TROCEN®

Motion Control is Trocen

Small CCD User Manual

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Content

Software Installation 4

Software Instruction 6

Main Page 6

Menu 7

File 7

Tool 10

Help 11

Count 11

Array 12

Processing Parameters 14

Basic Motion Control 15

Camera Settings 18

Camera Installation 18

Basic Settings 18

Calibrate Range 20

Calibrate Offset 24

Match 27

Image Combination (Match) 33

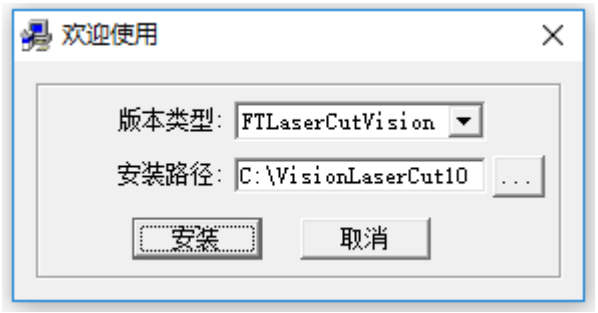
Two Mark Locate 36

Appendix: The Introduction of Function Keys 42

Software Installation

Open the installation file and double-click “ SetUp.exe ”.

Figure1-1 Installation

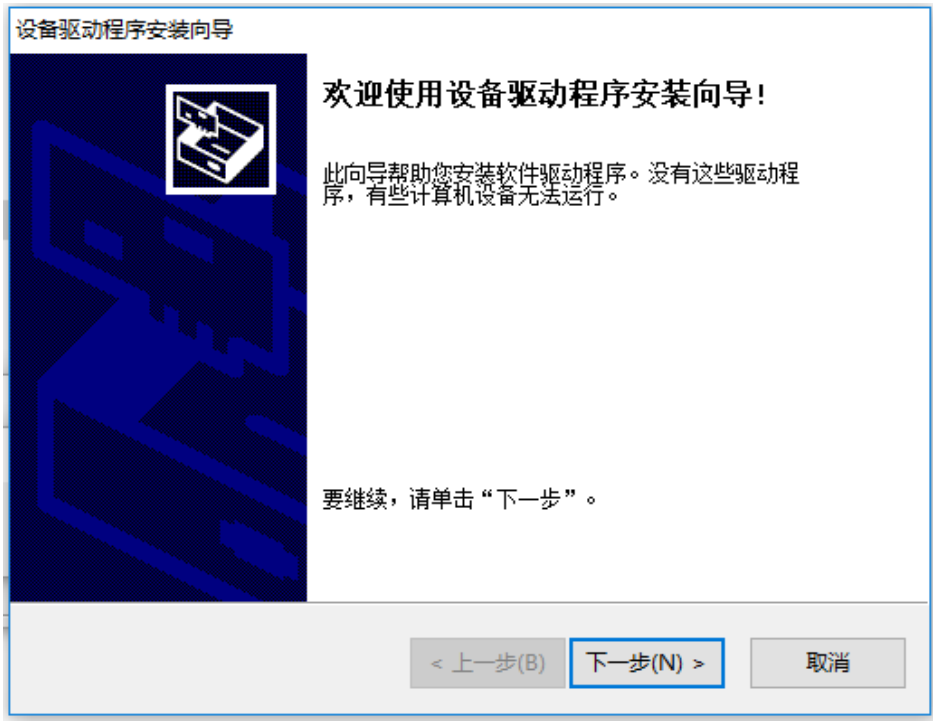


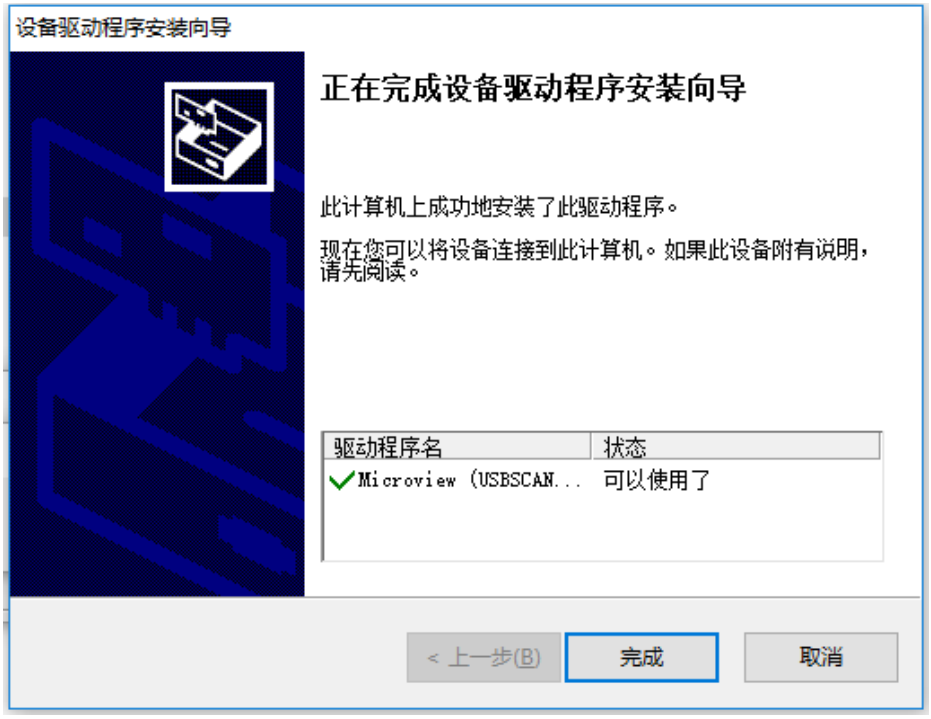
Click【安装】to start installing, click【取消】to exit.

Figure1-2 During Installation

Install the camera driver. Click【下一步】→【完成】, if the system prompts "安装成功", the VisionLasercut1.0 software has been successfully installed.

Figure1-3 Install Camera Driver





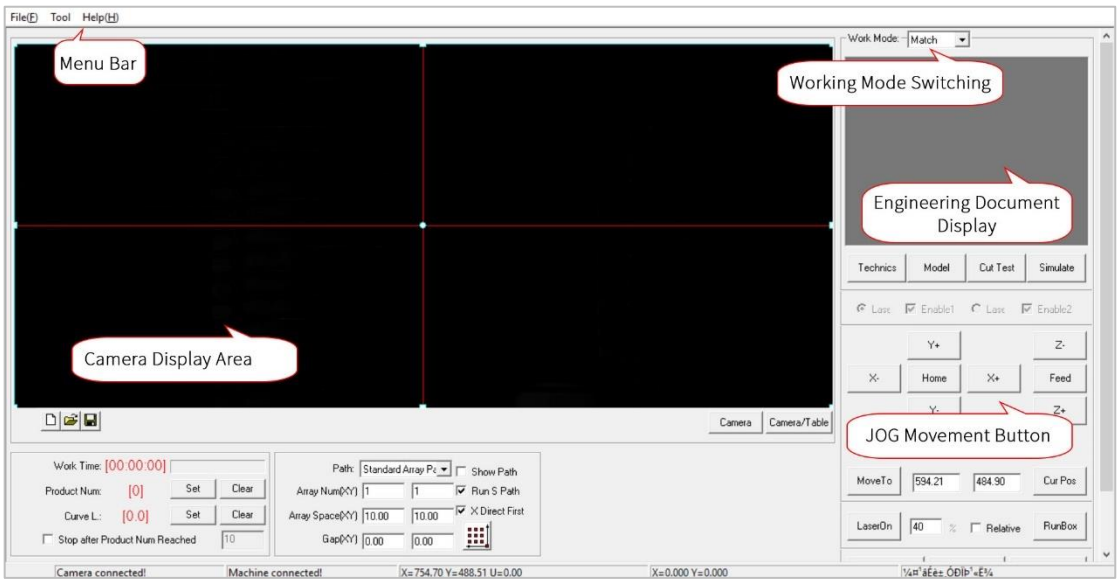
Software Instruction

Main Page

In the process of cutting, if use small CCD for visual cutting, users need to connect the camera to computer by the USB cable (contained by camera). In this case, the control card must be connected to computer by network mode (the host computer and control card must be in the same network segment), users can refer to the control card manuals for specific setting methods.

Open the software and make sure the camera and control card connection.

Figure2-1 Main Page of Software



Menu

File

New

Create a new processing file.

Open

Open saved project files (* .FTV)

Save

Save the current file (*. FTV).

Save as

Save the current file to project file (*.FTV).

Import

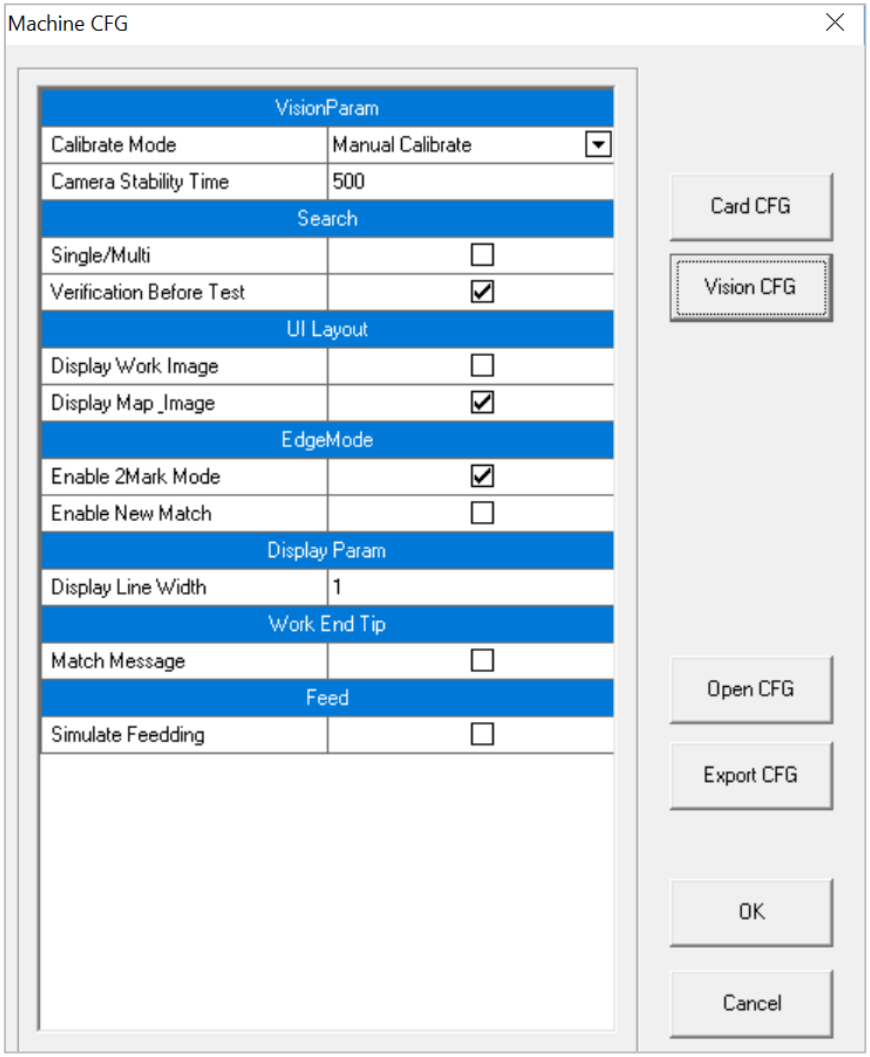
Import AI/PLT/DXF files.

Export DXF/PLT

Export current file to project file (*.DXF/*.PLT).

Machine Settings

Figure2-2 Machine Settings

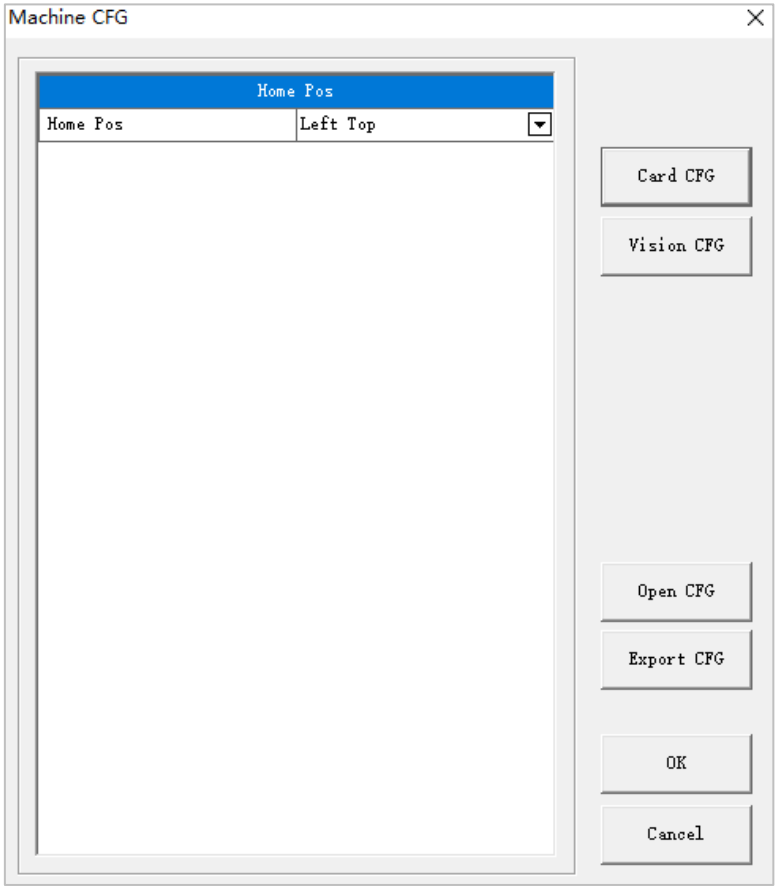


1. Calibrate Mode, suggest “Manual Calibrate”.
2. Camera Stability Time: this parameter is smaller, and the recognition speed is faster.
3. Search: users can check【Single/Multi】or【Verification Before Test】. If users don’t check【Single/Multi】, the camera recognizes one time

and the machine cuts one time. If check【Single/Multi】, the machine will cut after the camera recognizes all the graphics. If check【Verification Before Test】, users need to click【Test】two times before cutting, if do not check it, users only need to click【Test】one time.

4. UI Layout: users can check【Display Work Image】or【Display Map Image】.
5. Edge Mode: users can check according to need.
6. Other parameters settings: users can check functions according to need.

Figure2-3 Machine CFG



1. Click【Card CFG】and set the【Home Pos】. The home pos must be the same as machine.
2. Click【Open CFG】to modify config file, like company info.
3. Click【Export CFG】to export config file.

Exit

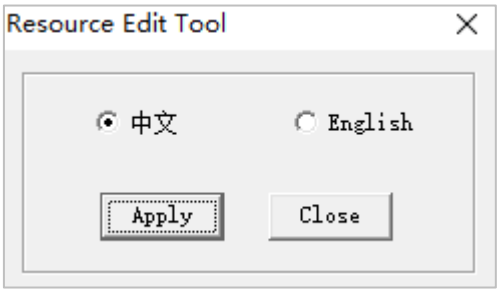
Close the VisionLaserCut software.

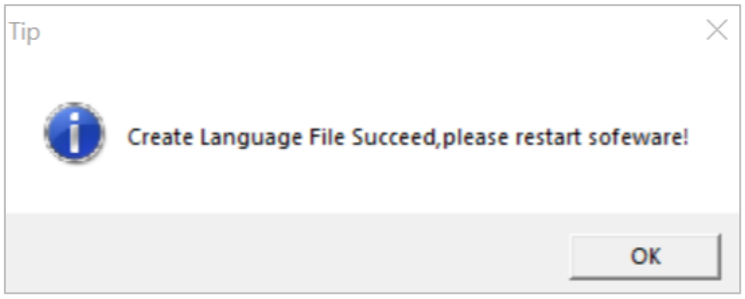
Tool

Language

Set language.

Figure2-4 Language Setting





Reconnect Motion Card

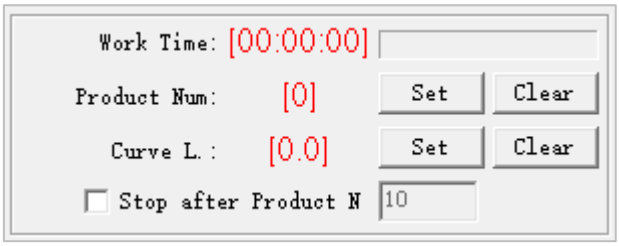
Reconnect control card.

Help

Check the info【About VisionLaserCut】. These information can be modified by【File】→【Machine Settings】→【Open CFG】.

Count

Figure2-5 Cutting Params Settings

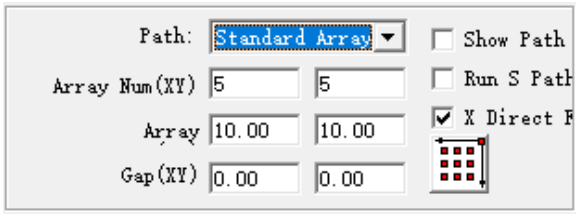


1. Work Time: display the processing time.
2. Product Num: display the processing number. Click【Clear】to make the number to zero.
3. Stop after product N: the machine will stop after processing specified quantity.

Array

Users can set【Standard Array】or【Custom Path】according to need. Input numbers into【Array Num】and【Array (Array Distance)】, then the camera will scan corresponding numbers of graphics from the current position. Click " " to set the scan direction.

Figure2-6 Standard Array Parameter Settings



1. S shape trajectory: "√" The machine to "S" shape motion
2. X direction is preferred: "√" First cut the X axis direction of the graphics.

Choose【Custom Path】, click【Define】to open the【Define Local Path】interface and set parameters. Move the camera to the first point and click " ", move the camera to the second point and click " ", after confirming the two positions, click【Combine】→【OK】, the camera will scan graphics within this area.

Figure2-7 Custom Path

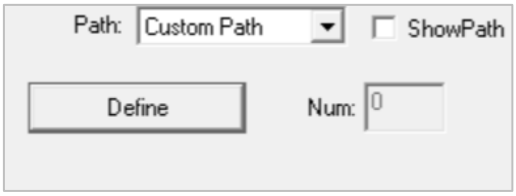
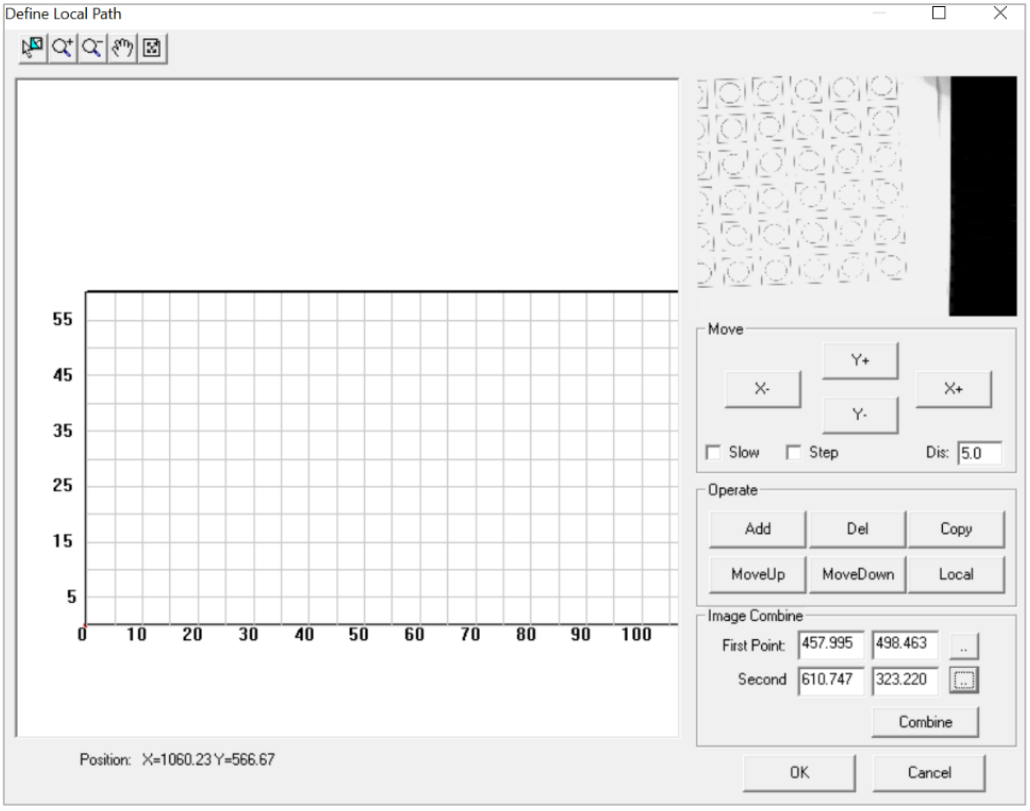


Figure2-8 Custom Path Parameter Seetings



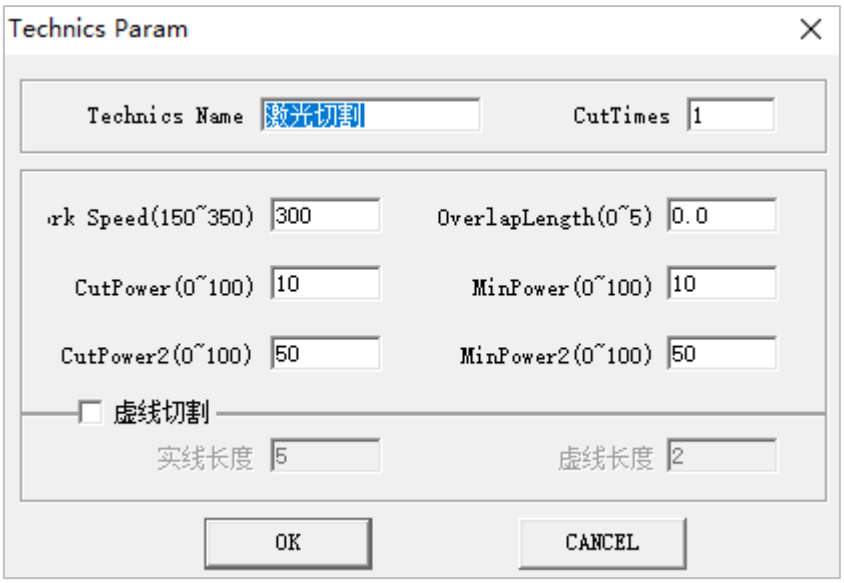
Processing Parameters

Click【Technics】to set Layer Params. Select layer and press【Up】/【Down】 to change order, press 【Property】 to set technics params. The default processing is from top to bottom.

Figure2-9 Layer Interface

Double click the selected layer or click【Property】to set technics params.

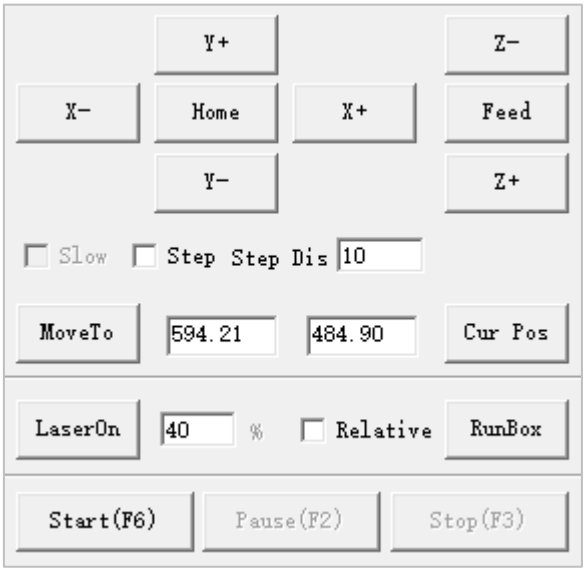
Figure2-10 Technics Param



1. Speed: the cutting speed of the current layer (mm/s).
2. Overlap Length: the size of overcutting (reserved notch for negative number).
3. Cut Power: the laser power of cutting.
4. Min Power: the laser power of turning.
5. Check【Dotted Cutting】, the machine will cut dotted line. Set【Solid Length】and【Dotted Length】, press【OK】.

Basic Motion Control

Figure2-11 Basic Motion Control



1. 【X/Y/Z +】: move towards X+/Y+/Z+ direction.
2. 【x/Y/Z -】: move towards X-/Y-/Z- direction.
3. 【Feed】: set feeding parameters, users need to check【Simulate Feeding】on machine setting page. Check【User-Define】and click

“ ... ” to add new length.

Figure2-12 Feed Settings

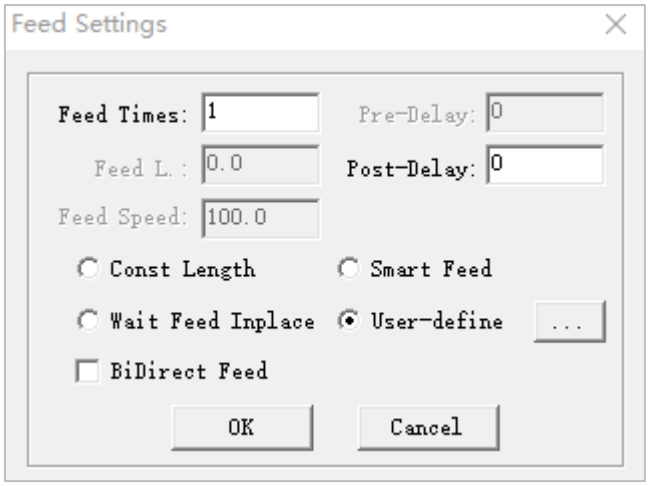
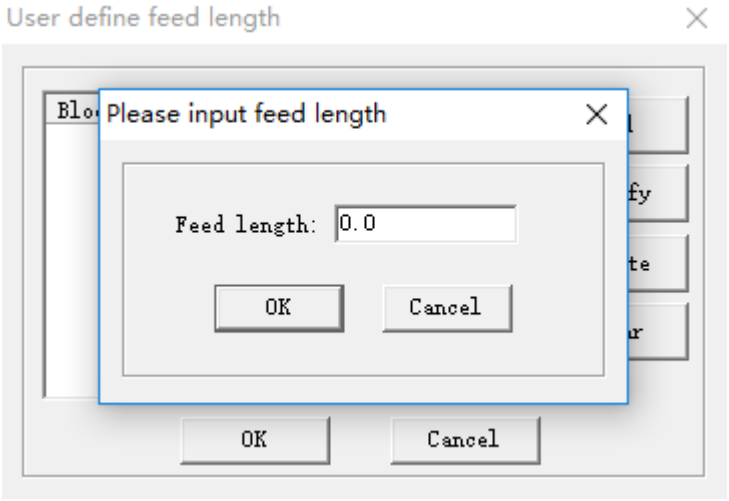


Figure2-13 User Define



4. 【Home】: back to origin point.

5. 【Slow】: check this function, the machine moves at the manual slow speed. If not, the machine moves at the fast speed.

6. 【Step】: check this function, the laser head jogs at the【Step Dis】. If not, the laser head moves continuously.

7. 【Cur Pos】: display the current coordinates of laser head.
8. 【Move to】: input the accurate coordinates and click【Move to】, then the laser head will move to this position.
9. 【Laser On】: click this button, the laser head will light out.
10. 【Run Box】: use it to confirm the size and position of the cutting graphics.
11. 【Start】: click【Start】, the machine starts to work.
12. 【Pause】: click【Pause】, the machine will pause, then click【Start】, the machine will continue to work.
13. 【Stop】: click【Stop】, the machine will stop working and go back to origin point.
14. 【Model】/【Cut Test】/【Simulate】functions and parameters settings are introduced in later chapters.

Camera Settings

Camera Installation

Open the package, connect the two parts of camera in Figure3-1 and connect the LED light with the power supply by the extension line of the LED light. When installing the camera, it is recommended to face the camera trademark to the operators.

Figure3-1 Camera Installation

Basic Settings

Connect the assembled camera to the computer with the USB cable.

1. Open the VisionLaserCut software, make sure the camera and control card have connected.

2. Click【Camera】, adjust【Expo】and【Contrast】manually to make the camera recognize graphics clearly. Click【Auto Exposure】, the camera will adjust expo and contrast automatically.
3. Click【Machine CFG】→【Card CFG】→【Home Pos】to set the origin point (the Home Pos must be at the same position with machine).
4. Adjust【Mirror Image】. If the graphics recognized by camera is not the same as origin graphics, click this button to adjust. After adjusting, if the graphics are not the same, then we recommend to reinstall the camera. It is recommended to face the camera trademark to the operators.
5. Click【Camera/Table】to change between camera and work table.

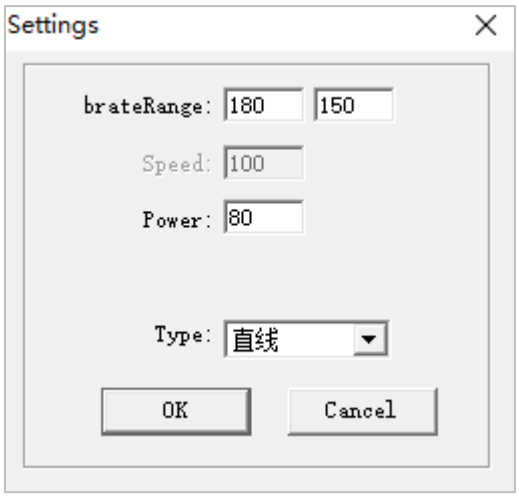
Calibrate Range

Click【Camera】→【Calibrate Range】, the machine will dotted calibration (【File】→【Machine Settings】→【Vision CFG】→【Manual Calibrate】) .

Figure3-2 Calibrate Range Settings

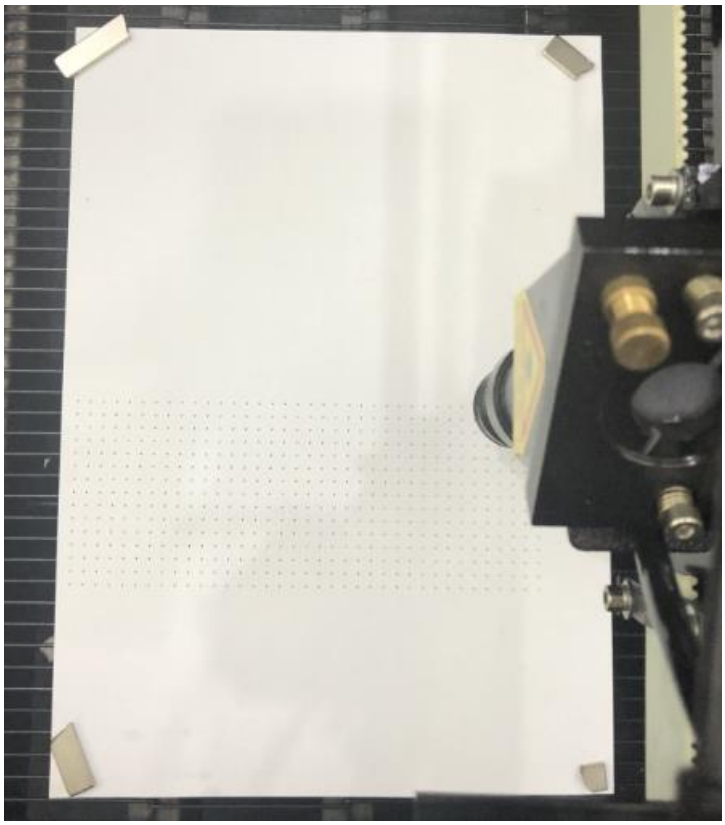
The default【Space】is “5” (Users can modify it). Click【Cali Point】to set parameters. With the laser head position as the center, the calibration range can be determined according to the current camera position and height (confirm that the laser head can calibrate point within the whole calibration range, and it is suggested to calibrate in the middle of the operating table to avoid missed drilling). Take calibrating on paper as an example, it is necessary to fix the paper on the operating table to avoid inaccurate calibration caused by position movement. The laser power should not be too large, about "8". Click【OK】and the laser head will start to calibrate point.

Figure3-3 Settings Interface



During calibrating point, the point diagram is shown as Figure 3-4 on the paper. Note whether the point is perfectly round. If the point is not round, adjust the laser path.

Figure3-4 Point Diagram



After calibrating point, click【Acquire】and the camera will shoot the current point diagram, as shown in figure 3-5. After acquiring the image, Click【Recognition】, and the points recognized by camera will be highlight displayed. Click " " and press the left button of mouse at the position where the points are not recognized by the camera to add points. Click " ", select the superfluous points, and press the【Delete】key on the keyboard to delete them. As shown in Figure 3-6, add points in the red box.

Figure3-5 Acquire

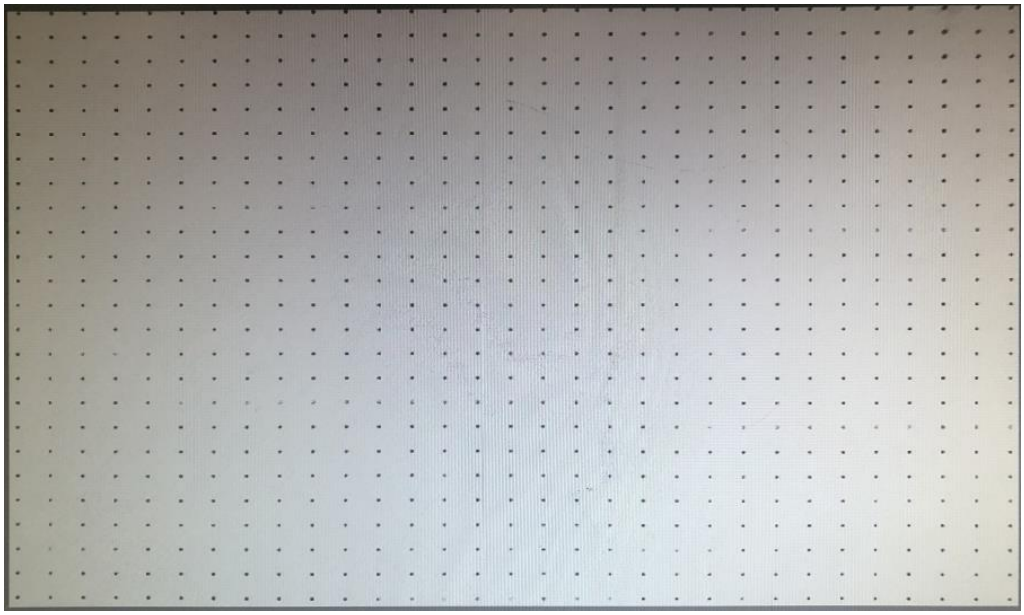
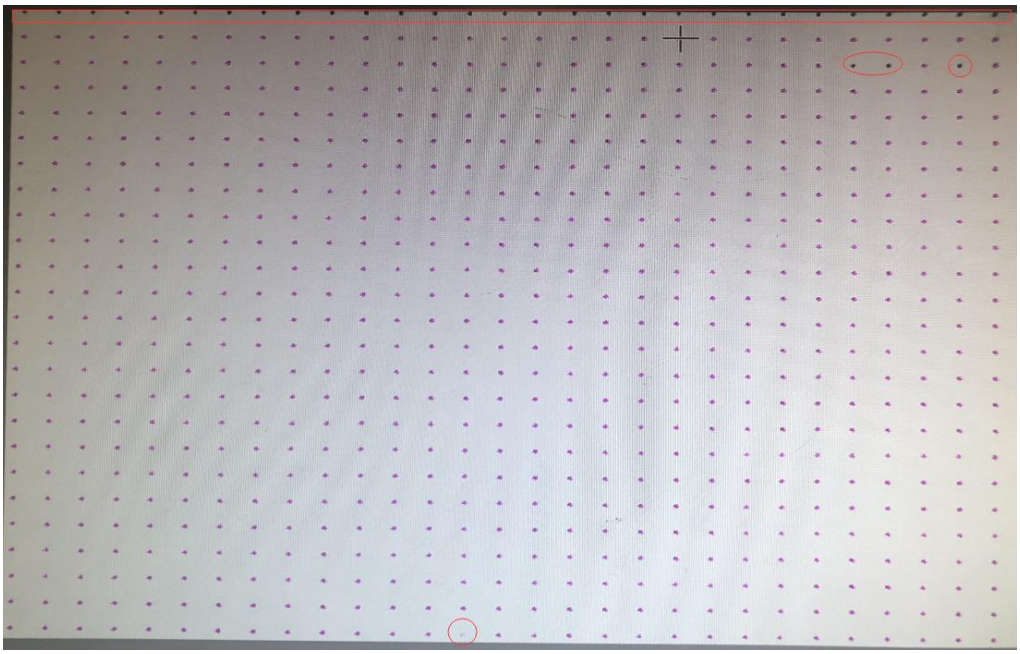
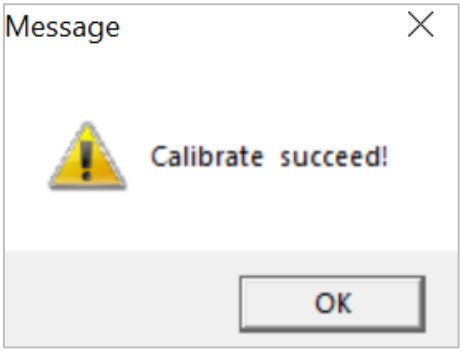


Figure3-6 Recognition



After adding calibration points, click【Save】, and the system prompts that "Calibration is successful!". If the system prompts "Calibration fails!", please reconfirm whether the calibration points have been added completely and click【Save】again.

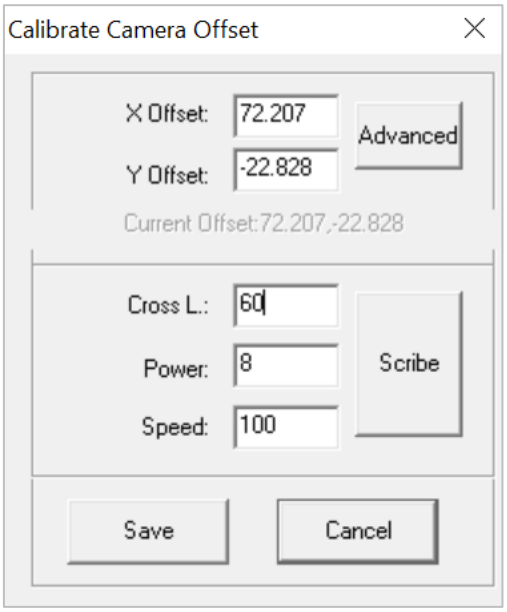
Figure3-7 Calibrate Successfully



Calibrate Offset

Click【Calibrate Offset】to set parameters.

Figure3-8 Calibrate Camera Offset



Click【Scribe】and the laser head will cut a cross on the paper. After cutting, open the position detection interface automatically and move the red marking cross on the screen to make it completely coincide with the cut cross. Check【Step】and set suitable【Step Dis】, then click【X-】/【X+】/【Y-】/【Y+】to adjust the cross slightly. Click【OK】→【Yes】→【Save】to complete camera offset correction.

The【X Offset】/【Y Offset】is the current offset value.

Figure3-9 Cut Cross

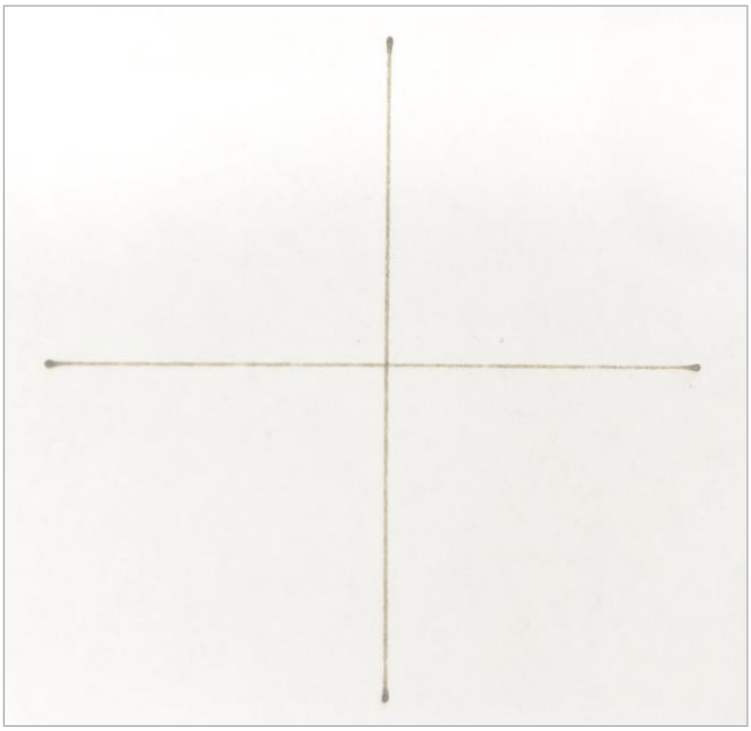


Figure3-10 Adjust Marking Cross

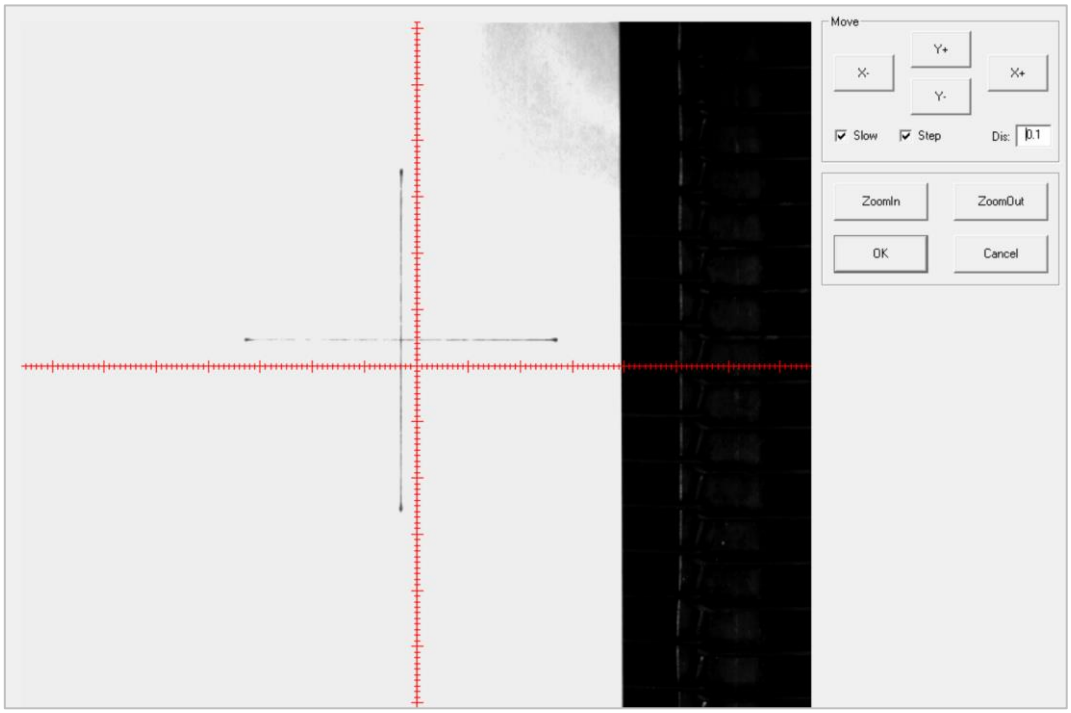
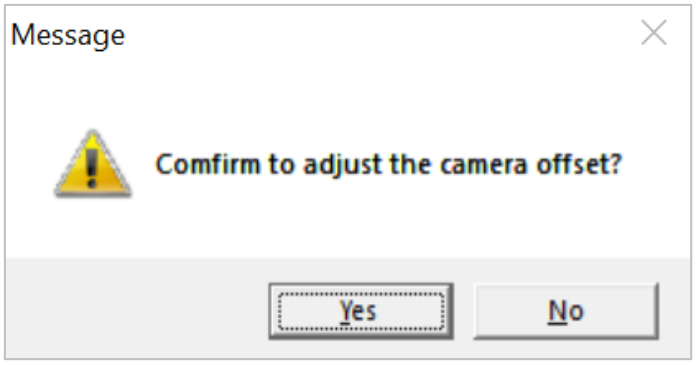


Figure3-10 Message



Match

Under the Match work mode, users need to establish model first. Click 【Model】to open the match config interface, and click【Add】to create a new model. The【Percent】value is larger and the accuracy is higher. High similarity may easily lead to missing cutting, while low similarity may lead to inaccurate cutting. Users can set this parameter according to need, and it is recommended to set it around 40-50.

Figure4-1 Add Model

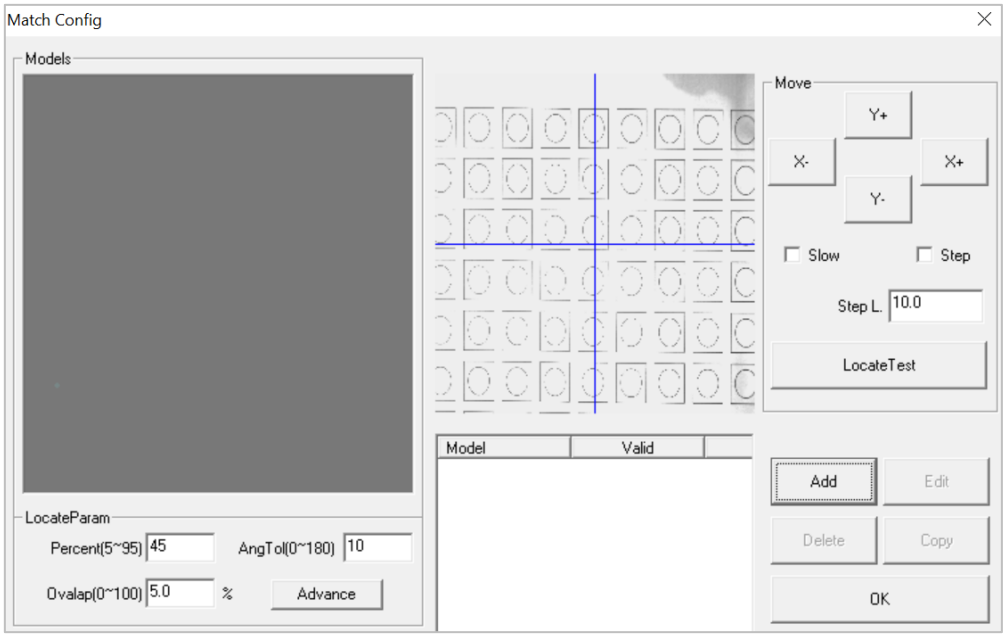
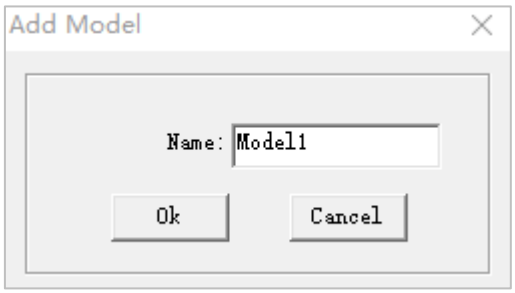
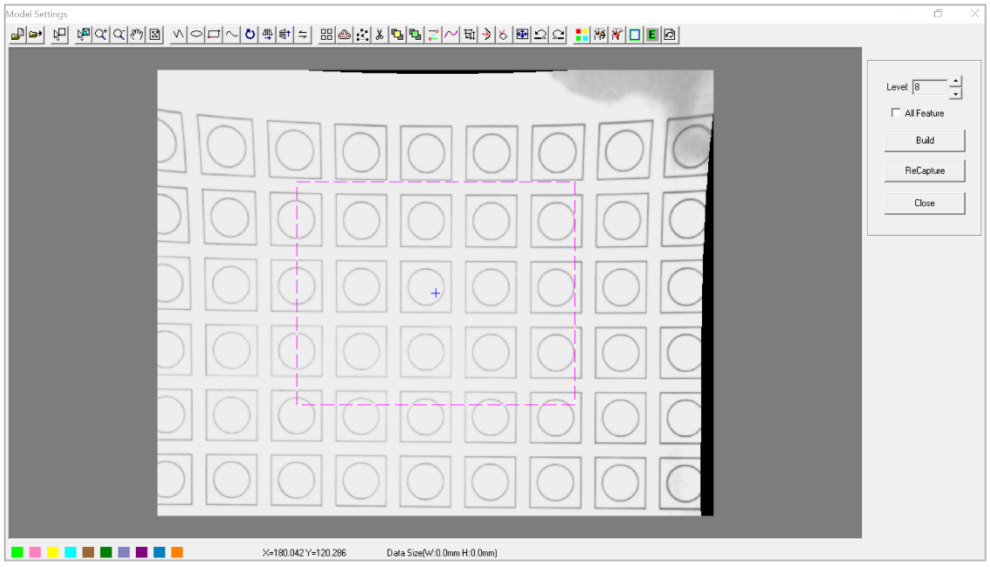


Figure4-2 Model Name



Input the model name and click【OK】to open model settings interface.

Figure4-3 Model Settings



Click “ ” to draw the feature range. Click " " and click the feature range marquee, drag the control points around the marquee, and adjust the marquee to the required size and position, as shown in figure 4-4. The size of the graphics can be adjusted when the cursor changes to a two-way arrow "⟷", and the graphics can be moved when the cursor changes to a cross arrow"✣".

Figure4-4 Adjust Feature Range

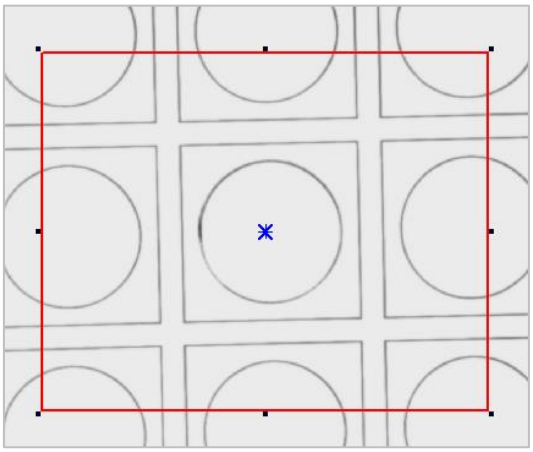
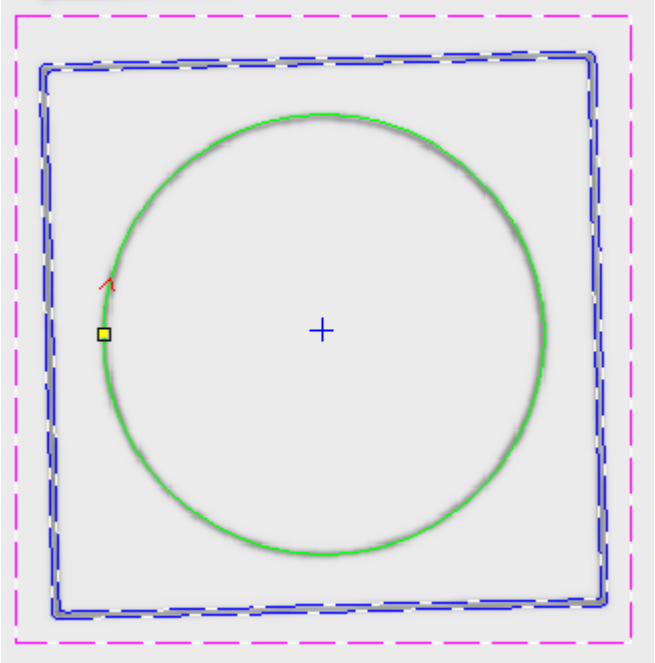


Figure4-5 Model



After adjusting the pink feature range, the blue feature line appears. Modify【Level】to adjust the feature line. Click【Build】to save the current feature. Select the graphics editing buttons to draw the cutting lines, as shown in Figure 4-5. The green line is the cutting line.

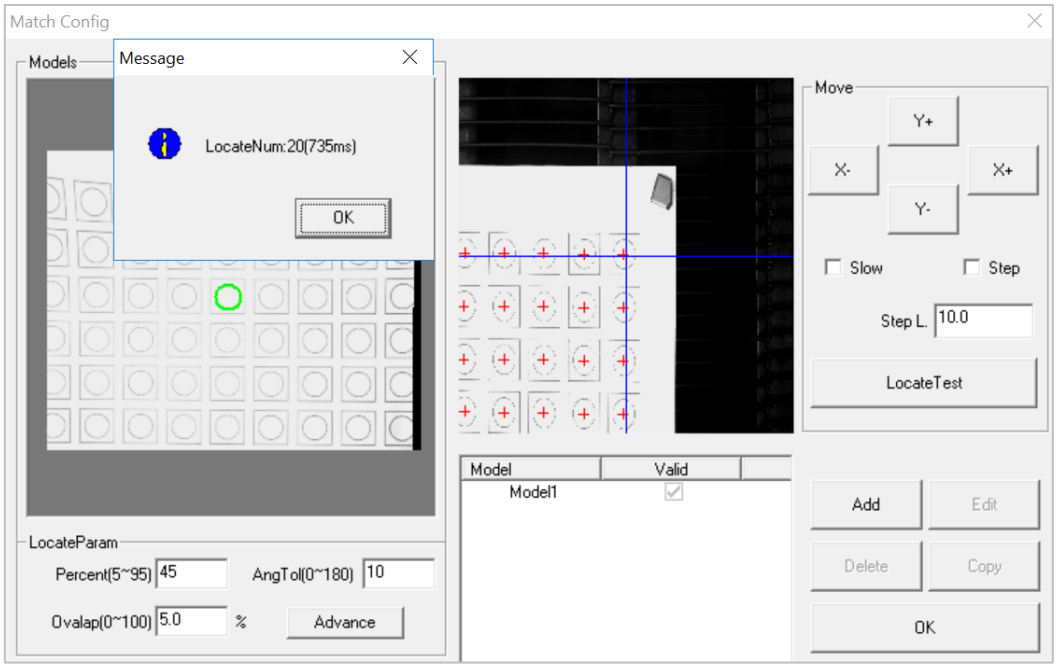
If the cutting file has been drawn in other software, click " " to import the cutting file (the file format is AI, PLT or DXF).

The selected graphics is shown in red, as shown in Figure 4-4. Click【Close】to exit the model settings interface. Click【File】→【Save as】save the model.

Move the laser head to the appropriate position and click【Locate Test】to check whether the recognition is effective. Click【OK】to close the

current interface.

Figure4-6 Locate Test



Move the laser head to the initial position of camera shooting, adjust the size of feature range, set parameters such as【Array Num】and【Array】, click【Simulate】, and the laser head will scan according to parameter settings as shown in Figure 4-7/4-8.

Note: Be sure to adjust the feature range first, otherwise the camera will not be able to accurately recognize.

Figure4-7 Adjust Feature Range

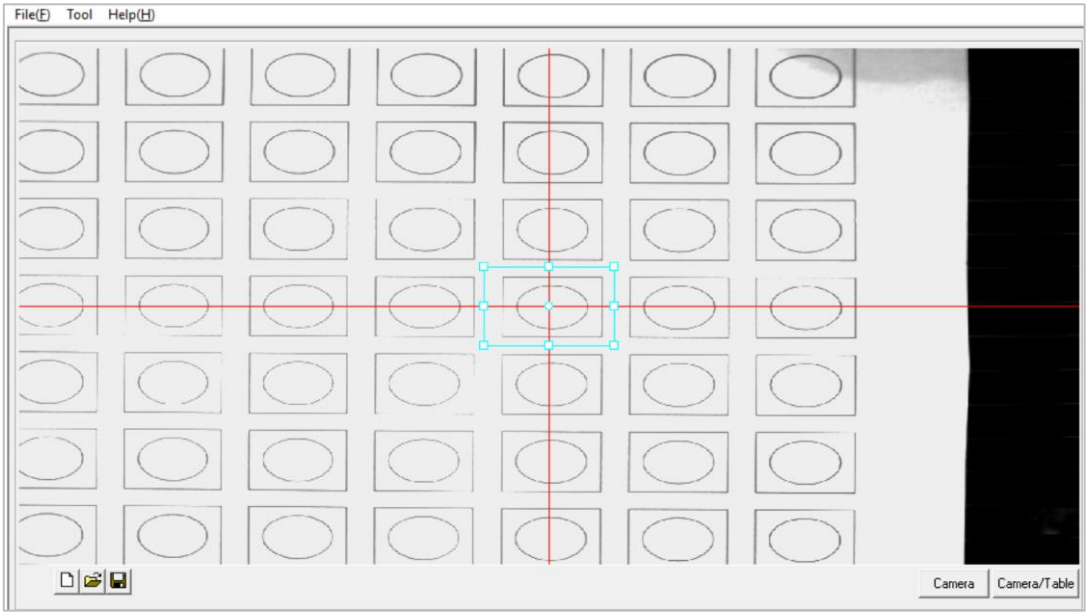
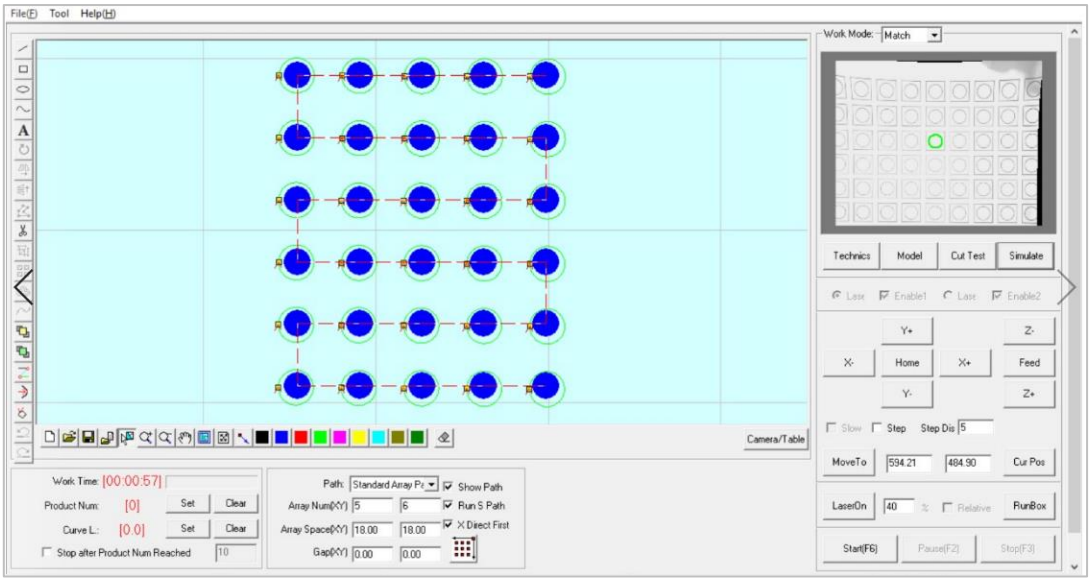


Figure4-8 The Whole Scanning



Move the laser head to appropriate position, set【Array Num】to "1 row 1 column", and click【Cut Test】. After cutting test, observe whether there is offset between the cutting graphics and the actual graphics. If there is no offset, users need to do nothing. If there is an offset, click【Camera】

→【Calibrate Offset】, and modify the X/Y offset value to make the cut graphics coincide with the drawing graphics.

The VisionLaserCut software supports multi-model cutting, allowing users to add multiple models as needed.

In case of dislocation cutting, the value of dislocation parameter shall be set in “

” on the main interface. If there is an difference in angle, do not forget to set suitable【ngTol】on the match config interface(【Model】→【ngTol】).

Image Combination (Match)

Under match work mode, if the cutting graphics is too large for the camera to recognize at one time, users can use image combination function.

Move the camera to the feature point (marked by the letter "C") and create a new model (refer to the details in Chapter 4 for the way to add model).

Figure5-1 Move to Feature Point

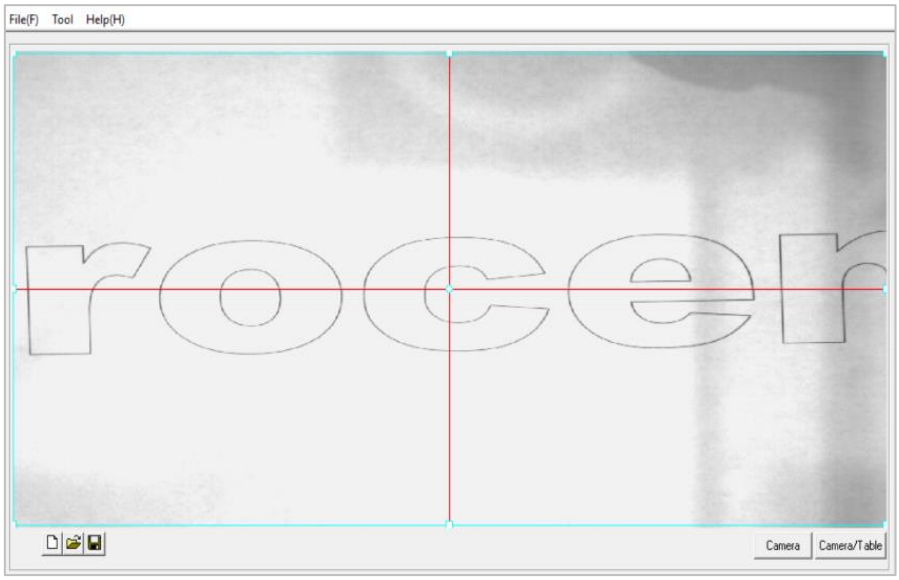
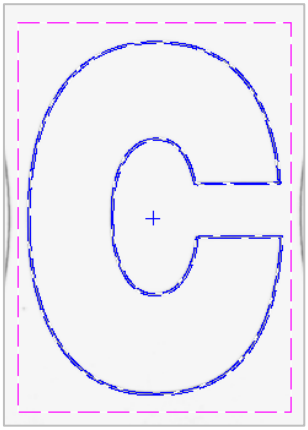
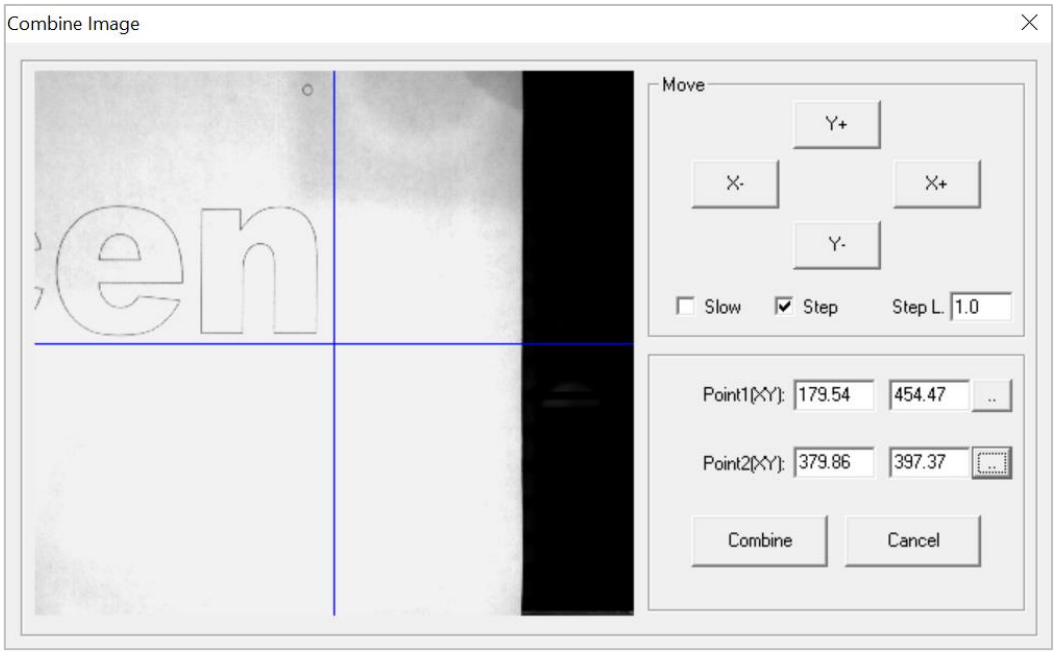


Figure5-2 Add Model



Click " " to open the image combination interface, move the laser head to the upper left and lower right corner of the graphics, click " " to display the coordinates of current position, then click【Combine】.

Figure5-3 Image Combination



After combination, click【Close】. Click " " to import cutting files or draw cutting graphics by drawing tools. Click【OK】on the match config interface. On the main interface, adjust the feature range to make the whole feature point in the range, then click【Simulate】to do recognition test. If the camera recognizes all the graphics and displays the cutting lines, it means the image combination is successful. Set parameters according to need, then click【Start】, the machine will start to cut.

Figure5-4 Adjust Feature Range

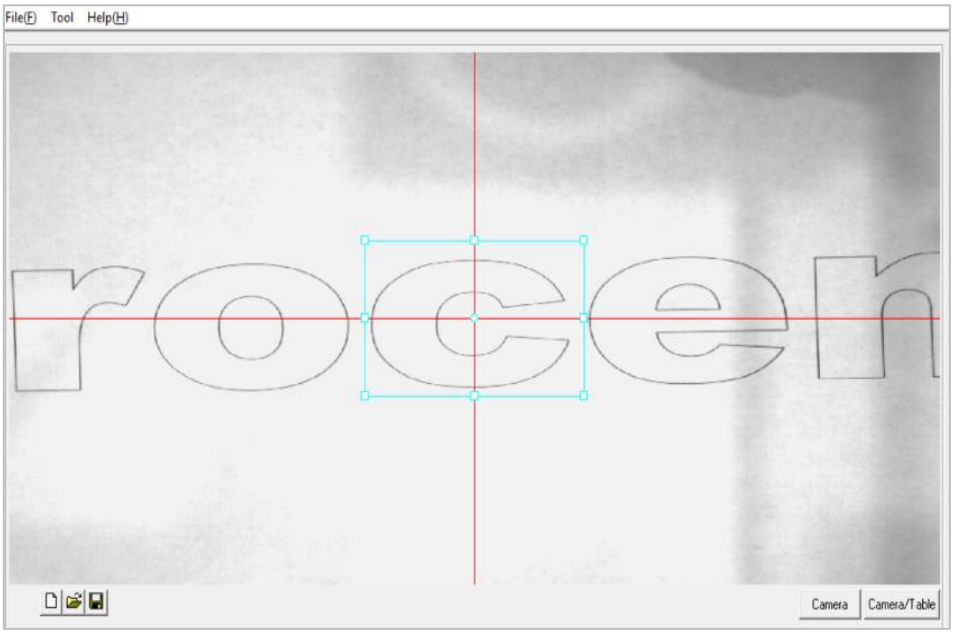


Figure5-5 Simulate

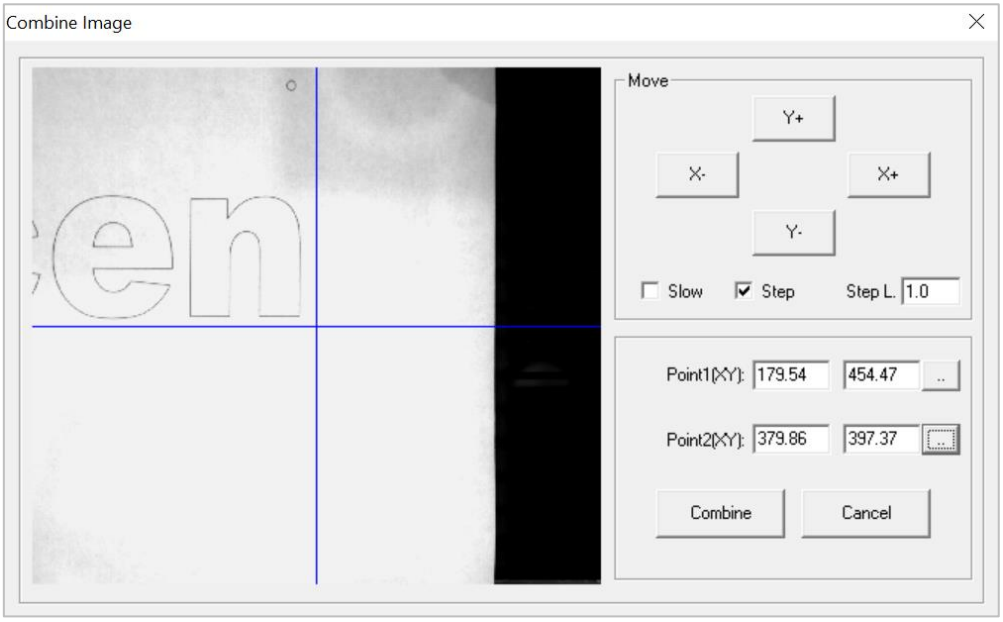
Two Mark Locate

If the cutting image is too large for the camera to recognize at one time, users can adopt two mark locate mode for cutting processing. If the working file is too large, cutting in the whole range with two mark locate mode, it is recommended to use the Mark cutting function in LaserCAD software, which has higher accuracy.

Click【Camera】to adjust exposure and contrast to make the image line clear. Choose【Two Mark Locate】mode, click【Model】→【Add】, click " " to open the image combination interface, move the laser head to the upper left and lower right position, click " " to get the current coordinates, then click【Combine】, the camera will scan the current image .

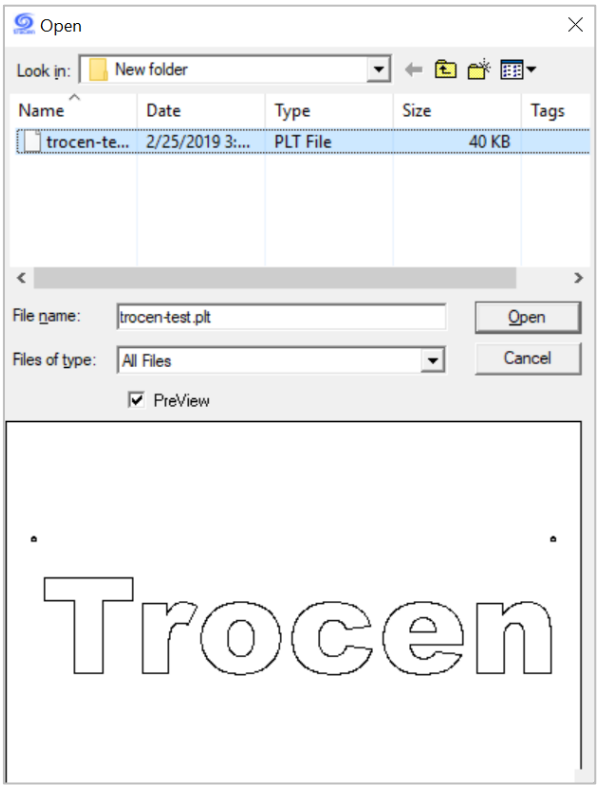
Note: In two mark locate work mode, the image must be scanned first, otherwise it cannot be cut.

Figure6-1 Combine Image



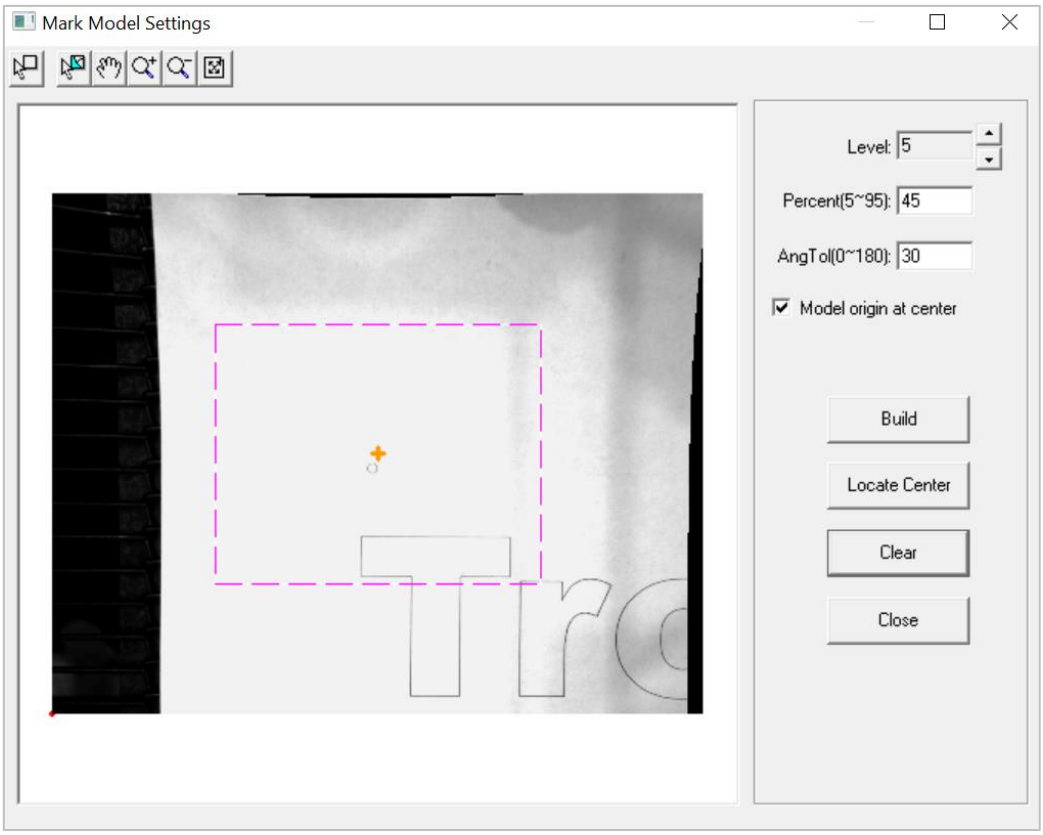
After the image is fully scanned, click " ". Click " " to import the cutting file or draw the cutting graphics with drawing tools.

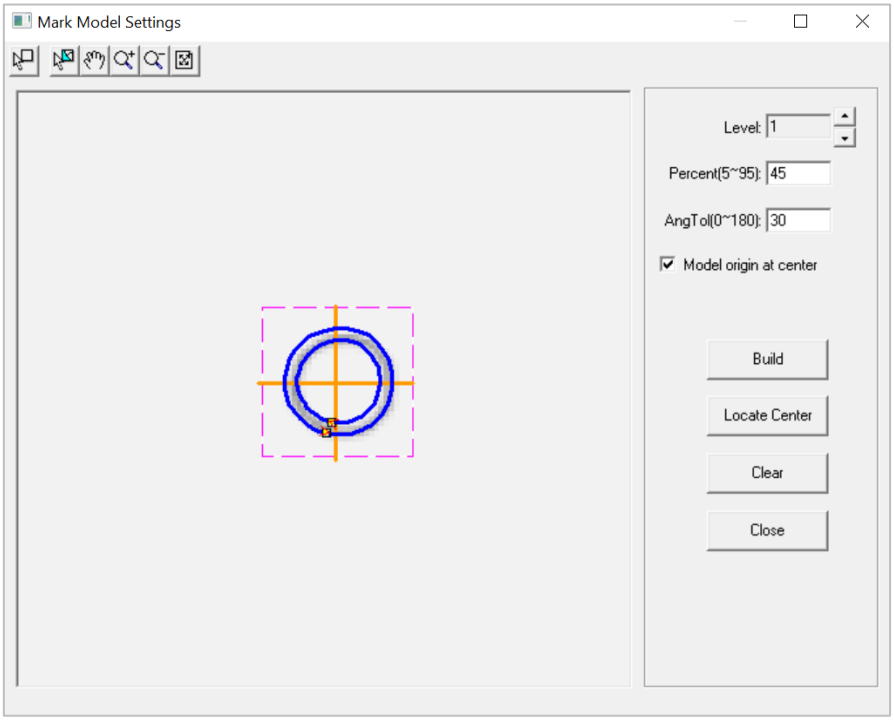
Figure6-2 Import Working File



Move the laser head to the first registration point, click【First Point】and open the Mark template setting interface. Click " " to set feature range, adjust accuracy as shown in Figure 6-3. Click【Locate Center】→【Close】.

Figure6-3 Mark Model Settings





Click【Yes】on the prompt box as shown in figure 6-4, and the imported working file or drawn working graphics will automatically locate and display "the first point" (blue words). Move the laser head to the second registration point, click【Second Point】, the setting method is the same as the first point, click【Yes】, the imported working file or the drawn working graphics will automatically locate and display "the second point" (pink words). After setting two registration points, the interface is shown as Figure 6-5

Figure6-4 Message

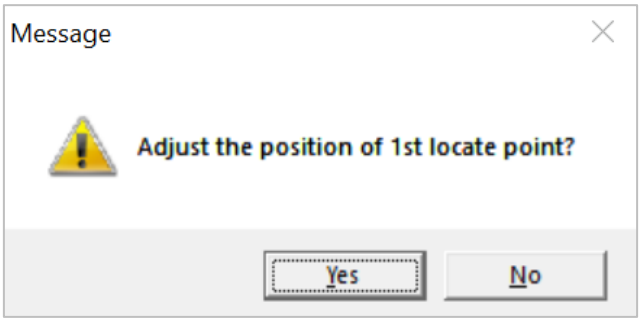
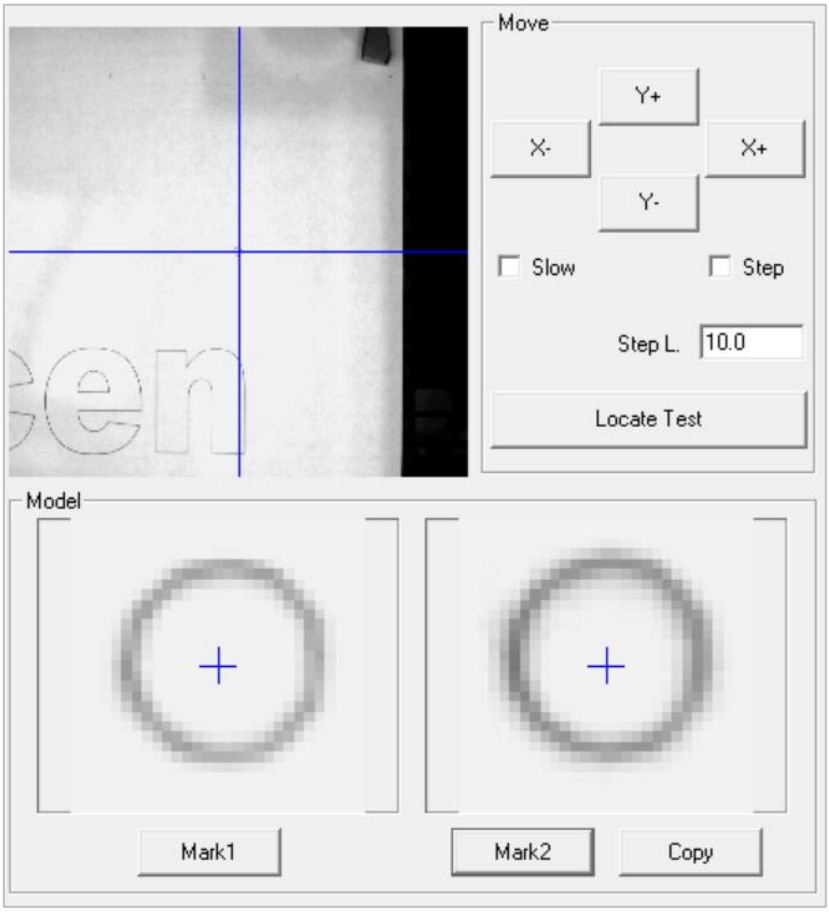


Figure6-5 Two Mark Points



Click【Close】, move the laser head to the first point position on the main page of software, and click【Simulation】to see whether the cutting file can be fully displayed. If the simulation result is shown as Figure 6-7, the

template setting is accurate.

Figure6-6 Simulate

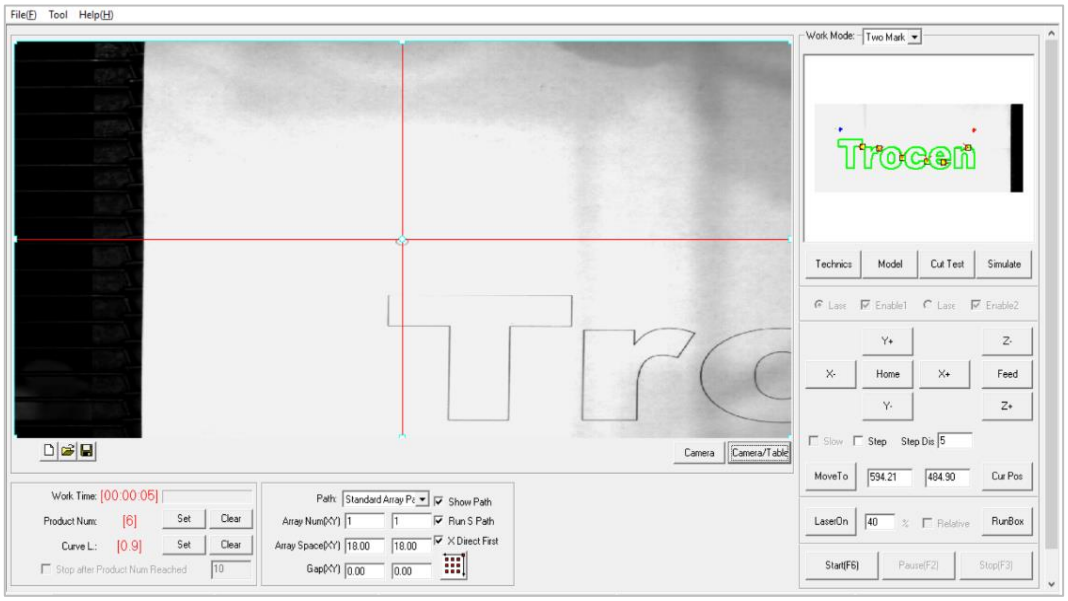
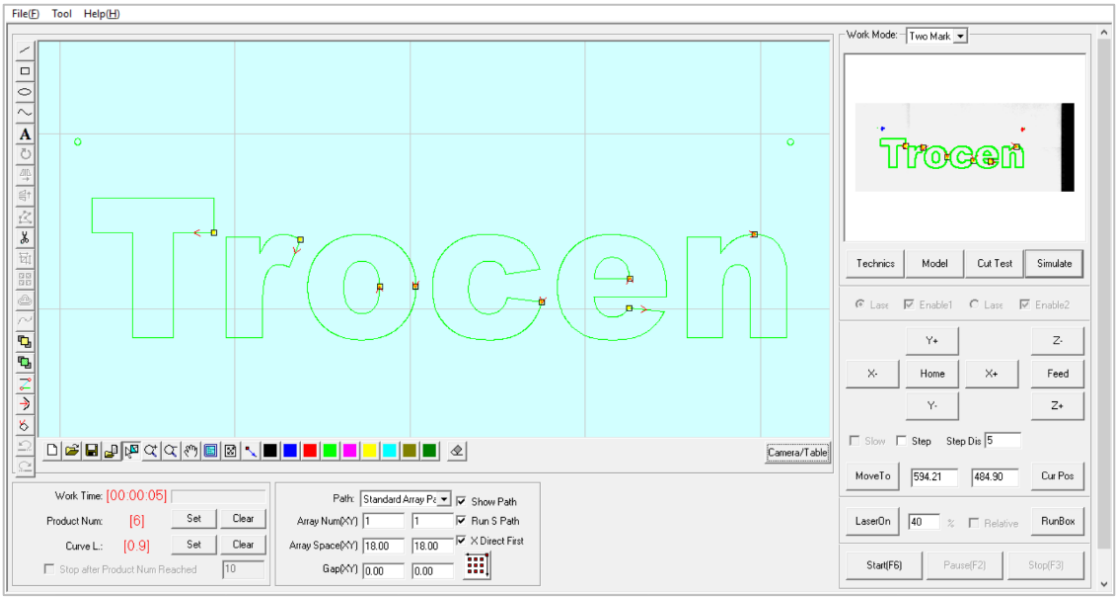


Figure6-7 Simulate Result



Appendix: The Introduction of Function Keys

1. Import

   Import working files, “*.PLT/*.AI/*.DXF” formats.

2. Export

   Export current file to “*.PLT/*.DXF” formats.

3. Template Range

   Draw the template range box.

4. Select

   The mouse is in a state of choice. Select the object you want to edit. Select the graphics or a part of the graphics, the selected part can be modified, moved, deleted or other editing operations.

5. Amplification

   Zoom in and display data. Click the button, click the left mouse button on the screen and scroll forward the middle mouse to enlarge the display of graphics (the graphics actual size does not change).

6. Shrink

   Zoom out and display data. Click the button, click the left mouse button on the screen and scroll backward the middle mouse to shrink the display of graphics (the graphics actual size does not change).

7. Translation

Move the current view.

8. Data Range

Complete display processing graphics range.

9. Multi Point Line

Draw any line. Drag the mouse on the screen and click the left button of mouse to draw any line. Click the right button of mouse to end drawing.

10. Ellipse

Draw an ellipse. Drag the mouse on the screen and click the mouse to draw the ellipse, press【Ctrl】while dragging the mouse To draw a circle.

11. Rectangle

Draw a rectangle. Click the button, drag the mouse to draw a rectangle of any size. Press【Ctrl】and drag the mouse to draw a square.

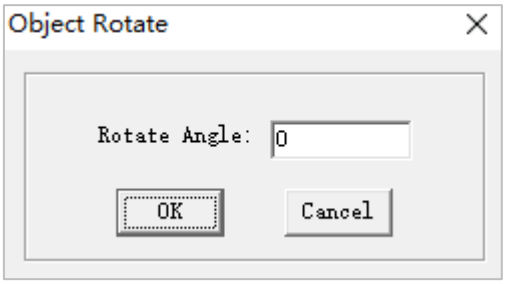
12. Bezier Curve

Draw the Bezier curve. Drag the mouse on the screen and click the mouse to draw the Bezier curve.

13. Rotation

Rotating graphics. Click " " to select the graphics need to be rotated and click " " to open the rotation interface, then enter the

corresponding angle, click【Sure】.



14. Horizontal Image

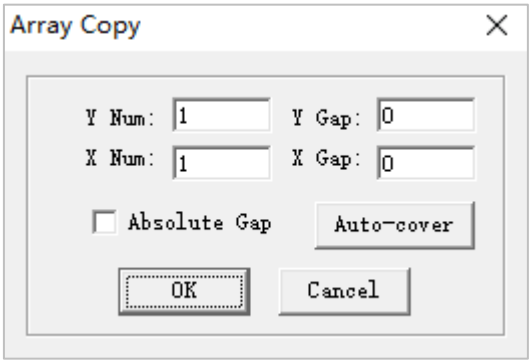
Click " " to select the graphics, click this button to mirror the selected graphics horizontally.

15. Vertical Mirror

Click " " to select the graphics, click this button to mirror the selected graphics vertically.

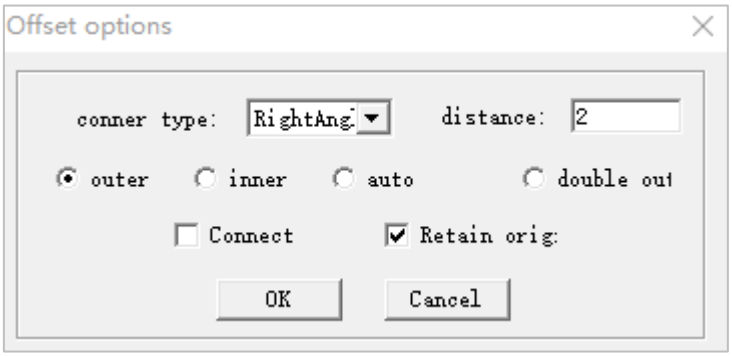
16. Array Replication

Click " " to select the graphics, and then click this button to open the array replication interface. Input the number of columns and rows, set suitable distance, then click【OK】. The distance between graphics is【Distance】.



17. Extended Edge

Click “ ” to select the graphics, click this button to open the 生成平行线 interface. Set parameters as need, click【OK】to change the edge of graphics.

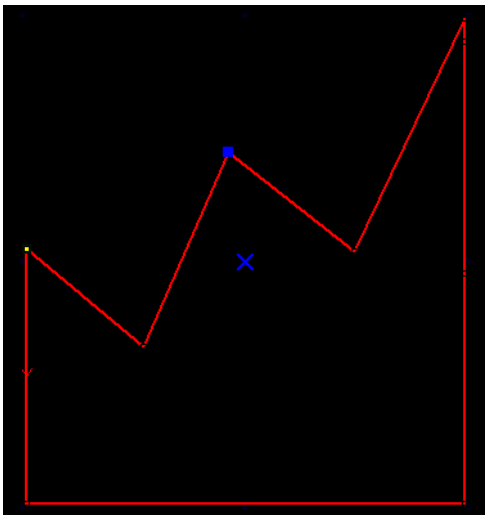


18. Cut

Click “ ” to select the graphics, click this button, then click the left button of mouse on the graphics to cut the graphics.

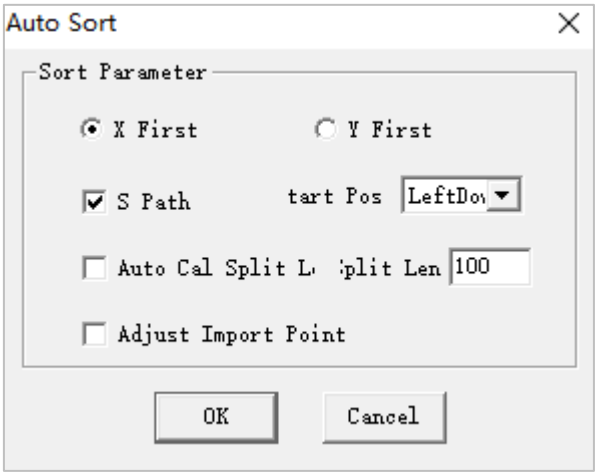
19. Node Editor

Edit the nodes of the selected graphics. Click the button, and the selected node of the graphics will be displayed as small squares. Select the node and drag it to modify the graphics. Move the mouse to the graphics and the cursor changes to a "cross" shape, double-click the mouse to add one node. If you want to delete a node, simply select the node and click【Delete】.



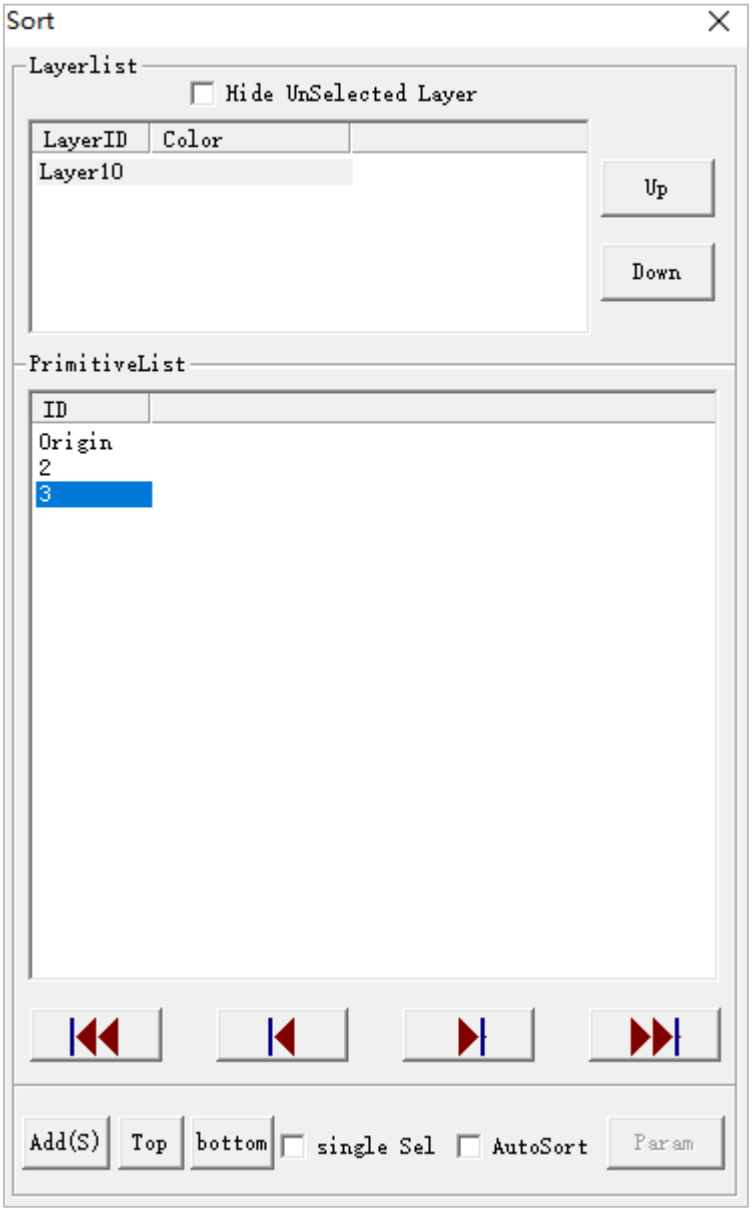
20. Automatic Sort

Set the output sequence. Click this button to open the automatic sort interface. Input corresponding parameters and click【OK】.



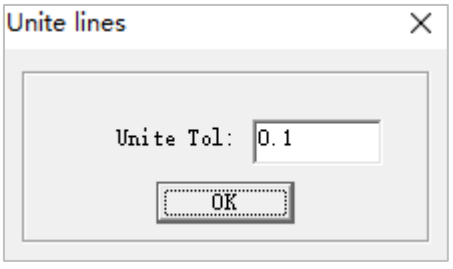
21. Manual Sort

Manually set the output sequence. Click this button to open the manual sort interface. Input corresponding parameters and click【OK】



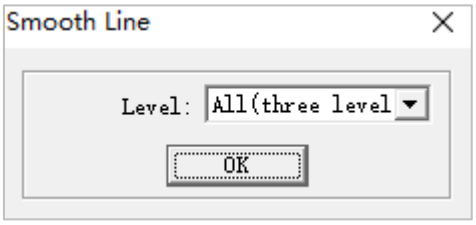
22. Merge Connected Line

Merge linked data.



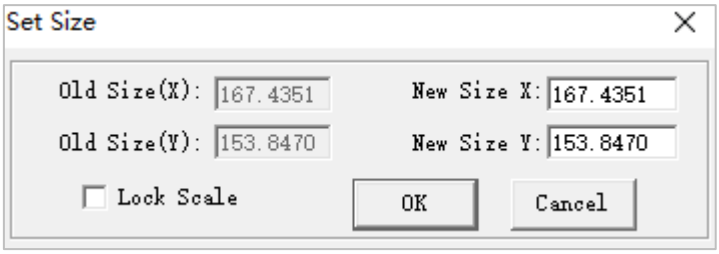
23. Smooth

Smooth treatment of the curve, can improve the speed of cutting and stability.



24. Size

Zoom graphics. Click " " to select graphics, click " " to open the set size interface, then input the length of X and Y, click【OK】. If you want the graphics zoom by the same scale in X and Y direction, please check【Lock Scale】function.



25. Set Start Point

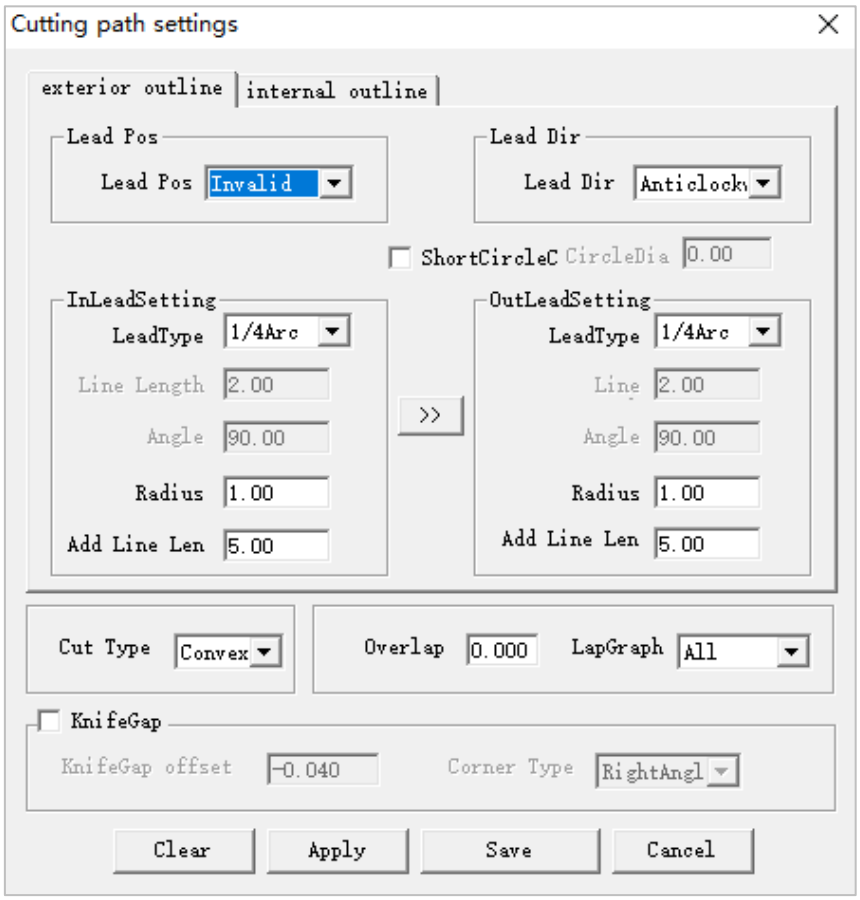
The system will automatically define the start point (generally the intersection of two-line segments) and cutting direction according to the graphics. Select the graphics, click this button, and move the mouse to the position that needs to be edited, then the cursor will change into a "cross" shape. Click the left button of mouse at this position on the graphics to set the point as the start point. Click the

【F】on the keyboard to change the cutting direction.

26. Calculation Leads to Outlet

Click this button to open the cutting path settings interface.

1) Exterior Outline: outside of the entire graphics.



2) Lead Position: set the lead position, including: Invalid, Max Corner, Longest Edge, Left Bottom, Left Top, Right Bottom, Right Top.

3) Lead Direction: set the lead direction according to the cutting direction, including: Invalid, Anticlockwise, Clockwise.

4) Short circle center lead: if the diameter of circle less than a certain value, the cutting path will start from the center of circle.

5) IN Lead Setting

   a) Lead Type: Invalid, 1/4Arc, Line, 1/2 Arc.

   b) Line Length: set the length of the lead (valid for a straight line).

   c) Angle: sets the angle of the introduction (for linear effective)

   d) Radius: set the introduction of arc radius (effective for 1/4 arc and 1/2 arc).

   e) Add Line Len: add line on the arc (effective for 1/4 arc and 1/2 arc).

6) Out Lead Setting: same as In Lead Setting.

7) : make the Out Lead Setting same as In Lead Setting.

8) Cut Type: cutting methods.

9) Overlap: set whether the graphics is sealed or not (positive: sealed, negative: no sealing).

10) Lap Graph: set the sealed graphics, including All, Outer, Inner.

11) Knife Gap: compensation of laser cutting width.

12) Knife Gap Offset: set the offset value.

13) Corner Type: when compensating the slot, whether the graphics adopts the Right Angle or the Fillet at the corner, the Right Angle cutting effect is better than the Fillet, it is suggested to use the Right Angle.

14) Internal Outline: relative to the inside of the whole graphics, the settings are same as Exterior Outline.

27. Revocation

Return to the previous edit state.

28. Recovery

To undo the previous state.

29. Matching

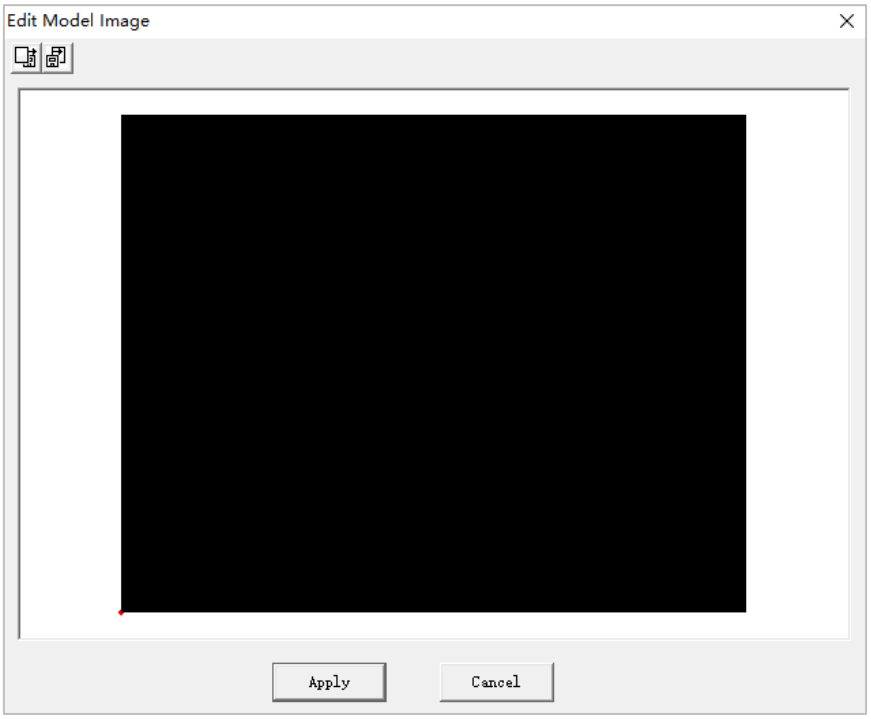
Open the graphics matching interface.

30. Export BMP

Export current file to BMP format.

31. Edit Model Image

Open the Edit Model Image interface, import or export models.



32. Outline Transformed into Cutting Path

After the camera scans the graphics, click " " to extract the outline, then click " " to convert the extracted outline into the cutting path.

33. Extract Outline

After the camera scans the graphics, click " " to extract the outline of the graphics.

34. Retrace

Restore to the previous cutting path.