen N10P operation instructions, if you have any questions, feel free to contact us, we will be happy to serve you.

Thanks again for supporting NeoDen Tech.