

FOCUS ON MOTION CONTROL PROVIDE THE BEST MOTION CONTROL SOLUTIONS



Laser CAD User Manual



Shenzhen Trocen Automation Technology

Address: First Floor, Building 4, Zhiheng Industrial
Park, Nantou Pass Second Road, Nanshan
District, Shenzhen City, Guangdong
Province, China

Tel: +86-0755-27958262

Fax: +86-0755-27447913-608

Web: www.sztcen.com

Copyright

Shenzhen Trocen Automation Tech. Co. Ltd. (Hereinafter referred as Trocen) reserves the right to modify the products and product specifications in this manual without prior notice.

Trocen is not liable for any loss or liability arising directly, indirectly, specifically, incidental or consequential due to the use of this manual or this product.

The company has the patent, copyright and other intellectual property rights of the product and its software. Without authorization, it shall not directly or indirectly reproduce, manufacture, process, use this product and its related parts.



Users have the responsibility to pay attention to the design error and establish protection mechanisms. Trocen doesn't accept any responsibility or liability for any damage or loss resulting from improper operation.

Contact Us

[Shenzhen Trocen Automation Tech. Co. Ltd.](#)

First Floor, Building 4, Zhiheng Industrial Park, Nantou Pass Second Road,
Nanshan District, Shenzhen City, Guangdong Province, China

Tel: +86-0755-27958262

Fax: +86-0755-27447913-608

Email: qiancheng@sztrocen.com

Website: www.sztrocen.com

Introduction

Thanks for Choosing Trocen Motion Control

In order to feedback customers, we will help you to complete the production of the equipment with first-class quality motion controller, perfect after-sales service and efficient technical support.

More Information about Trocen Products

You could get more information about the company and products on our website www.sztrocen.com, including company profile, product introduction, technical support and the latest release products, etc. You could call +86 (0755) 27958262 for more information.

Technical Support & After-Sales Service

You could contact technical support and after-sales service by the following ways:

Email: qiancheng@sztrocen.com

Tel: +86-0755-27958262

Fax: +86-0755-27447913-608

Address: First Floor, Building 4, Zhiheng Industrial Park, Nantou Pass
Second Road, Nanshan District, Shenzhen City, Guangdong
Province, China

Code: 518100

User Manual

By reading this instruction, the users will know the basic operation of LaserCAD.

For Who

This manual is applicable to engineers who have a certain understanding of laser mechanical automation.

Main Content

The particular use and operation of LaserCAD.

Content

1. Introduction	10
2. LaserCAD Installation	12
3. Basic Operation of LaserCAD	19
3.1 Main Interface	19
3.2 File	21
3.2.1 New	21
3.2.2 Open.....	21
3.2.3 Save	23
3.2.4 Save as.....	24
3.2.5 Import	25
3.2.6 Export.....	27
3.2.7 Import Machine Config.....	29
3.2.8 Export Machine Config	30
3.2.9 Import Soft Config	31
3.2.10 Export Soft Config.....	32
3.3 Select & Transform	33
3.3.1 Select.....	33
3.3.2 Change Color	35
3.3.3 Rotate.....	35
3.3.4 Size	37
3.4 Edit.....	38
3.4.1 Undo.....	38

3.4.2 Redo	38
3.4.3 Cut.....	38
3.4.4 Copy	38
3.4.5 Paste.....	38
3.4.6 Delete.....	38
3.4.7 All Select.....	39
3.4.8 Group	39
3.4.9 Ungroup	39
3.4.10 All Ungroup.....	39
3.4.11 Add Node	39
3.4.12 Delete Node.....	40
3.4.13 Separate Node.....	40
3.4.14 Unite Node	40
3.4.15 Move	41
3.4.16 Zoom	41
3.4.17 Align	41
3.4.18 Nudge Offset	41
3.4.19 Convert to Leftover.....	42
3.4.20 Convert LastRow to Leftover.....	42
3.4.21 Cancel Leftover	44
3.4.22 Convert Middle_Row to Leftover	44
3.4.23 ClothingMark.....	46
3.4.24 Manual Notch.....	46

3.4.25 Change Size.....	46
3.5 Draw.....	47
3.5.1 Select.....	47
3.5.2 Rect Select.....	47
3.5.2 Edit Node.....	48
3.5.4 Draw Line.....	52
3.5.5 Draw Polyline.....	53
3.5.6 Draw Rectangle.....	53
3.5.7 Draw Ellipse	53
3.5.8 Draw Bezier	53
3.5.9 Text.....	55
3.6 Tool	56
3.6.1 Array Clone.....	56
3.6.2 Select by Color.....	58
3.6.3 Mirror Horizontally	58
3.6.4 Mirror Vertically.....	58
3.6.5 Manual Order	59
3.6.6 Automatic Order.....	60
3.6.7 Smooth Object(s).....	63
3.6.8 Delete Repeated Lines	64
3.6.9 Unite Lines.....	66
3.6.10 Auto Cutting Guide_Line.....	66
3.6.11 Edit Cutting Guide_Line	69

3.6.12 Image Invert	70
3.6.13 Image Dither	70
3.6.14 Create Image Block	71
3.6.15 Create Image Outline	73
3.6.16 Close Check	73
3.6.17 Parallel Offset	74
3.6.18 Measure Length.....	76
3.6.19 Estimate Work Time.....	76
3.6.20 Simulate.....	77
3.7 Options.....	78
3.7.1 System Options.....	78
3.7.2 Array Output Options	95
3.7.3 Position Relative	102
3.7.4 Default Parameters	104
3.8 View	104
3.9 Help.....	105
3.9.1 About.....	105
3.9.2 Modify Icon	108
4. Control Panel.....	109
4.1 Communicate by USB	109
4.2 Network Mode	112
4.2.1 Communicate by Network	112
4.2.2 Modify the IP Address of Computer.....	113

4.2.3 Check IP Address	116
4.3 Layer Options Settings	119
4.3.1 Layer Options.....	119
4.3.2 Cut Parameters	121
4.3.3 Engrave Parameters	123
4.3.4 Hole Parameters	125
4.3.5 Pen Parameters	126
4.3.6 Adjust Layer Processing Order	127
4.4 Machine Control.....	128
4.4.1 Download	129
4.4.2 Other Machine Control	133
5. CorelDraw Based Software	135
5.1 Manual Download Tool “AWCLaserCut”	135
5.2 Display Hidden Toolbar “AWCLaserCut”	137
5.3 Switch CorelDraw to LaserCAD	138
6. AutoCAD Based Software	140
6.1 ADD AWCLaserCut Toolbar.	140
6.2 Switch AutoCAD to LaserCAD	142

1. Introduction

LaserCAD is Trocen Laser Control System specialized windows version software. This manual will explain how to use the software to complete machining task in detail. And the LaserCAD runs on Windows system (Windows XP/Vista/Win7/Win8/Win10).

There are three versions: General Version (LaserCAD), CorelDraw based version, AutoCAD based version.

Software Features

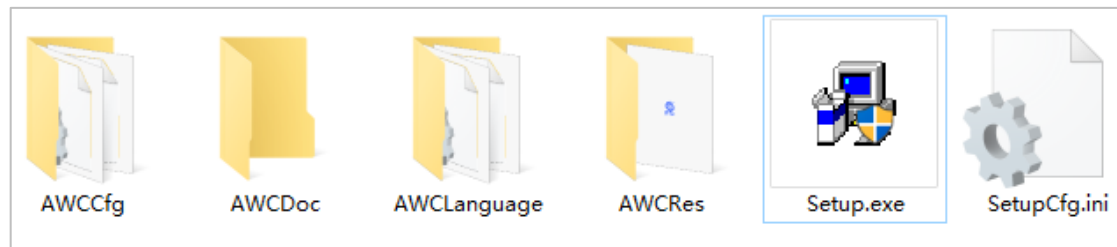
- Friendly interface, easy to learn, simple to operate.
- Support CorelDraw direct output version, AutoCAD direct output version.
- Compatible with AI、PLT、DXF、SVG、PDF、NC、DST、DSB、UD5、BMP、GIF、JPG、JPEG、PNG formats.
- Draw simple graphics, characters and edit/compose the imported data.
- Process by layers and define output sequence.
- Customized settings of working procedure and precision, simulation shows the running trial of laser head.
- Multiple functions of Path Optimization and pause during working.
- Multiple preservation and reuse of graphics and machining parameters.
- Function of estimating working time and cost budget.
- Array output, immediate output and go-back-to-origin output.

- Unique double laser system supports working synchronously or working independently.
- Set the working start point, working path, go-back position of laser head according to different requirement.
- Compatible with multiple communication modes, USB communication and network communication.
- Engrave photograph directly, support rotating engraving.
- Support slope engraving.

2. LaserCAD Installation

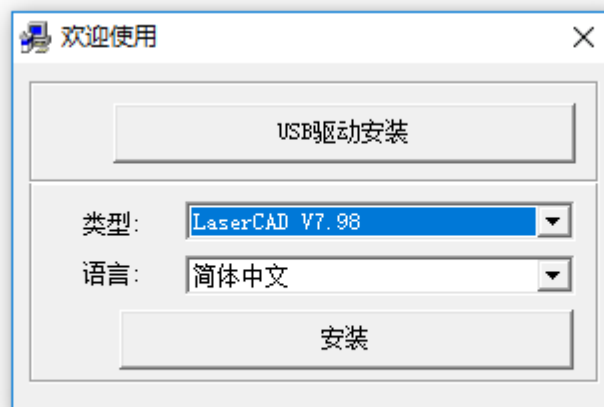
1. Access to installation directory.

Figure2-1 Installation Directory



2. Double click Setup.exe.

Figure2-2 Installation Interface



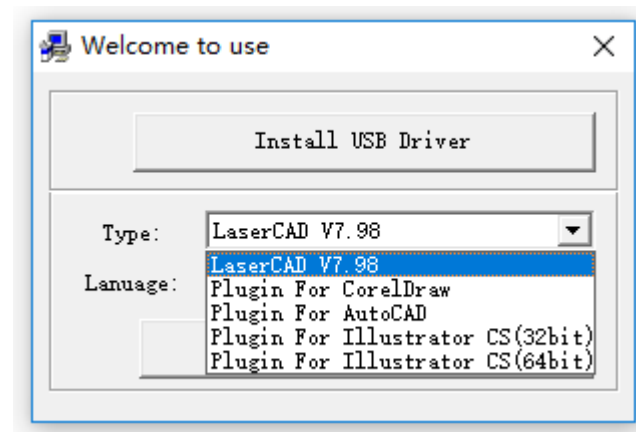
3. Click Language and choose English.

Figure2-3 Set Language



4. Choose the version of LaserCAD and press 【Install】 .

Figure2-4 Choose LaserCAD Version



Press **【Browse】** and choose installation directory, press **【OK】** to start installation.

Figure2-5 Installation Directory

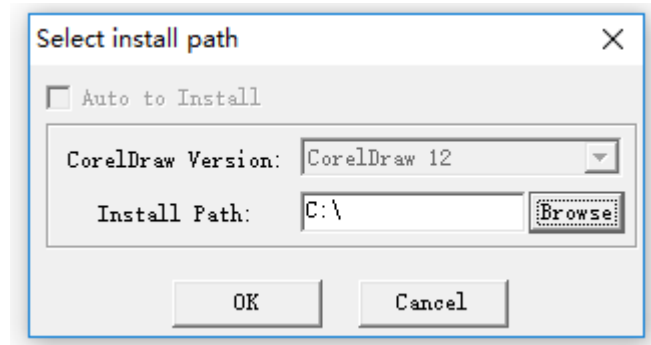
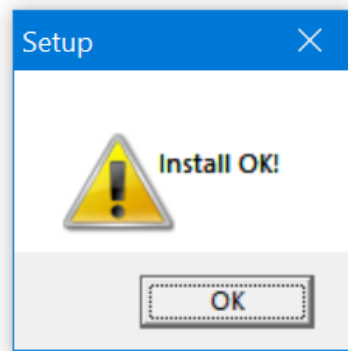
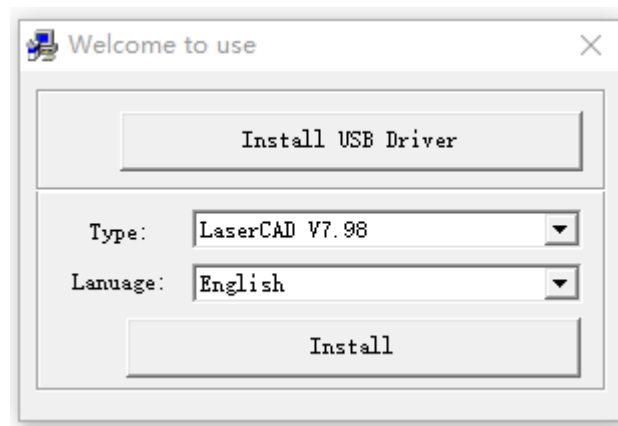


Figure2-6 Install OK



5. Install USB driver. Press **【Install USB Driver】** .

Figure2-7 Install USB Driver



Fogure2-8 FTDI Driver Installation

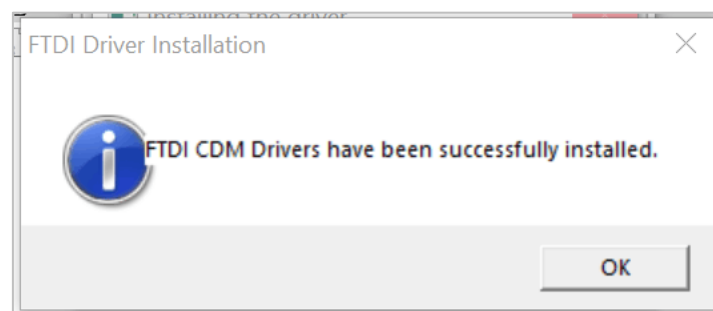


Figure2-9 Install Wizard

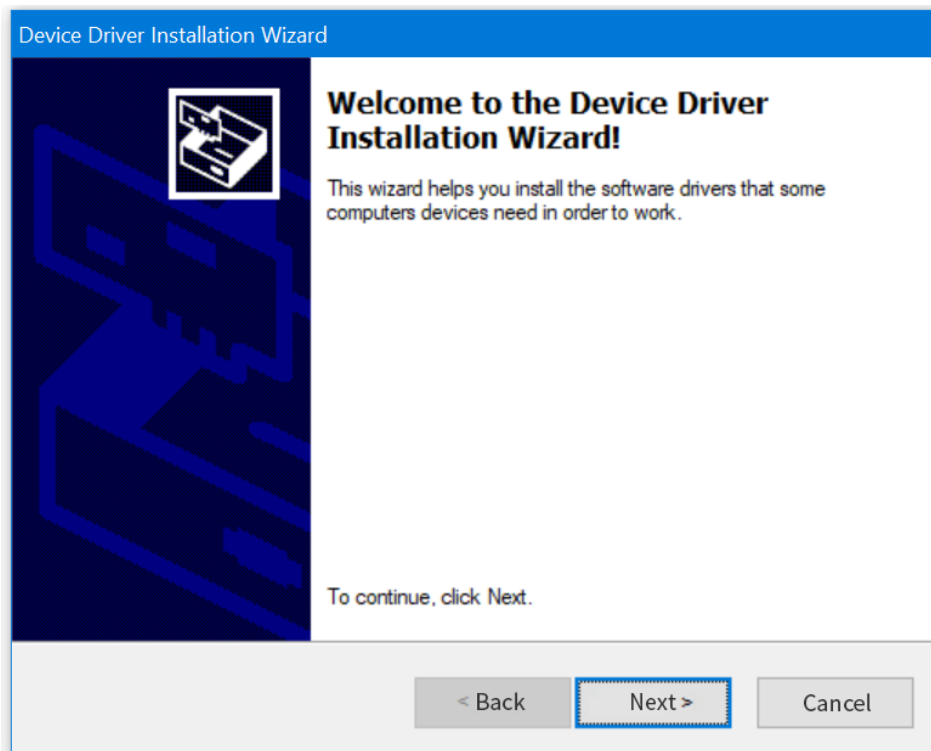
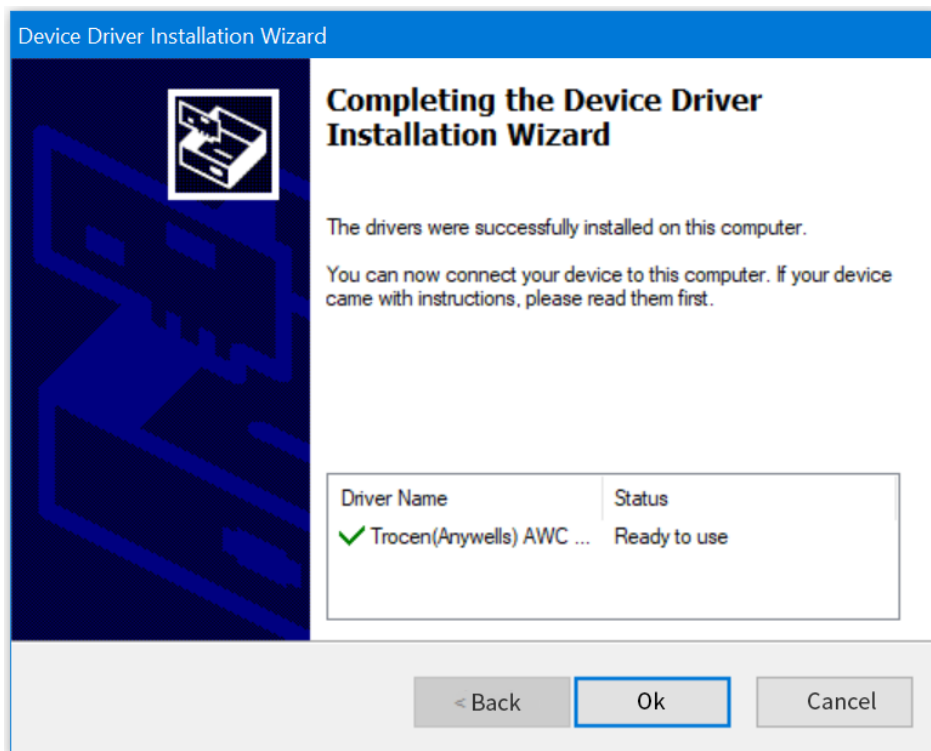
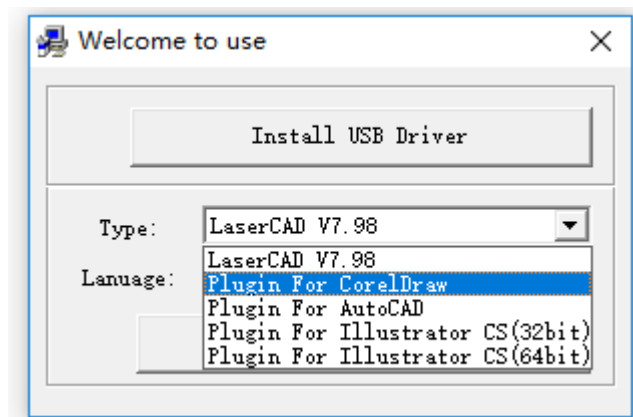


Figure2-10 Finish Installation



6. Install CorelDraw plugin. Choose **【Plugin For CorelDraw】** and press **【Install】** .

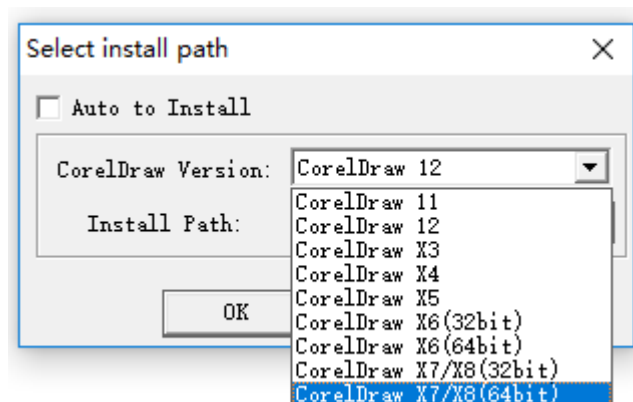
Figure2-11 Choose Plugin for CorelDraw



According to the CorelDraw version installed in computer, select the corresponding plug-in model. If the CorelDraw in computer is CorelDraw 7 (64 bit) version, then select **【CorelDraw X7/X8 (64 bit)】** in the drop-down list.

Press **【Browse】** to choose installation directory and press **【OK】** to start. Please note that the plugin for CorelDraw should be installed under the directory of CorelDraw software.

Figure2-12 The Version of Plugin

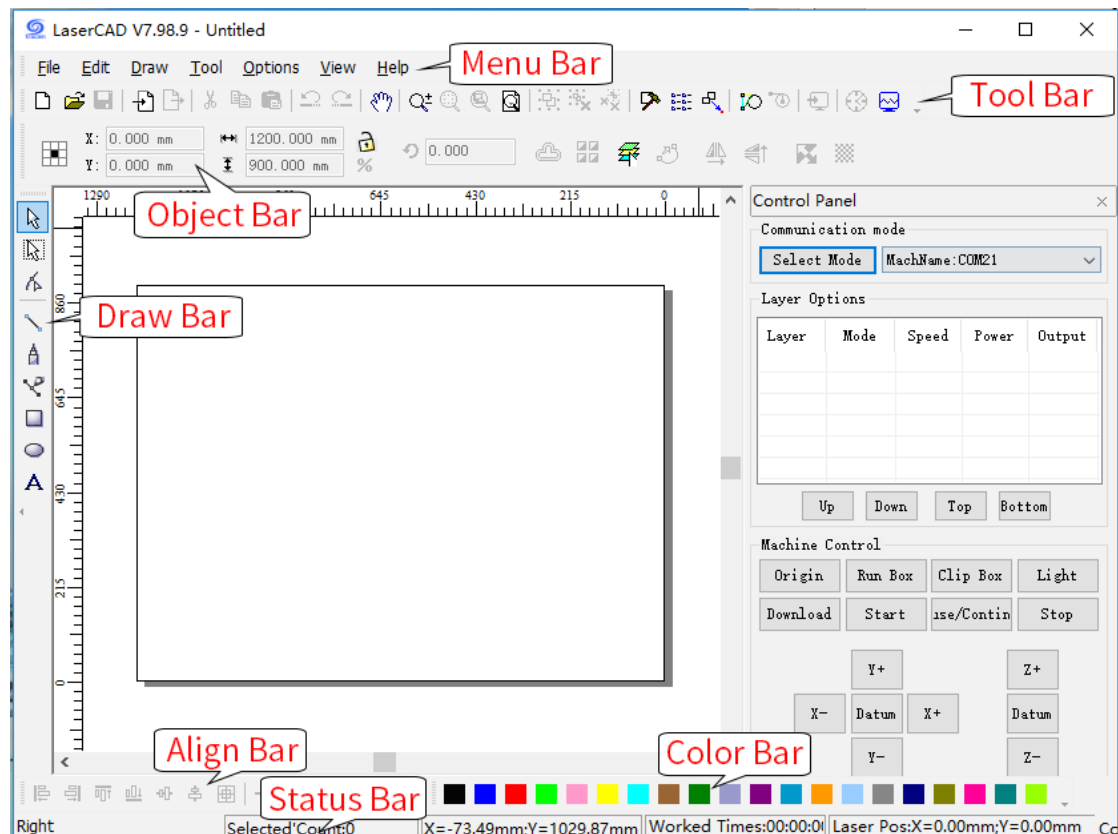


7. The way to install other plug-ins is the same as CorelDraw plugin.

3. Basic Operation of LaserCAD

3.1 Main Interface

Figure3-1-1 Main Interface



- Menu bar

The main functions of this software are executed by the command options in the menu bar. The menu bar contains seven sub-menus with different functions: File, Edit, Draw, Tool, Options, View and help.

- Tool bar

The tool bar contains some of the commonly used functions, most of

which are selected from menus, in the form of command buttons.

- Object bar

The object bar provides relevant properties when selecting graphics and using tools. By setting the corresponding properties in the property bar, the graphics will change.

- Draw bar

It's on the left of working area. With these draw tools, they make operation more flexible and convenient.

- Align bar

Make multi objects align to perfect the layout of page.

- Color bar

Alter the color of selected layer and create multiple layers.

- Control panel

Use control panel to process tasks of laser machining, including setting communication, layer parameter, loading graphics and so on.

3.2 File

3.2.1 New


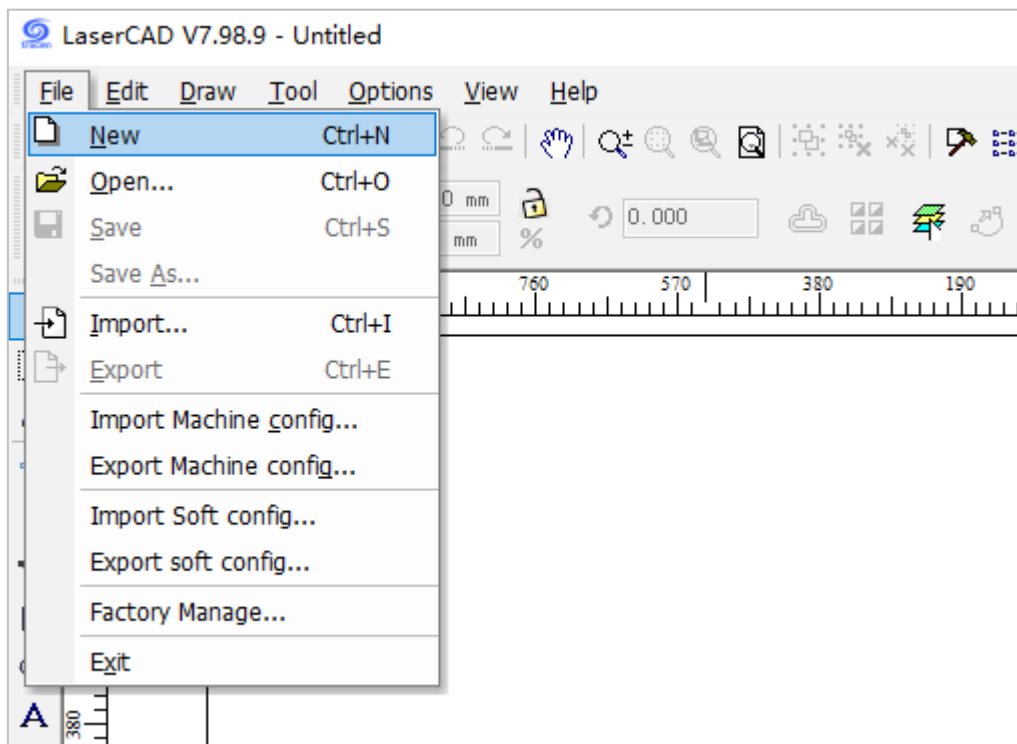
Press **【File】** and click **【New】** or click “” on the tool bar to create a new file.

Figure3-2-1 New



3.2.2 Open

Press **【File】** and click **【Open】** or click “” on the tool bar to open a file.

The suffix of file must be “pwj5” and users can preview the graphics on the open page.

The offline files with the suffix “ud5” cannot be opened directly by this way, and they can be opened via **【Import】** .

Figure3-2-1 New

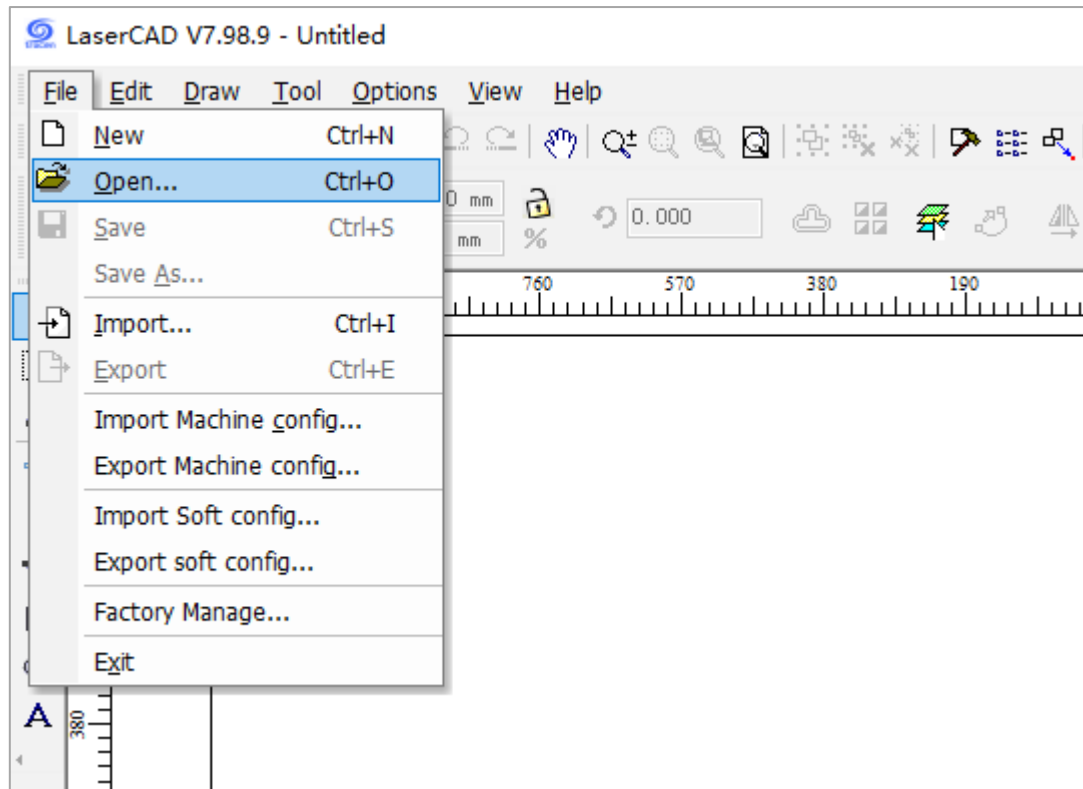
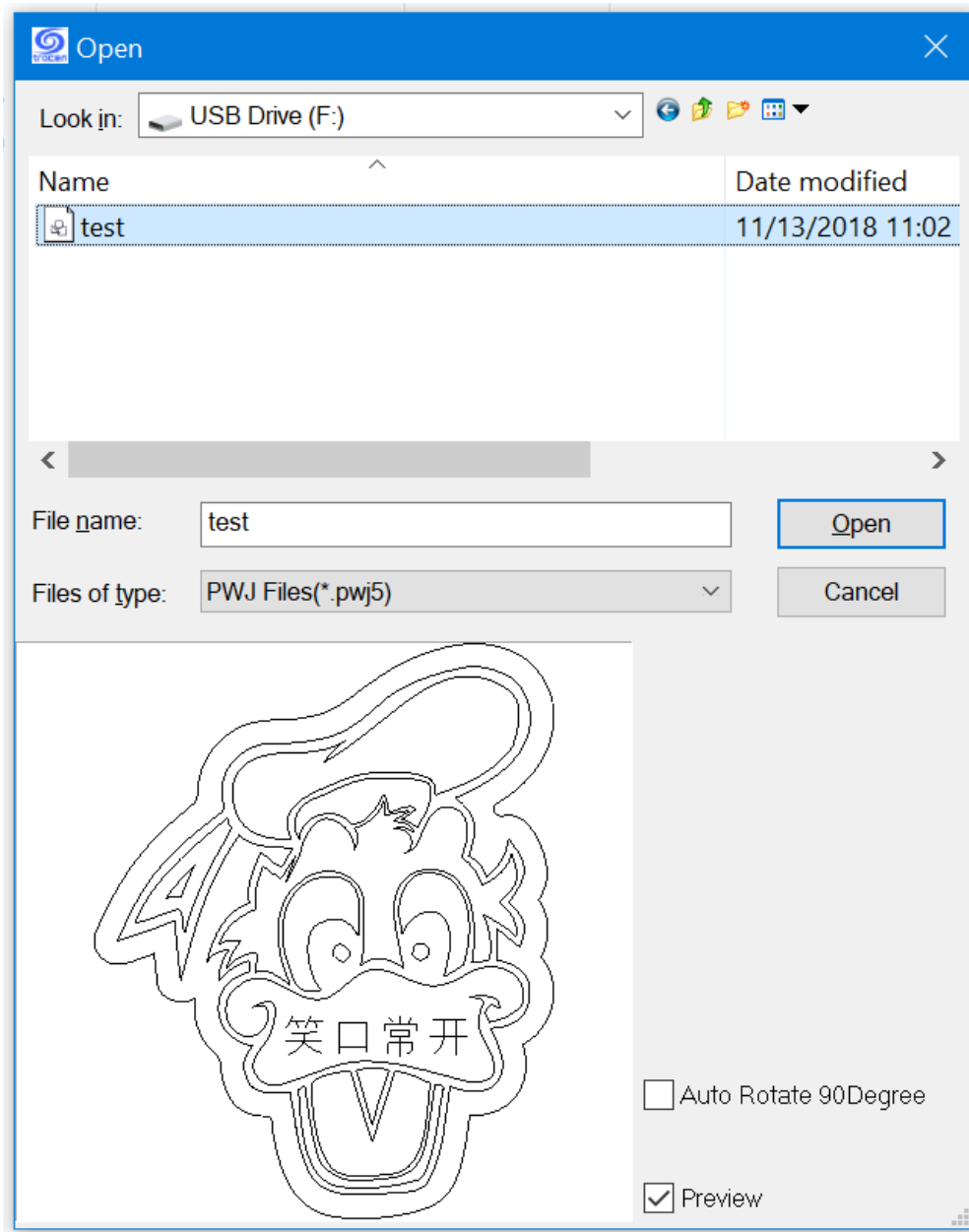


Figure3-2-3 Choose File



3. 2. 3 Save


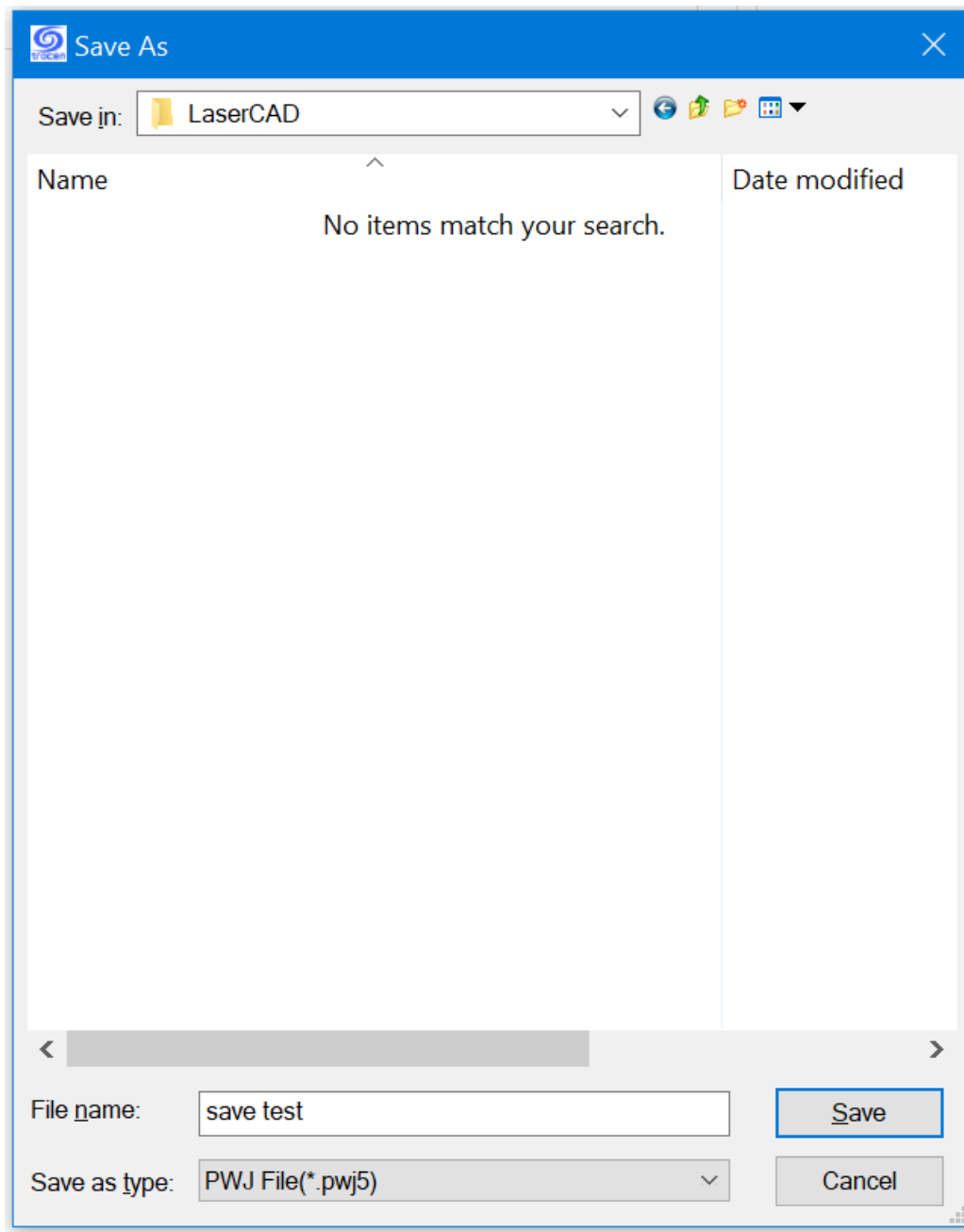
Press **【File】** and click **【Save】** or click “” on the tool bar to save the file.
The suffix of file is “pwj5”.

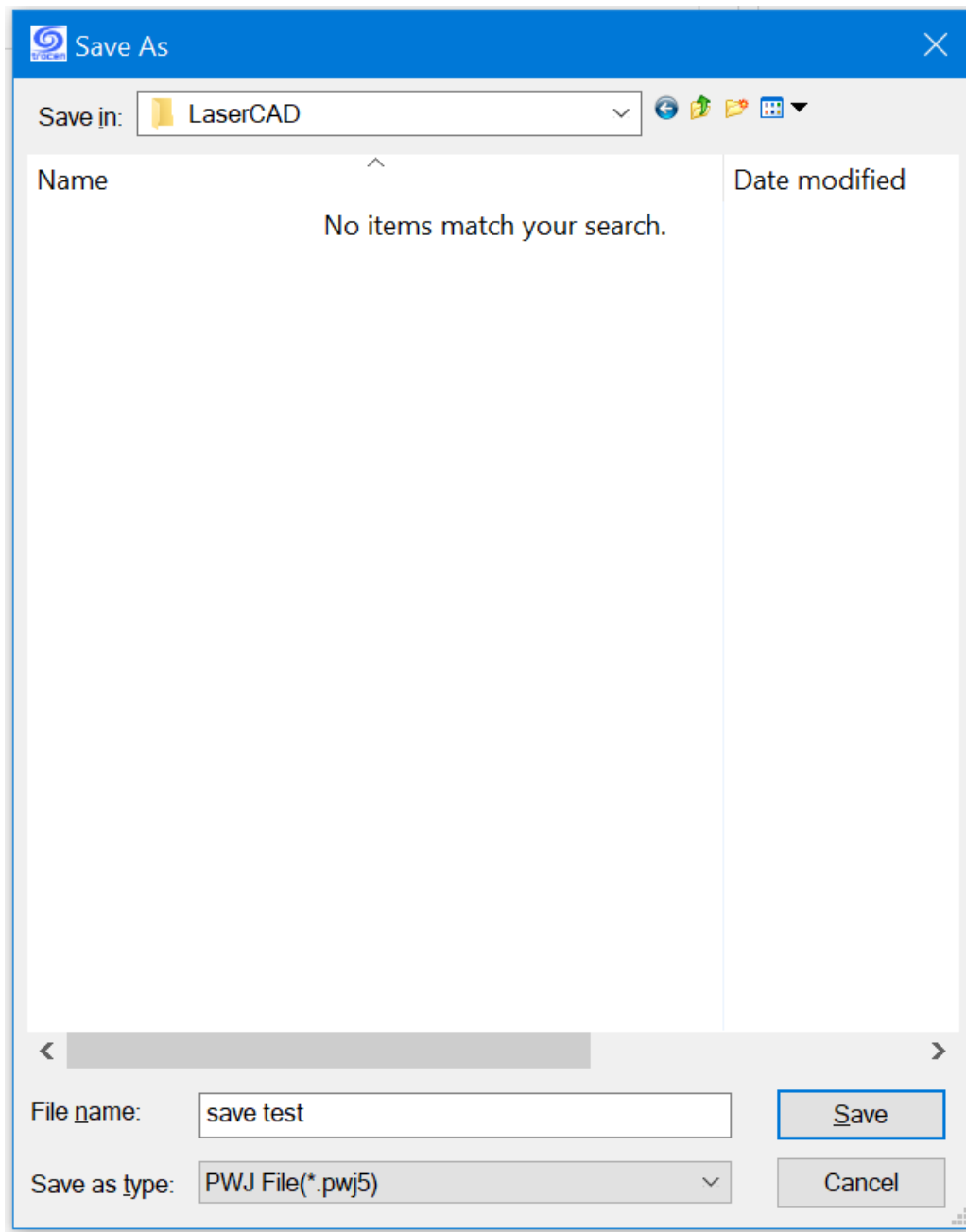
Figure3-2-5 Save




3.2.4 Save as

Press **【File】** and click **【Save as】** to save the file. The suffix of file is “pwj5”.

Figure3-2-6 Save as



3.2.5 Import

Press **【File】** and click **【Import】** or click “” on the tool bar to import a file. Trocen LaserCAD software supports AI, DXF, PLT, DST, DSB, BMP, GIF, JPG, PNG, MNG, ICO, TIF, TGA, PCX, JBG, JB2, JBC, PGX, RAS, PNM, SKA,

RAW and some other formats.

Figure3-2-7 Import

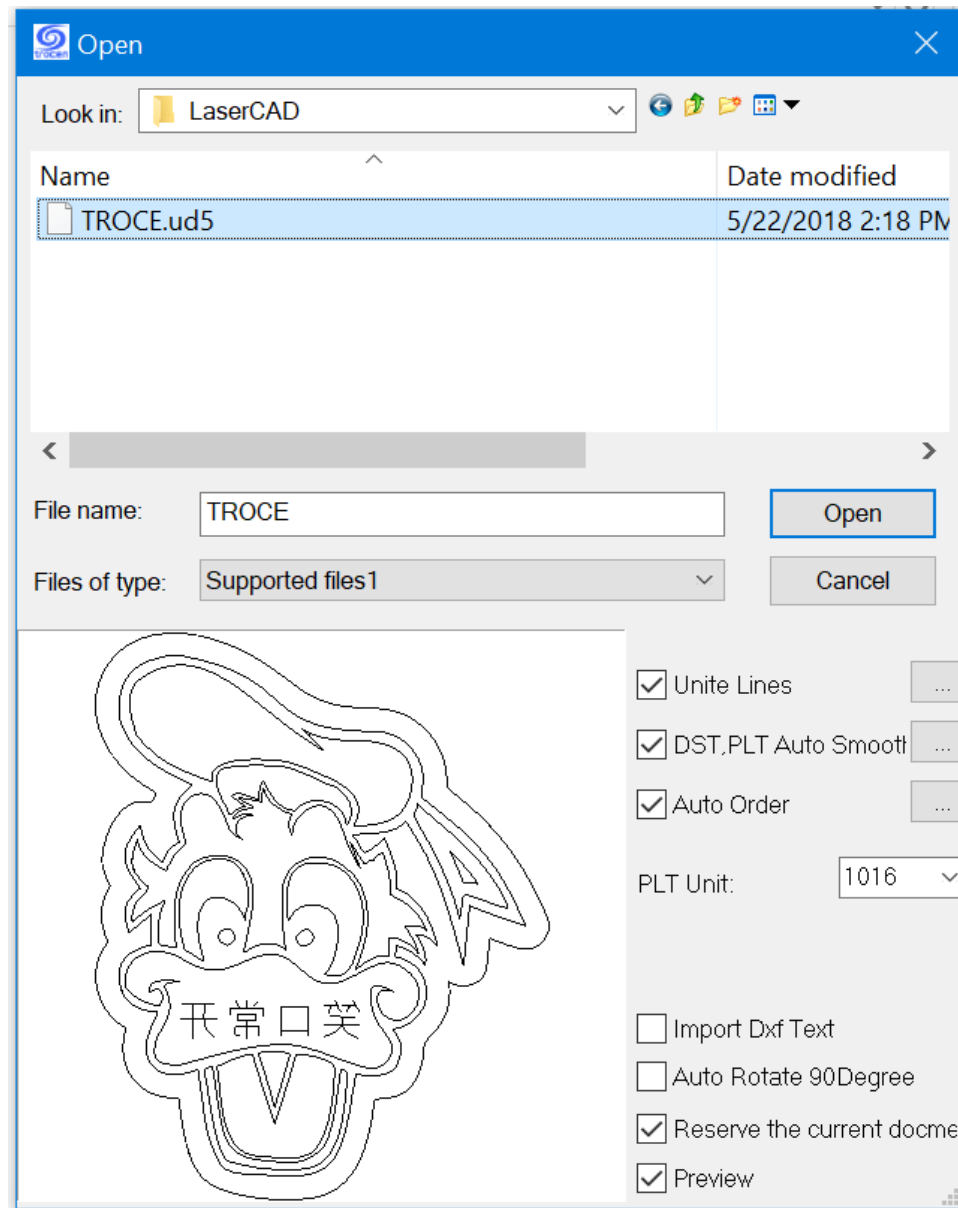



Table3-2-1 Instruction

Function	Instruction
Unite Lines	While importing graphics, combine the connected lines into one line.

DST, PLT Auto Smooth	Smooth processing of curves while importing DST and PLT file graphics can improve the speed and smoothness of cutting.
Auto Order	When the graphics is imported, multiple objects in the graphics will be automatically ordered, making the laser head move the shortest distance during process.
PLT Unit	The unit of PLT.
Import Dxf Text	Output text content in DXF file.
Auto Rotate 90 Degree	The imported graphics rotates 90 degrees automatically.
Reserve the Current doc...	The software retains the graphics before the file is imported. After imported, the software work area will show the original graphics and the imported file.
Preview	Displays preview when the file is selected.

Press “” behind Unite Lines to set unite tolerance.

Press “” behind Auto Order to enter the route optimize interface, users can set these parameters according to need. Please refer to the Chapter 3.6.6 of this article for more detail about Route Optimize

3.2.6 Export


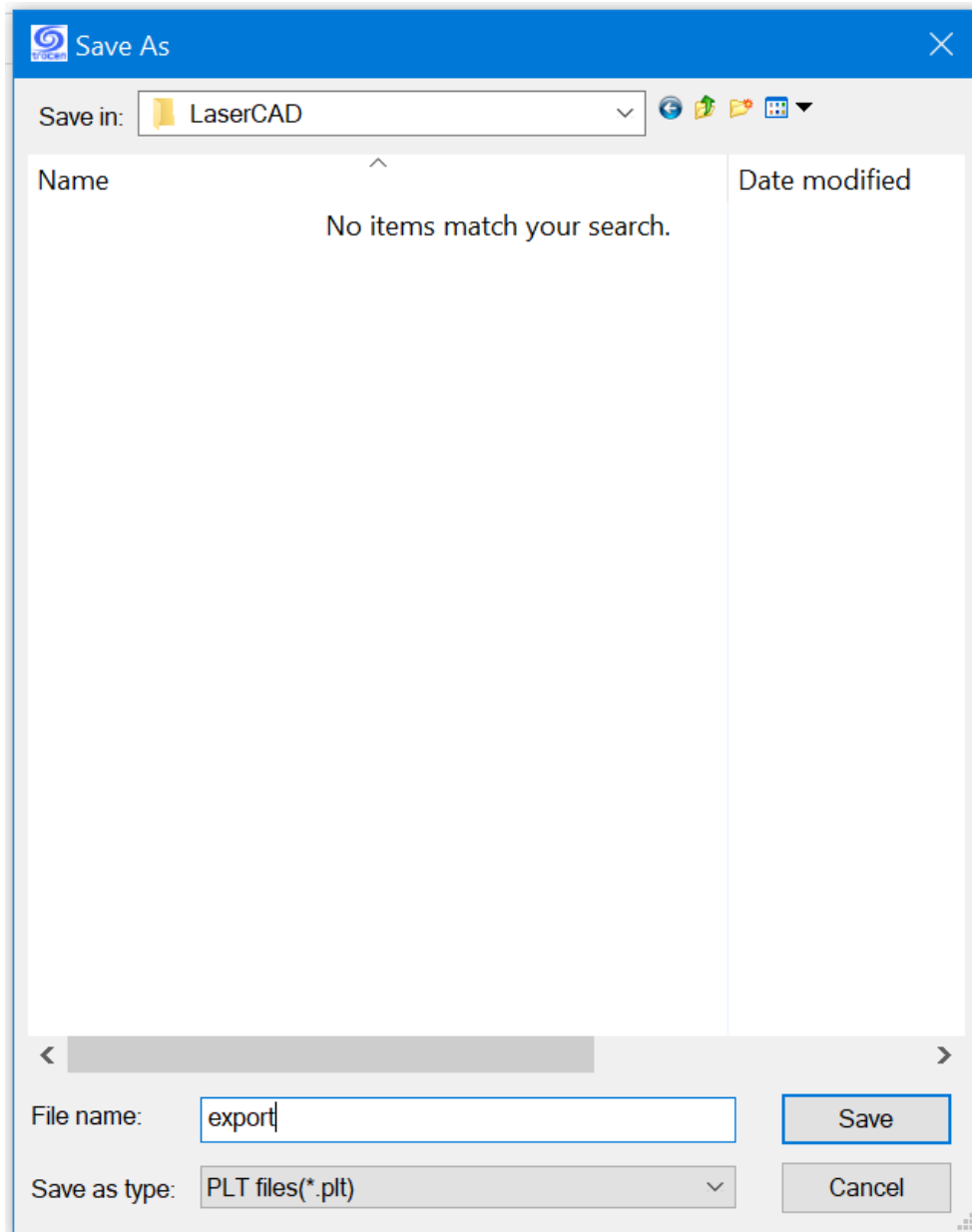
Press **【File】** and click **【Export】** or click “” on the tool bar to export the file. The suffix of exported file is “plt”.

Figure3-2-8 Export

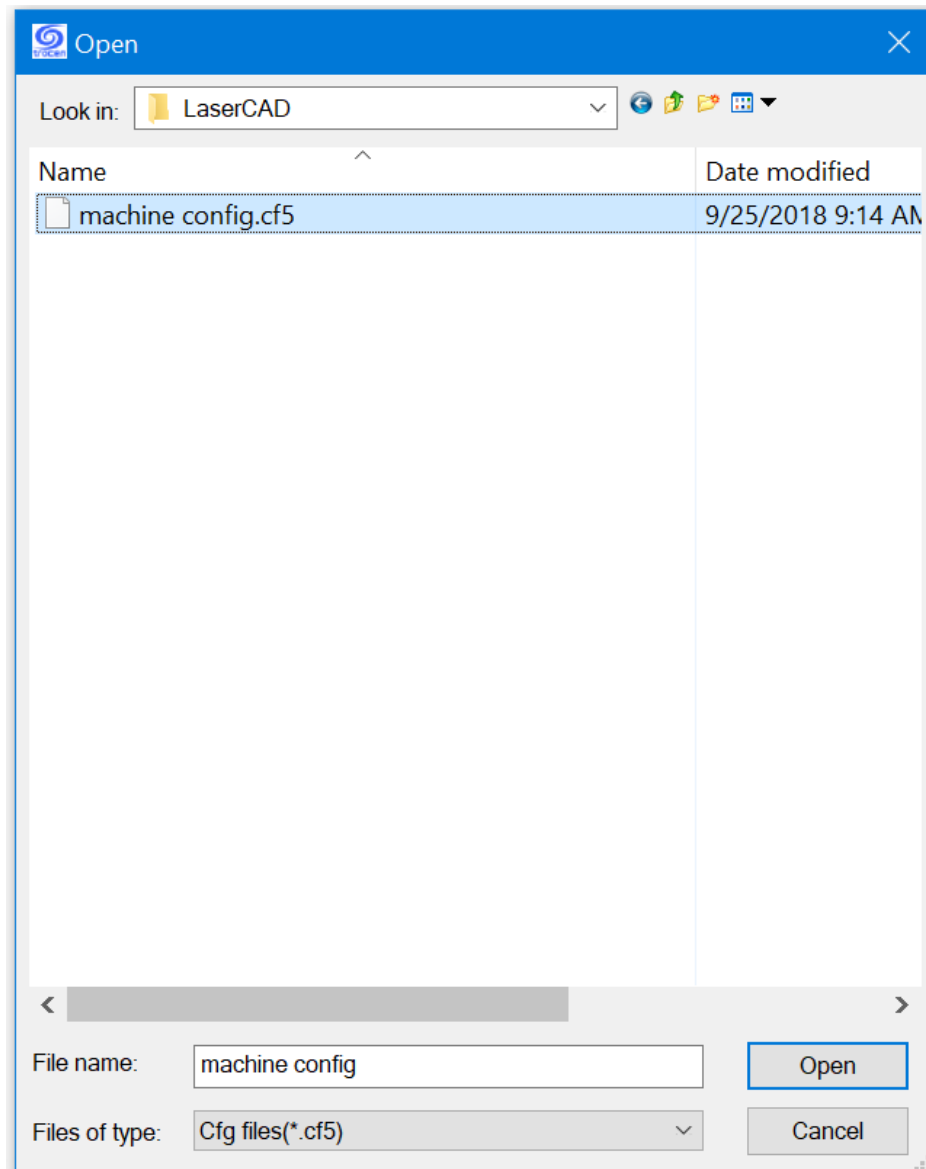


3.2.7 Import Machine Config

Press **【File】** and click **【Import machine config...】** to import the config file.

The suffix of the imported config file is “cf5”.

Figure3-2-9 Import Machine Config

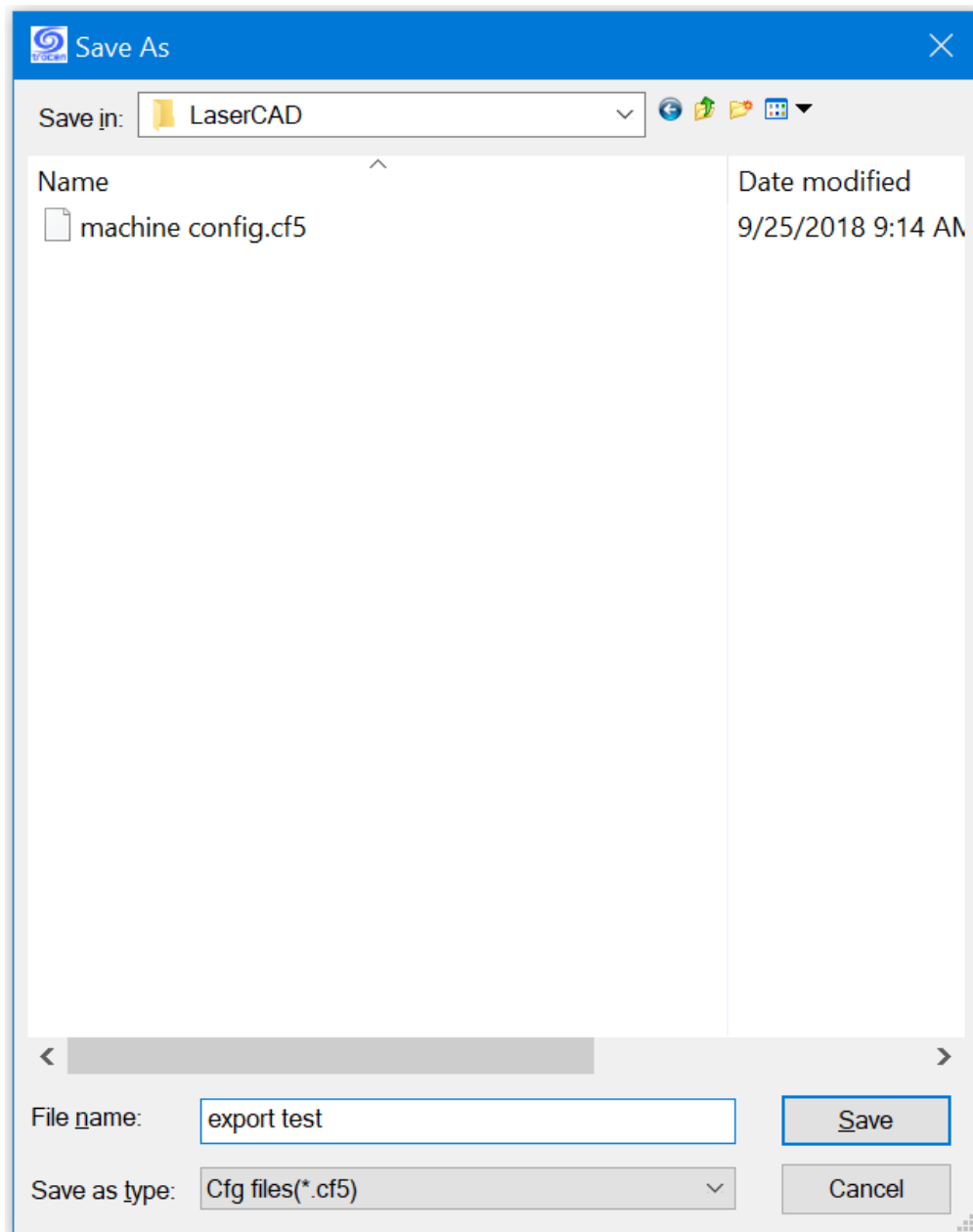


3.2.8 Export Machine Config

Press **【File】** and click **【Export machine config...】** to export the config file.

The suffix of the exported config file is “cf5”.

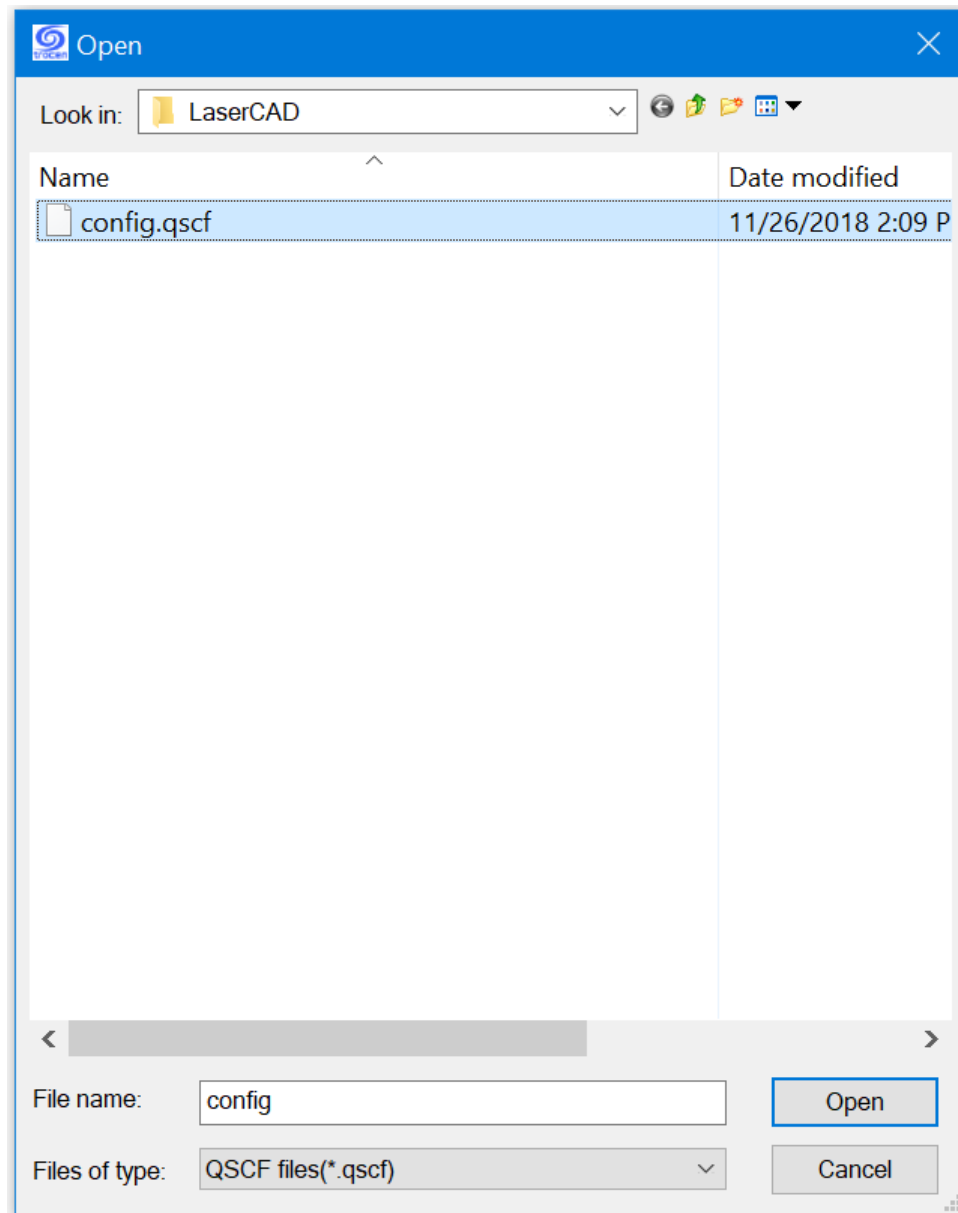
Figure3-2-10 Export Machine Config



3.2.9 Import Soft Config

Press **【File】** and click **【Import soft config...】** to import the config file. The suffix of the imported config file is “qscf”.

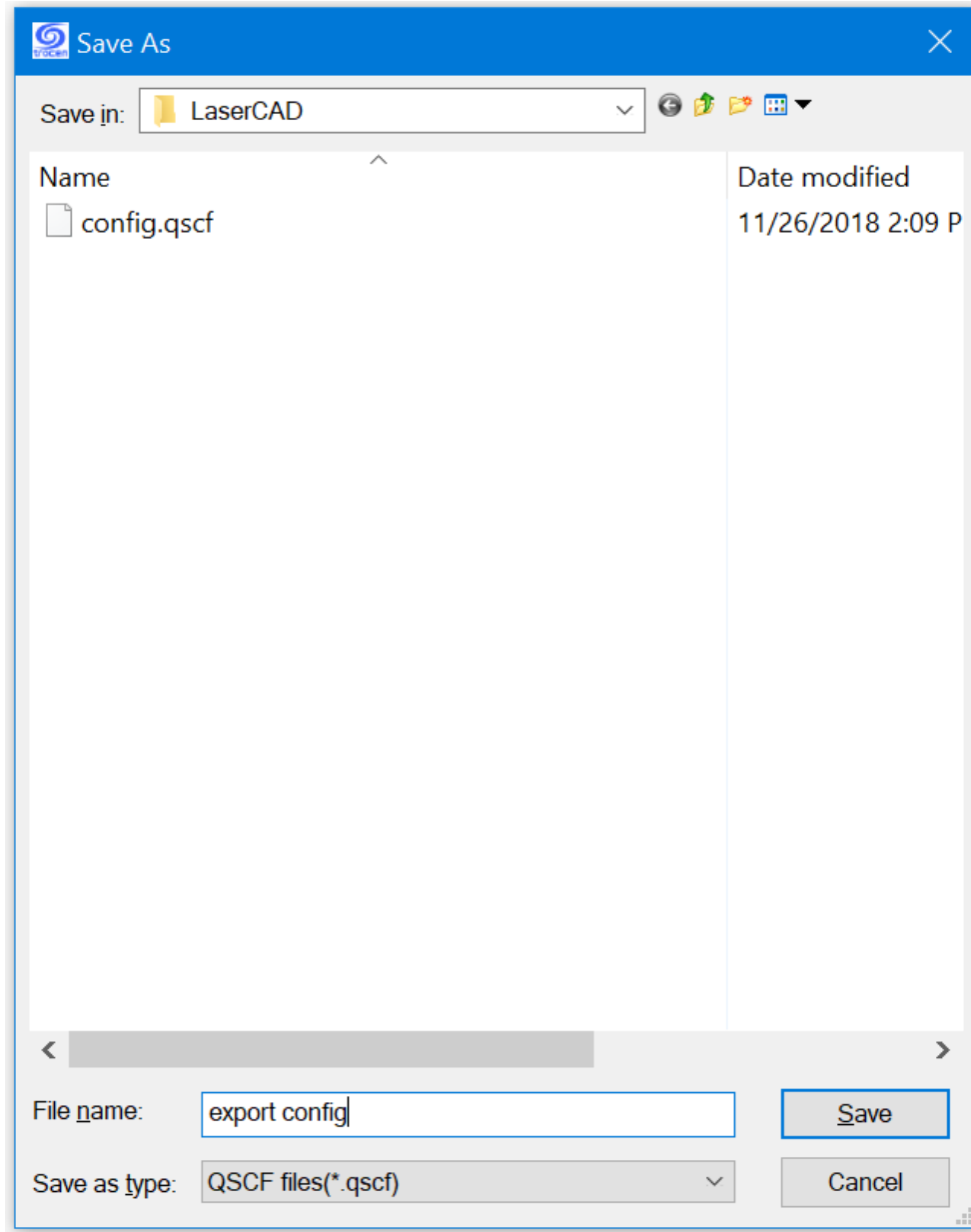
Figure3-2-11 Import Soft Config



3.2.10 Export Soft Config

Press **【File】** and click **【Export soft config...】** to export the config file. The suffix of the exported config file is “qscf”.

Figure3-2-10 Export Machine Config



3.3 Select & Transform

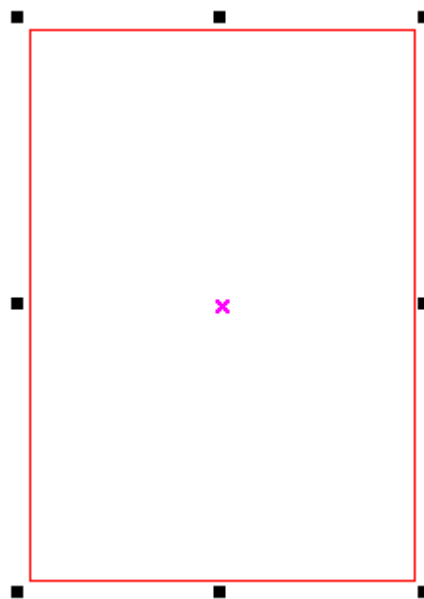
3.3.1 Select

While drawing or editing a graphics, you need to select the graphics first. When the graphics is selected, there is a "X" mark in the center. There are 8 control points around and the outline color is red by default.

Click **【Select】** under **【Draw】** or click "🖱️" on draw bar. There are five ways to select graphics.

- 1) Click **【All select】** under **【Edit】** to choose all the graphics on page.
- 2) Left-click the graphics.


Figure3-3-1 Choose One Graphics



3) Rect Select

"🖱️": Press the left-key of mouse and drag, as long as the selection box

touches the graphics will be selected.

“”: Press the left mouse button and drag. The selected graphics must be all selected by box.

4) Add/cut selected graphics

Add: Select the first graphics, then press “Shift” and click (or box) other graphics at the same time.

Cut: Press “Shift” and box to cut graphics, then the selected graphics will be removed from the selected range.

5) Select by color


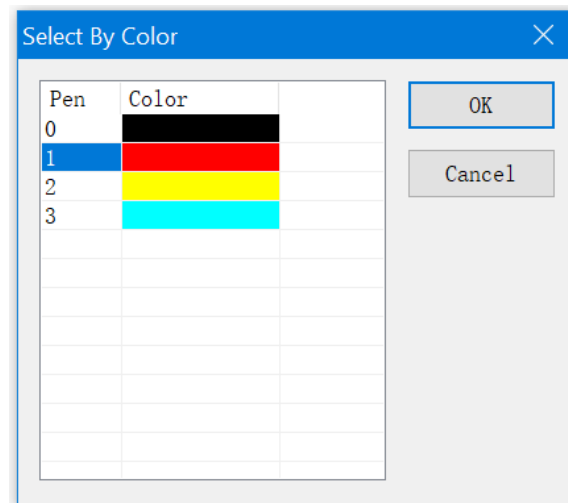
Click 【Select by color】 under 【Tool】 or click “” on tool bar, then choose one color, press 【OK】 and all the graphics in this layer will be selected.

Figure3-3-2 Select by Color



3.3.2 Change Color

Select one graphics, then click any color you need on the color bar

“”, then the graphics will change color.

3.3.3 Rotate







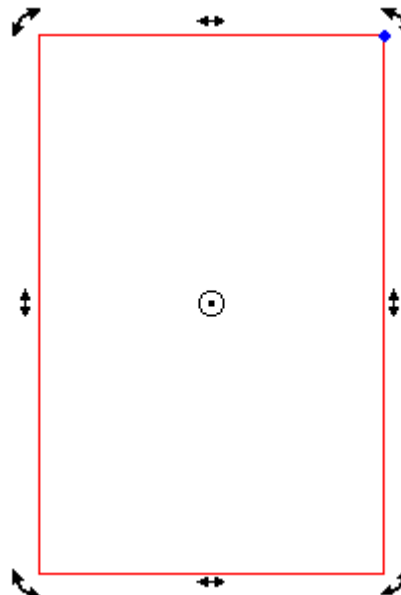
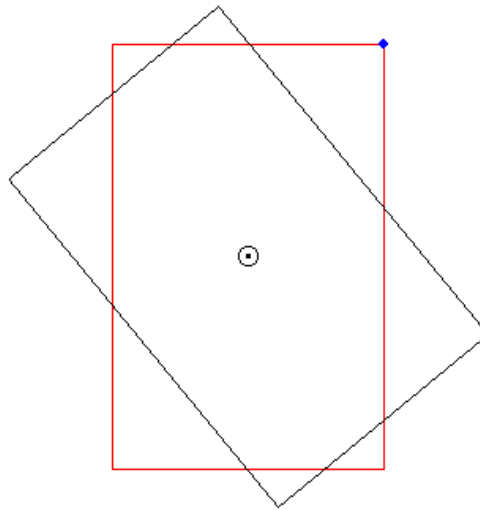
- 1) Input the rotate degree in “”, then press “” to make the graphics rotate.
- 2) Click “” and select the graphics, then click the graphics again, there will be 8 control points like “” and “”. “” is for rotation and “” is for beveling.

Figure3-3-3 Rotate/Bevell



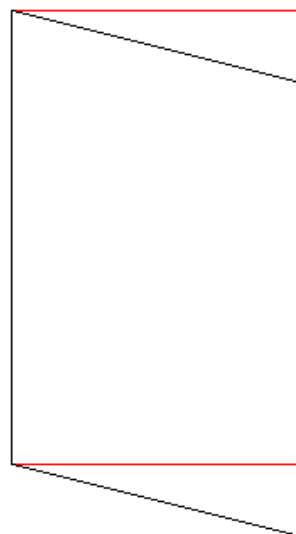
Move the mouse over the rotation control point and drag. As you drag, the outline of graphics rotates. When rotates to the desired position, release the mouse to complete rotation.

Figure3-3-4 Rotate



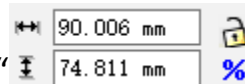
Move the mouse over the beveling control point and drag. As you drag, the outline of graphics moves. When moves to the desired position, release the mouse to complete beveling.

Figure3-3-5 Bevell



3.3.4 Size

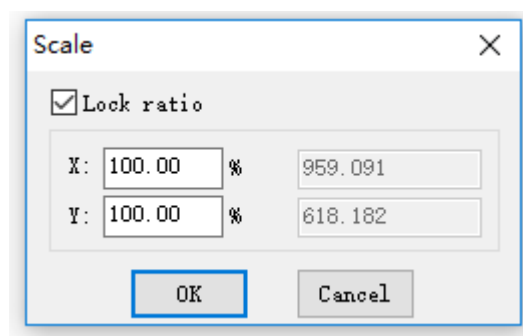
- 1) Select a graphic and drag the control points to change the size of graphics.



- 2) Input accurate value in “ ” textbox, then press **【Enter】** on keyboard to change the size of graphics. If the “ ” changes to “ ”, when you change one value, the other value will change in proportion to the origin ratio at the same time.

Click “%”, users can change the size of graphics by percentage.


Figure3-3-6 Change by Percentage




If you check “Lock ratio” and change the X (Y) value, then the Y (X) value will change in the same percentage. If the “Lock ratio” is not checked, the X and Y percentages will not affect each other. Users can set different values according to need.

3.4 Edit

3.4.1 Undo

Press **【Edit】 / 【Undo】** or click “” to undo the previous action.


3.4.2 Redo

Press **【Edit】 / 【Redo】** or click “” to redo the previous action.


3.4.3 Cut

Select one or multi graphics, press **【Edit】 / 【Cut】** or click “” to cut these graphics.

3.4.4 Copy

Select one or multi graphics, press **【Edit】 / 【Copy】** or click “” to copy these graphics.

3.4.5 Paste

After cutting or copying graphics, press **【Edit】 / 【Paste】** or click “” to paste these graphics.

3.4.6 Delete

Select one or multi graphics, press **【Edit】 / 【Delete】** to delete these graphics.


3.4.7 All Select

Press **【Edit】 / 【All Select】** to select all the graphics in the view.


3.4.8 Group

Select one or multi graphics, press **【Edit】/【Group】** or click “” to combine the independent graphics into a group.




3.4.9 Ungroup

Select one graphics group, press **【Edit】 / 【Ungroup】** or click “” to split the group into several independent graphics and groups.



3.4.10 All Ungroup

Select one graphics group, press **【Edit】 / 【All Ungroup】** or click “” to split the group into several independent graphics.



3.4.11 Add Node

Press **【Draw】 / 【Edit Node】** or click “”, click where you want to add node, there will be a mark “”. Press **【Edit】 / 【Add Node】** or click “” to add a node.


3.4.12 Delete Node


Press **【Draw】 / 【Edit Node】** or click “”, select the node which you want to delete, press **【Edit】 / 【Delete Node】** or click “” to delete the node.

3.4.13 Separate Node

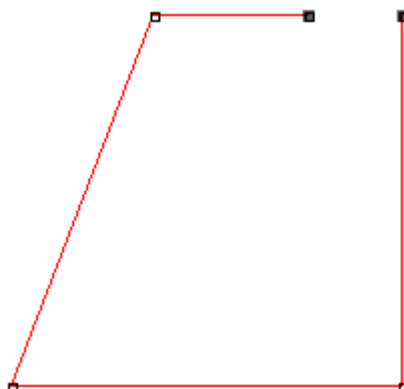
Press **【Draw】 / 【Edit Node】** or click “”, select the node which you want to separate, press **【Edit】 / 【Separate Node】** or click “” to separate the node.

3.4.14 Unite Node

Press **【Draw】 / 【Edit Node】** or click “”, select one node which you want to unite, then press **【Shift】** and select the other node at the same time.

Click **【Edit】 / 【Unite Node】** or click “” to unite the two nodes. Trocen LaserCAD only can unite 2 nodes at most one time.


Figur3-4-1 Unite Node





3.4.15 Move


Press **【Edit】 / 【Move】** or click “”, move the mouse to drag the view.

3.4.16 Zoom


Press **【Edit】 / 【Zoom】** or click “”. Click the left button of mouse (or scroll the mouse wheel forward) to enlarge view, and click the right button of mouse (or scroll the mouse wheel backwards) to reduce view.

Select the graphics, press **【Edit】 / 【Zoom】 / 【Zoom to selected】** or click “” to display the selected graphics by interface.

Select the graphics, press **【Edit】 / 【Zoom】 / 【Zoom to all objects】** or click “” to display all the selected graphics by interface.

Select the graphics, press **【Edit】 / 【Zoom】 / 【Zoom to page】** or click “” to display work area by interface.

3.4.17 Align

Select multi graphics, press **【Edit】/【Align】** or click “” to make graphics align as need.

3.4.18 Nudge Offset

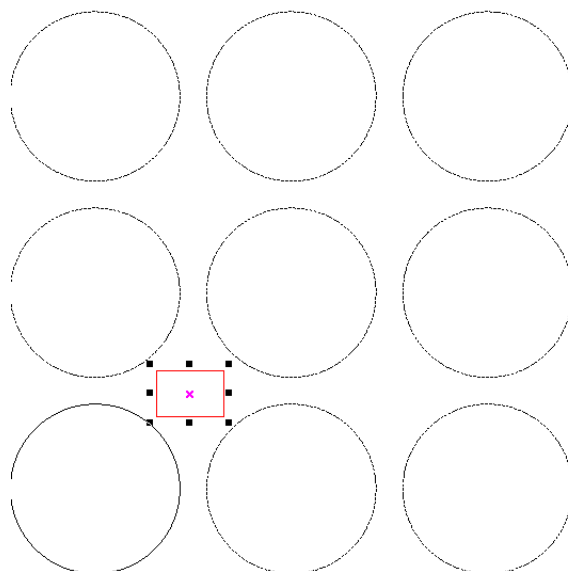
Select graphics, press **【Edit】 / 【Nudge offset】** and choose the relevant direction to make graphics move tinily.

3.4.19 Convert to Leftover

When this function is used in array, it means adding other graphics in blank space to save material. It is usually used in double laser head array processing.

As shown in figure 3-4-2, draw a rectangle in the array. Click **【Edit】 / 【Convert to leftover】** to cut the rectangle in the blank area of the material to save the material.

Figure3-4-2 Convert to Leftover



3.4.20 Convert LastRow to Leftover

When this function is used in array, it means adding other graphics in the last column. Click **【Edit】 / 【Convert LastRow to Leftover】** and the last column of the array will be transformed into solid line. The graphics of solid line can be deleted and the new graphics can be added to the

position for cutting through the import function.

Figure3-4-3 Convert LastRow to Leftover

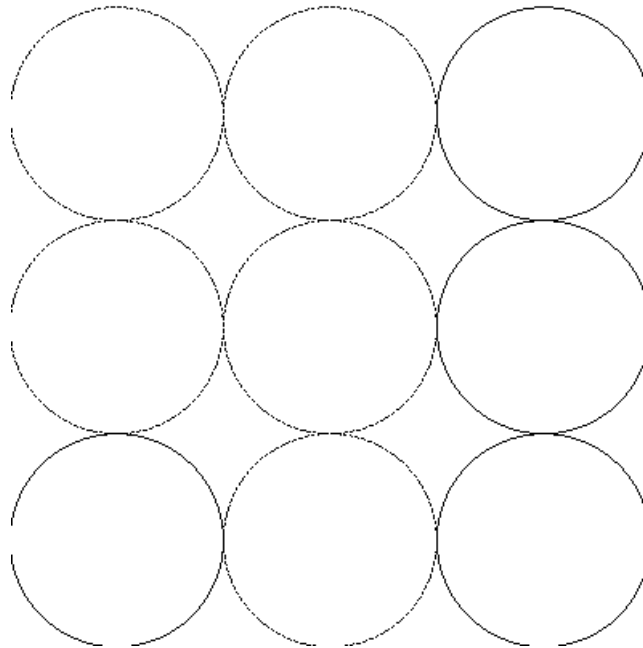
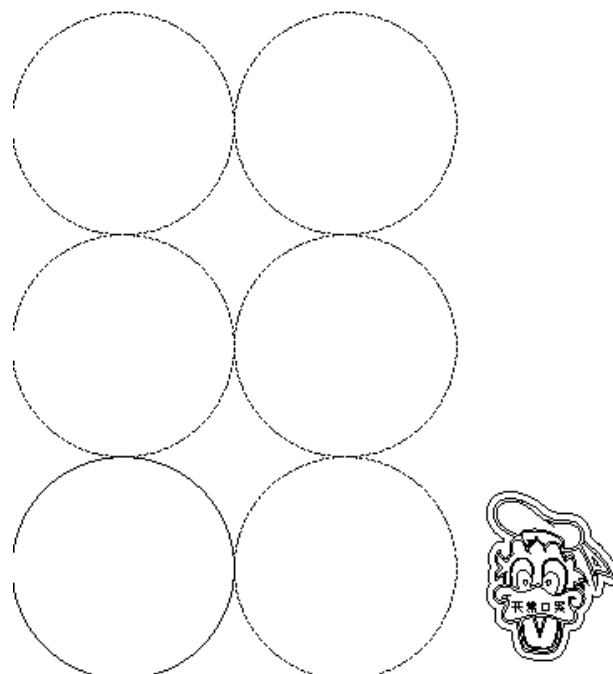


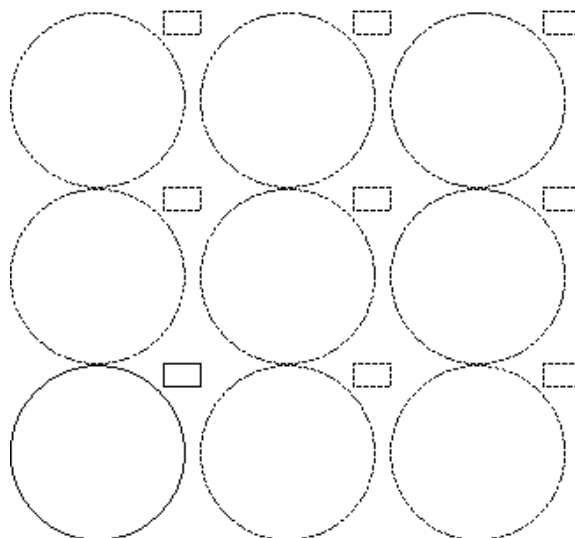
Figure3-4-4 Import New Graphics



3.4.21 Cancel Leftover

After adding leftover to array, click **【Edit】 / 【Cancel Leftover】** to remove leftover. The leftover graphics will convert to a part of array, as shown in figure 3-4-5.

Figure3-4-5 Cancel Leftover



3.4.22 Convert Middle_Row to Leftover

When this function is used in array, it means adding other graphics in the middle column. This function is only valid if the array column number is odd. Click **【Edit】 / 【Convert Middle_Row to Leftover】**, the middle column of array and the columns before the middle column will be all transformed into solid line. Delete the graphics in middle column, and import other graphics for cutting.

As shown in Figure 3-4-6, the array of 3 rows and 3 columns is displayed. Click **【Edit】 / 【Convert Middle_Row to Leftover】**, and the first and second

columns in the array are converted to solid line.

Figure3-4-6 Convert Middle_Row to Leftover

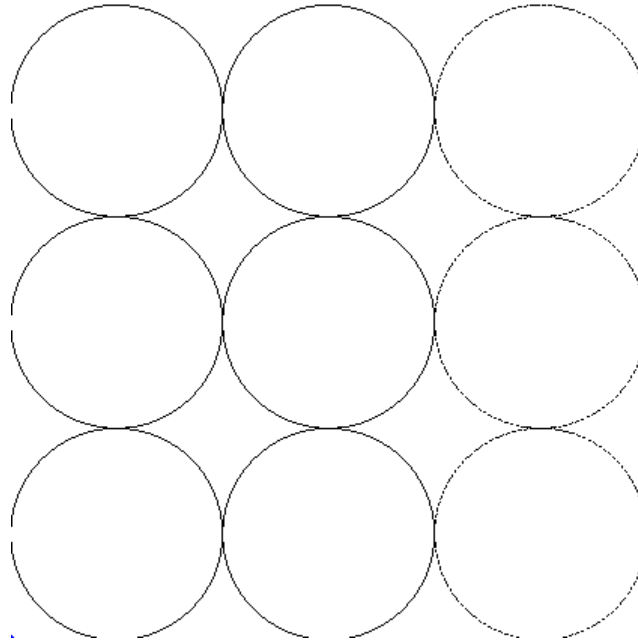
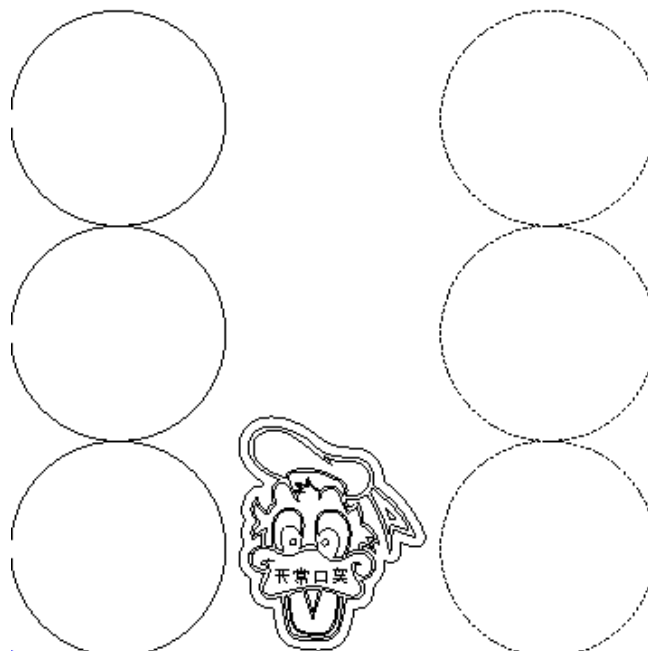


Figure3-4-7 Import Graphics in Middle Row



3.4.23 ClothingMark

Click **【Edit】 / 【ClothingMark】** and choose the mark according to need.

Click on the graphics, the mark will be added.

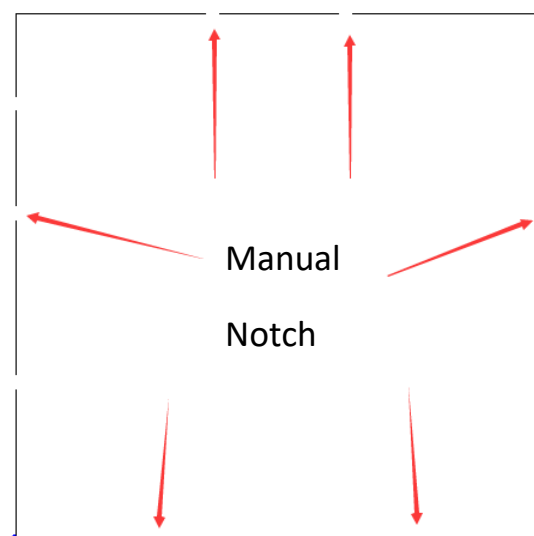
3.4.24 Manual Notch

During cutting, part of workpiece will be left on the edge to prevent it from falling off. This part is called bridge position.

Select graphics, click **【Edit】 / 【Manual Notch】** and input width parameter.

Move cursor to the edge of graphics, when the cursor changes to “+”, click left button of mouse to add notch manually.

Figure3-4-8 Manual Notch

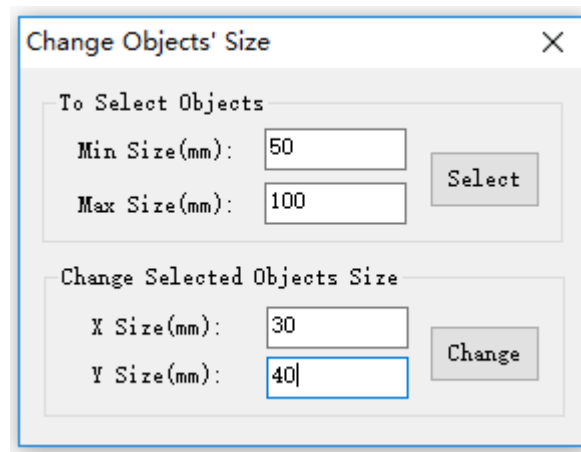


3.4.25 Change Size

Click **【Edit】 / 【Change Size】**, enter the ***Change Objects' Size*** page. Input the Min Size and Max Size, click **【Select】**. Then the graphics whose min


size and max size are in this range will be selected. Input values in X Size and Y Size, click **【Change】**. The selected graphics will change their size to the X size and Y size.

Figure3-4-9 Change Size






3.5 Draw

3.5.1 Select

Click **【Draw】 / 【Select】** or click “” to change from edit state to select mode, click the graphics directly to select it.

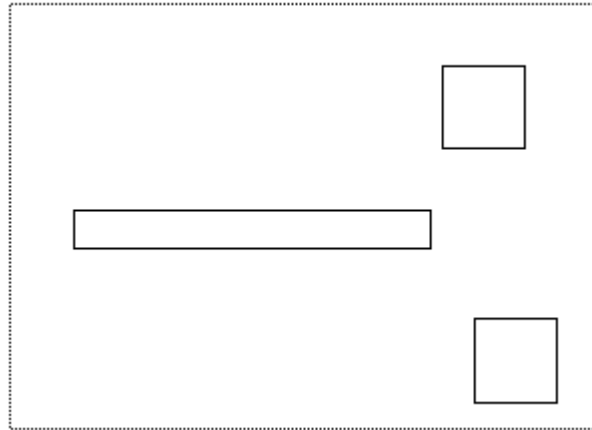
3.5.2 Rect Select

Click **【Draw】 / 【Rect Select】** or click “”/ “” to change from edit state to rect select mode. Press and drag the left button of the mouse, a dotted box appears on the interface. Release the mouse, all the graphics in the dotted box will be selected.





- 1) “”：Part of graphics is covered and the graphics will be selected.

2) “”: The whole graphics is covered and the graphics will be selected.

Figure3-5-1 Rect Select



3.5.2 Edit Node

Press **【Draw】 / 【Edit Node】** or click “”, there will be “” / “” / “” / “” on the object bar.

1. Select graphics.



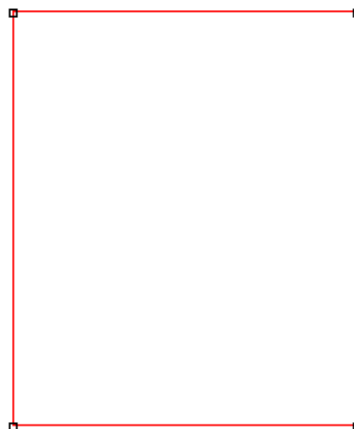
Select a graphics, click **【Draw】 / 【Edit Node】** or click “”. The node of graphics will show as “”.

Figure3-5-2 Select Graphics



2. Add node.

click where you want to add a node, there will be a mark “✱”. Click


【Edit】 / 【Add Node】 or click “” to add a node.

Figure3-5-3 Mark

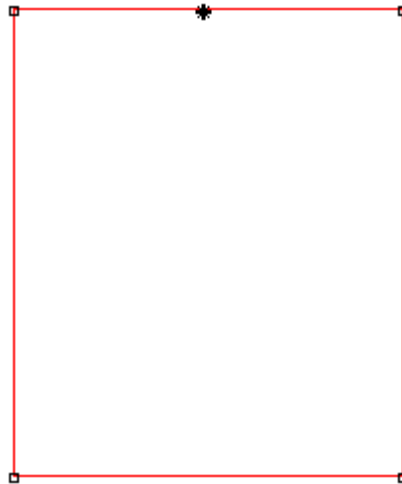
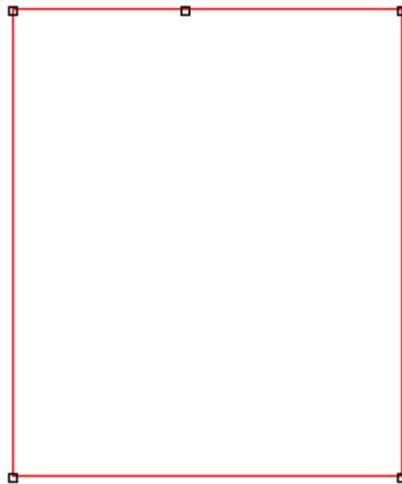




Figure3-5-4 Add Node



3. Delete node.

Click 【Draw】 / 【Edit Node】 or click “”, select the node which you want to delete, click 【Edit】 / 【Delete Node】 or click “” to delete

the node.

Figure3-5-5 Select One Node

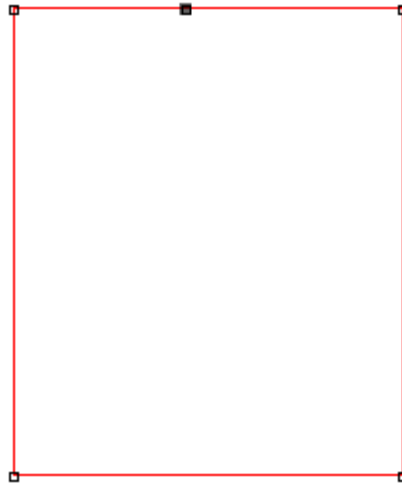
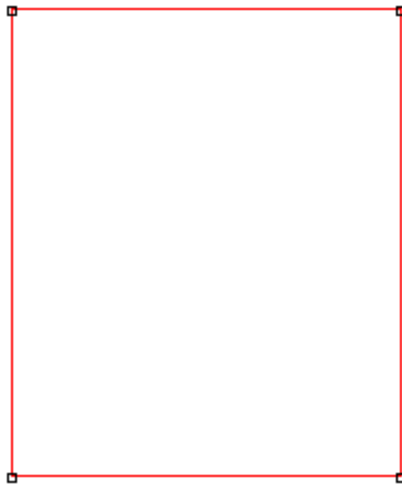




Figure3-5-6 Delete Node



4. Separate node.

Click **【Draw】 / 【Edit Node】** or click “”, then select the node which you want to separate, press **【Edit】 / 【Separate Node】** or click “” to separate the node.

Select the two nodes as Figure3-5-7, and separate these two nodes.

The graphics will separate into two parts as Figure3-5-8.

Figure3-5-7 Separate Two Nodes

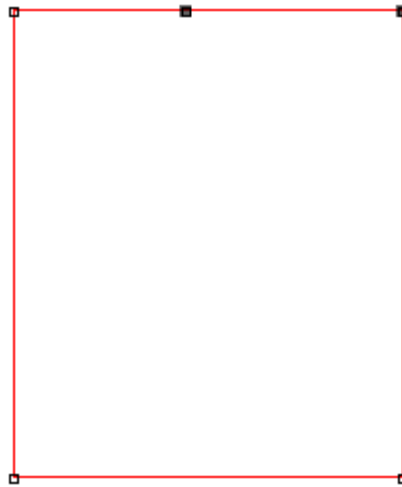
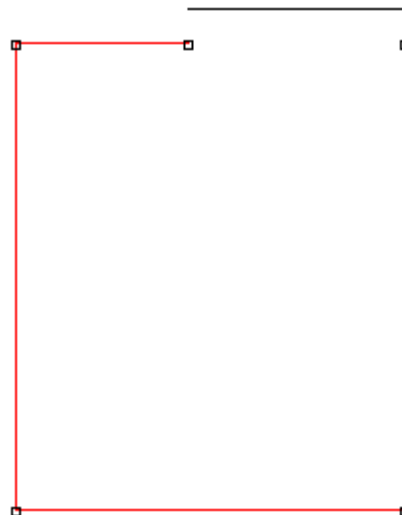




Figure3-5-8 Separate Graphics



5. Unite node.

Click **【Draw】 / 【Edit Node】** or click “”, select one node which you want to unite, then press **【Shift】** and select the other node at the same time. Click **【Edit】 / 【Unite Node】** or click “” to unite the two nodes.

Trocen LaserCAD only can unite 2 nodes at most one time.

Figure3-5-9 Select Two Nodes

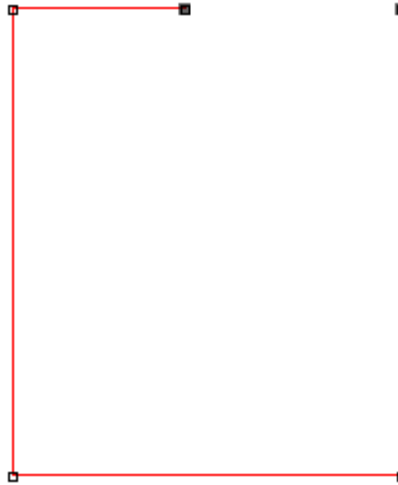
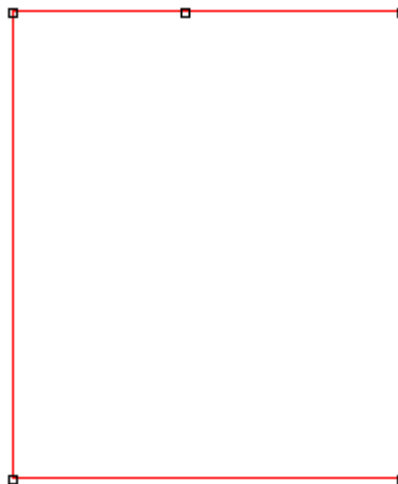



Figure3-5-10 Unite Nodes




3.5.4 Draw Line


Click **【Draw】** / **【Line】** or click “”. Click the left button of mouse on the screen and drag cursor to the desired position. Click the left button again to draw a line.

When drawing a line, press **【Ctrl】** while dragging cursor to draw a horizontal or vertical line.

3.5.5 Draw Polyline


Click **【Draw】** / **【Polyline】** or click "". Click the left button of mouse on the screen and drag the mouse to the desired position. Click the left button again to draw a line. Repeat these operations to draw polyline. Then click the right button of mouse to finish drawing.

3.5.6 Draw Rectangle

Click **【Draw】** / **【Rectangle】** or click "". Click the left button of mouse on the screen and drag cursor to draw a rectangle.


When drawing a rectangle, press **【Ctrl】** while dragging cursor to draw a square.

3.5.7 Draw Ellipse

Click **【Draw】** / **【Ellipse】** or click "". Click the left button of mouse on the screen and drag cursor to draw an ellipse.

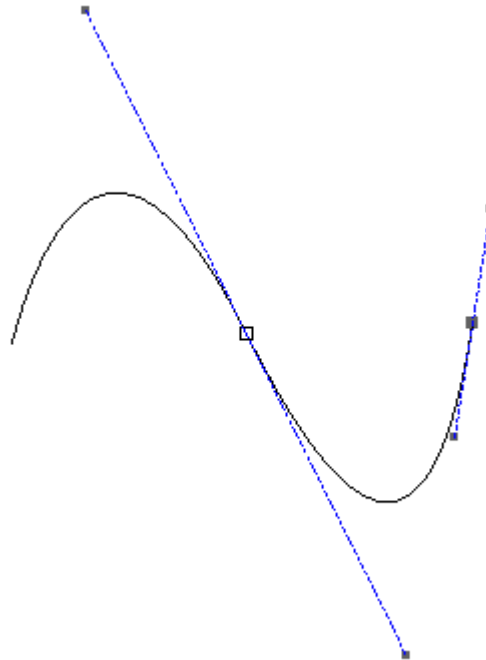
When drawing an ellipse, press **【Ctrl】** while dragging cursor to draw a perfect circle.

3.5.8 Draw Bezier

Click **【Draw】** / **【Bezier】** or click "". Click the left button of mouse on the screen to set the start point of Bezier curve and move cursor to the desired position, click the left button again and drag the left button to

adjust the curve.

Figure3-5-11 Bezier



3.5.9 Text

Click **【Draw】 / 【Text】** or click “**A**”. Click the left button of mouse two times on the screen to open the text input box. Select font and size of text, then click **【OK】** .

Figure3-5-12 Add Text

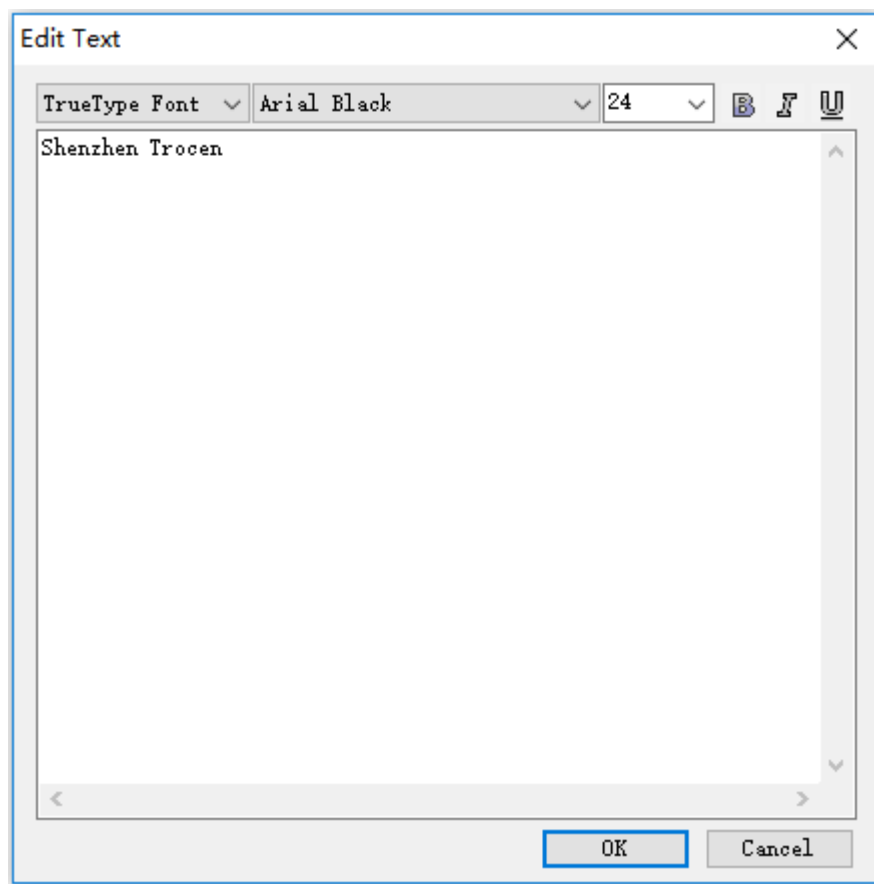
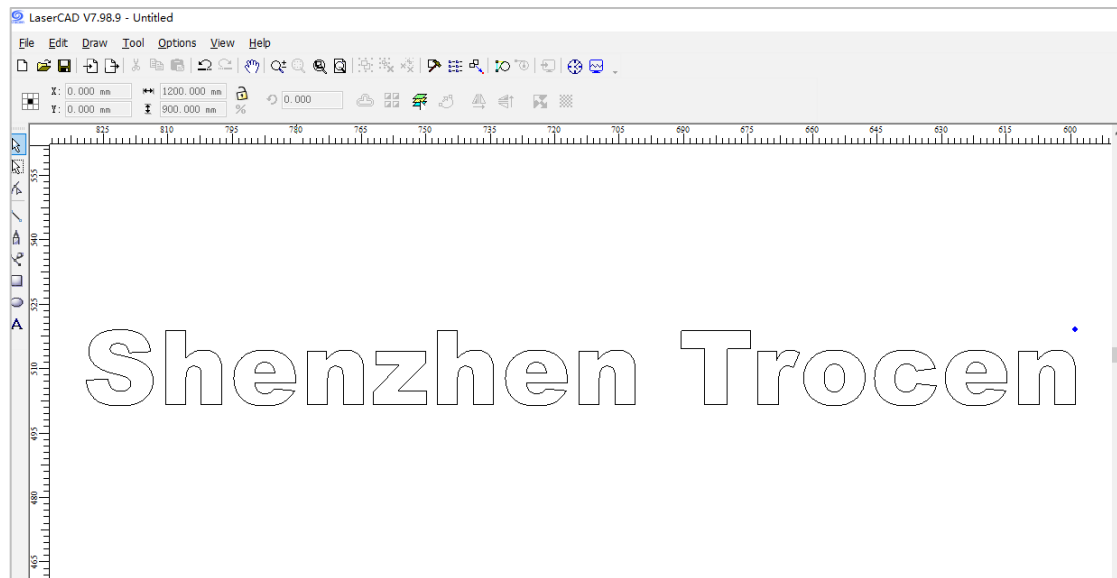


Figure3-5-13 Work Interface



3.6 Tool

3.6.1 Array Clone



Click “” to select the graphics which you want to setup array. Click **【Tool】** / **【Array Clone...】** or click “”, set the array parameters, click **【OK】** .

Figure3-6-1 Array Parameters

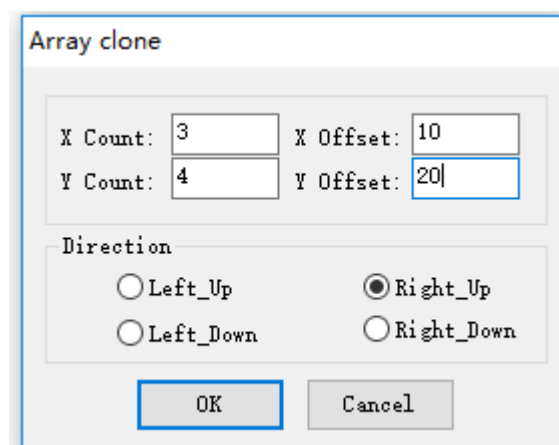


Figure3-6-2 Select Graphics

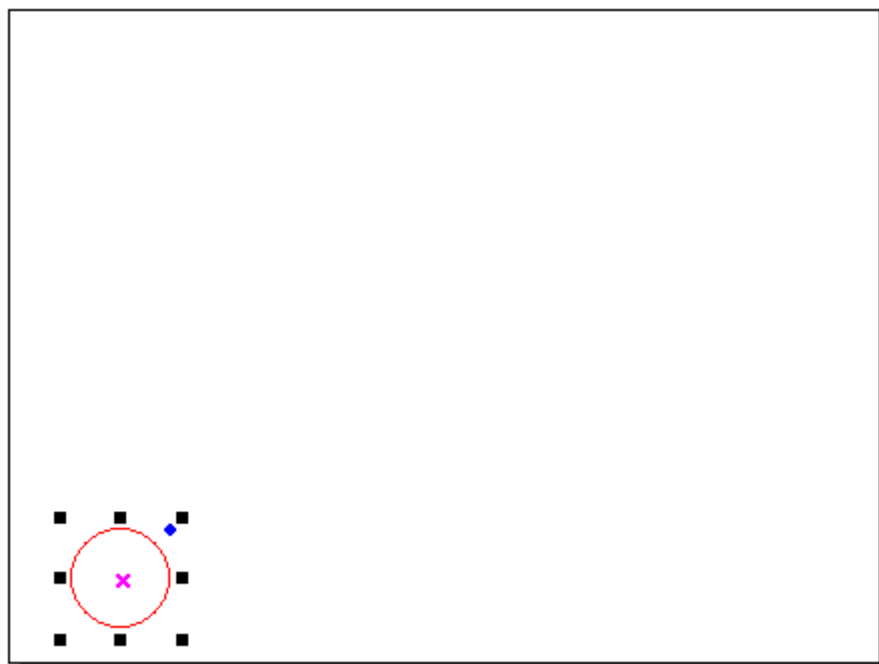
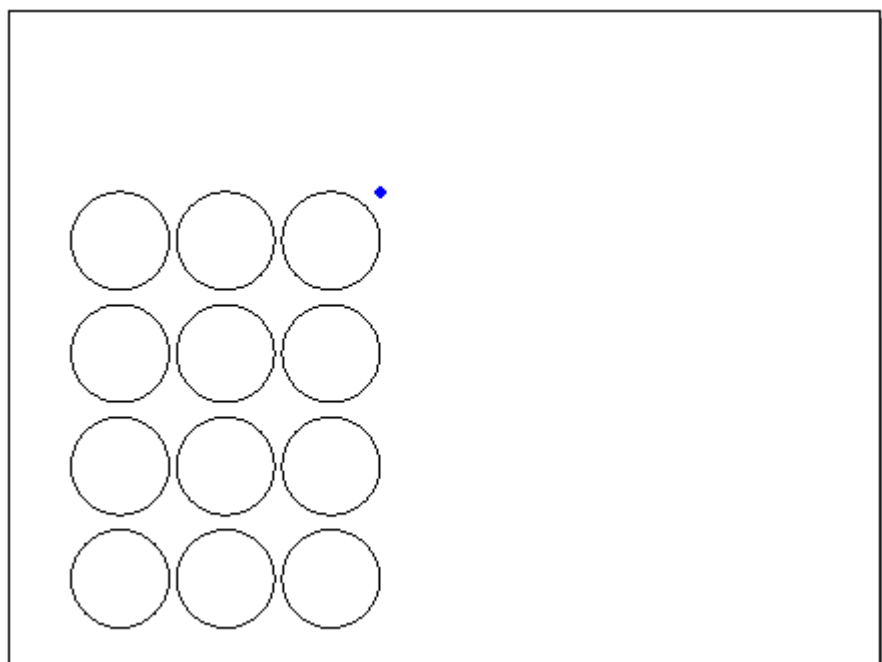


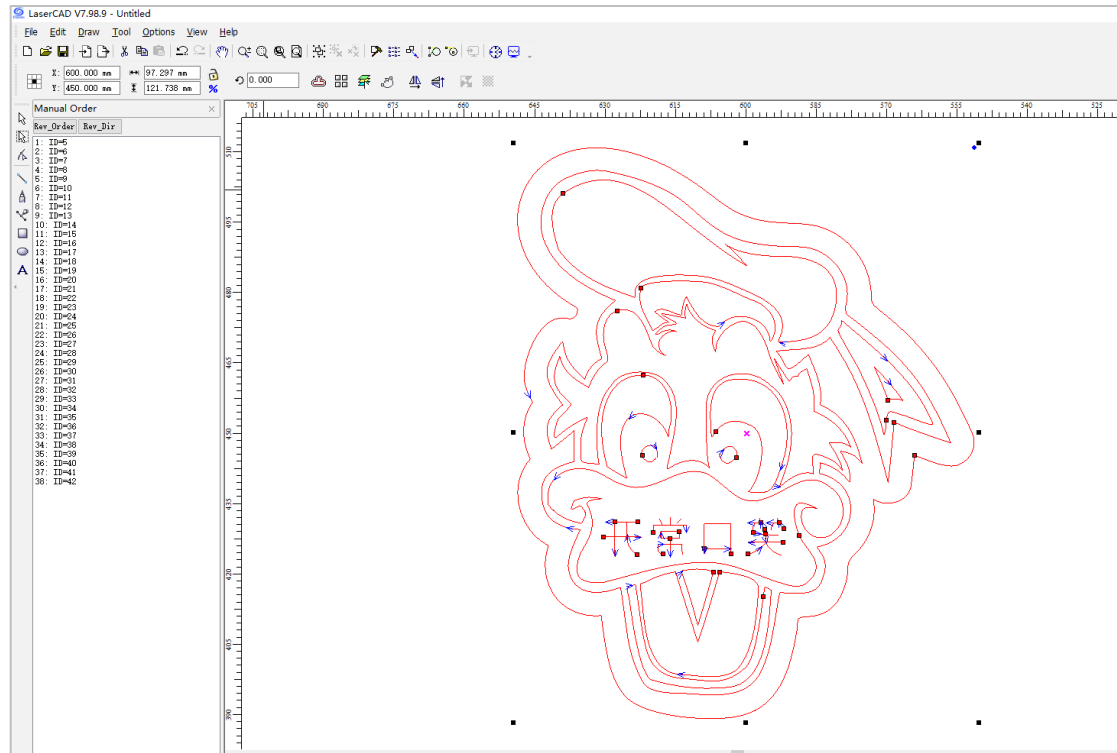
Figure3-6-2 Array



3.6.5 Manual Order

Click **【Tool】 / 【Manual Order】** to enter the manual order interface.

Figure3-6-5 Manual Order



1. Change serial number of objects. Items listed in the **【Manual Order】** window is related to the serial number of the corresponding objects. The closer to the top the item is, the more prior the corresponding object is to be processed.
 - 1) Drag items in the [Manual Order] with mouse, allow to change the item to top of cursor.
 - 2) Double click the item in the [Manual Order], will move it to the top
 - 3) Click **【Rev-Order】** will reverse all items.

2. Change cutting start point of object.

Cutting start point shown as “■”, click the object and change the cutting start point.

3. Change cutting direction of object.

Cutting direction is shown as “↵”. Click **【Manual Order】**/**【Rev-Order】** to reverse the cutting direction.

4. Rev_Order.

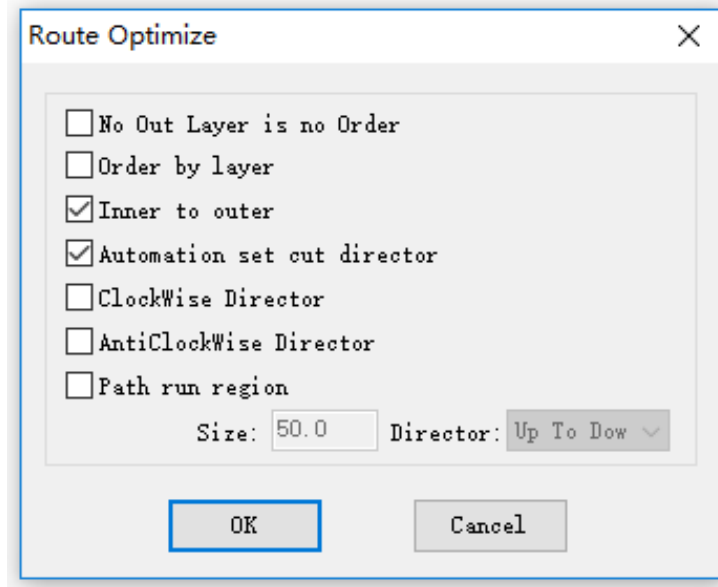
Click **【Manual Order】** / **【Rev-Order】** to reverse the cutting order.

3.6.6 Automatic Order

【Automatic Order】 is used to set the objects order automatically in the current file. After automatic order, the processing distance will be the shortest theoretically.

Click **【Tool】** / **【Automatic Order】** , select the functions as need and click **【OK】** .

Figure3-6-6 Automatic Order



- Order by layer

Graphics elements with the same color will be arrange in the same layer. When laser cutting, the machine will complete one color layer, then turn to another color.

- Inner to outer

Inner graphics will be processed preferentially to the outer graphics. When laser cutting, it will process the inner graphics, then turn to the outer graphics.

- Automation set cut director

Automatically set cutting start point and direction of the graphics when order the graphics.

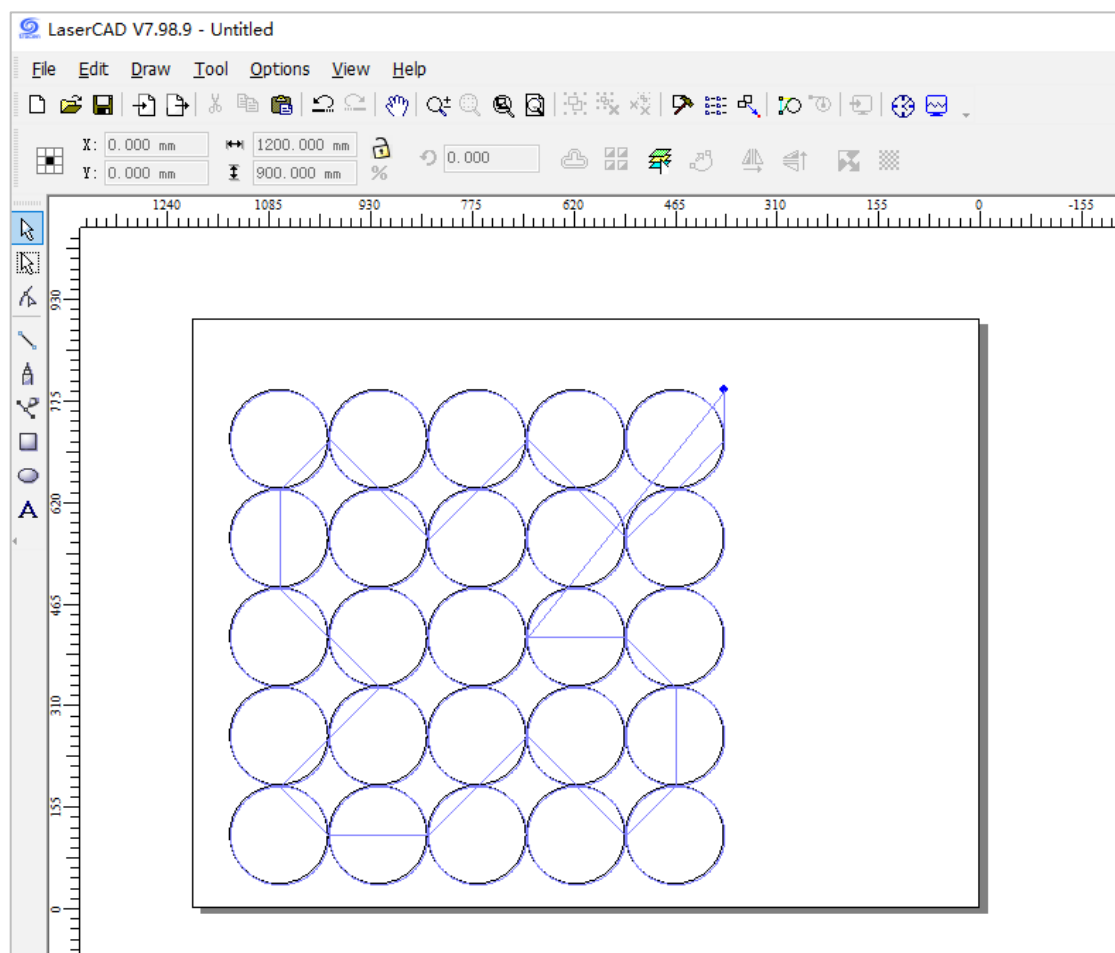
- Path run region

The machine will process graphics according to **【Size】** and **【Director】**

parameters. 【Path run region】is normally used to order regular array, (such as circle array or rectangle array), the 【Size】 is set to the height of a single graphics in the array.

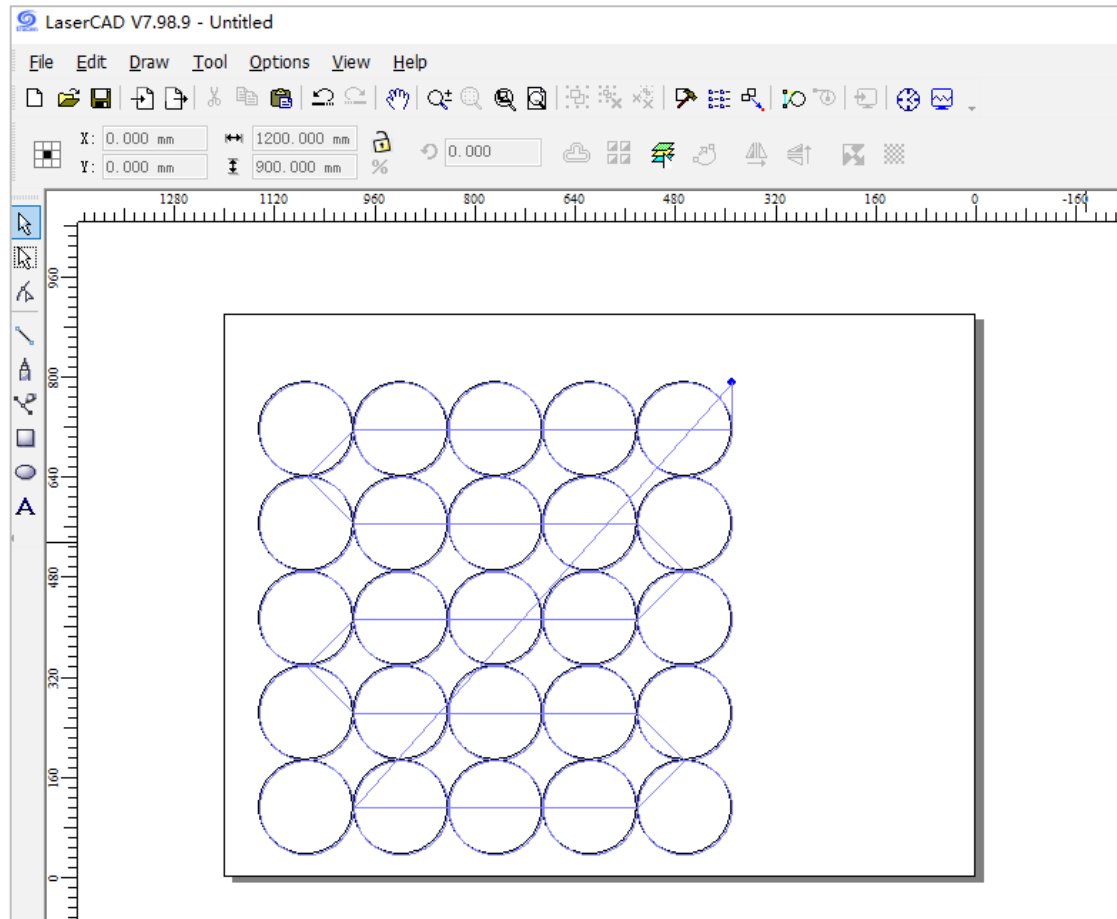
- Set up a circle array with 5 rows and 5 columns. The diameter is 150mm. Check【Automation set cut director】and【Clockwise director】, do not check 【Path run region】 , the cutting path is shown as Figure3-6-7.

Figure3-6-7 Cutting Path without 【Path run region】



Check **【Path run region】** and set the **【Size】** to “150”, **【Director】** to “Up to down”, the cutting path is shown as Figure3-6-8.

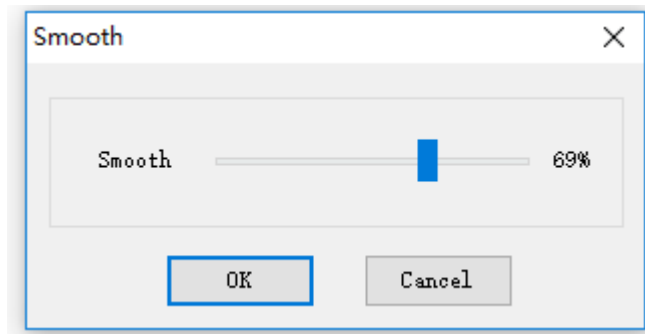
Figure3-6-8 Cutting Path with **【Path run region】**



3.6.7 Smooth Object(s)

Smooth the curve so as to increase cutting speed and stability. Click **【Tool】** / **【Smooth Objects】** , and set the suitable smooth value then click **【OK】** . The value of the smooth percentage is bigger and the curve is more smooth. But if the percentage value is too large, the graphics will change.

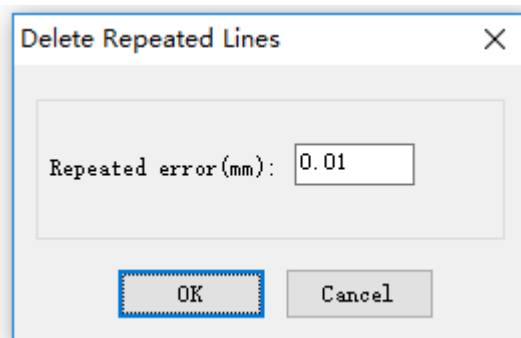
Figure3-6-9 Set Smooth Percentage



3.6.8 Delete Repeated Lines

【Delete Repeated Lines】allows delete repeated/overlapping lines, so the machine will not repeat cutting. Click 【Tool】 / 【Delete Repeated Lines】 , set suitable 【Repeat error】 , then click 【OK】 .

Figure3-6-9 Delete Repeated Lines



Set up a rectangle array with 3 rows and 4 columns as Figure3-6-10 (the X/Y Offset is “0”). Click 【Tool】 / 【Delete Repeated Lines】 (the Repeated error is “0.01”), then click 【OK】 , users can see the tooltip as Figure3-6-11.

After deleting repeated lines, the array will be divided into several independent segments as Figure3-6-12.

Figure3-6-10 Set Up Array

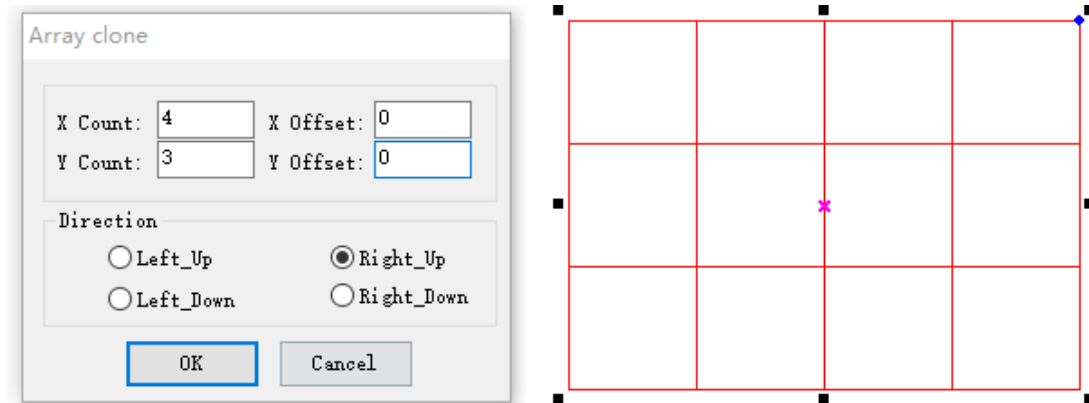


Figure3-6-11 Result of Delete Repeated Lines

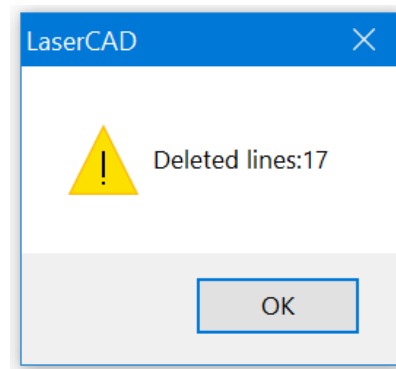
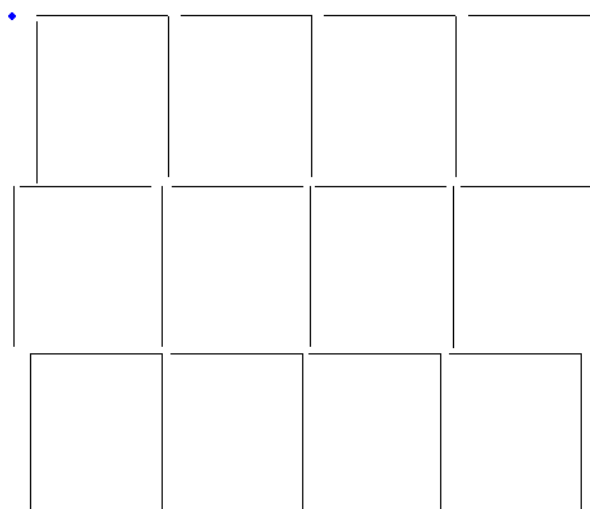


Figure3-6-12 Split Graphics



- Repeated error

Error value is used to judge whether 2 adjacent graphics are overlapped.

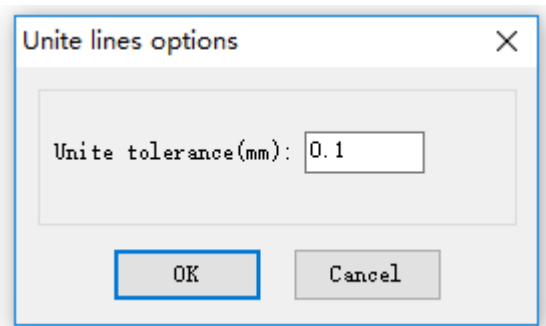
3.6.9 Unite Lines

【Unite Lines】 will unite linked multiple segment to single segment. Click **【Tool】/【Unite Lines】**, set suitable **【Unite tolerance】**, then click **【OK】**.

- Unite tolerance

2 segments will be united to 1 segment if their distances are smaller than unite tolerance.

Figure3-6-13 Unite Tolerance



3.6.10 Auto Cutting Guide_Line


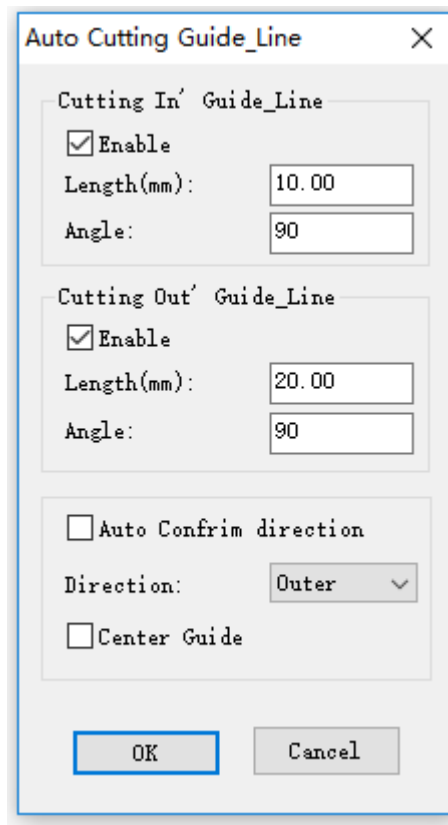
When drawing or importing a graphics, the curve does not have the guide line by default. Select the graphics that needs to add the guide line, click **【Tool】/【Auto Cutting Guide_Line】** or click “” to open the **【Auto Cutting Guide_Line】** interface.

Figure3-6-14 Auto Cutting Guide_Line



- Angle

The angle between the cutting in'/out' guide_line and the start line. Counterclockwise is positive.

- Direction

If you do not check【Auto Confirm direction】, you can set the direction to “Outer” or “Inner” manually. Set 【Direction】 to “Inner”, the guide line will be drawn from the inside of the graphics. And the “Outer” is opposite.

- Center Guide

The guide line leads to the center of graphics.

Figure3-6-15 Outer

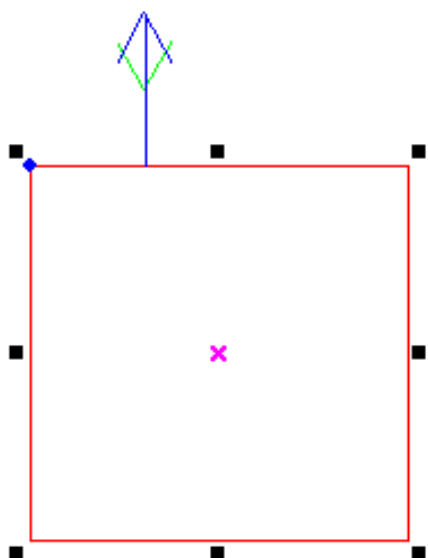


Figure3-6-16 Inner

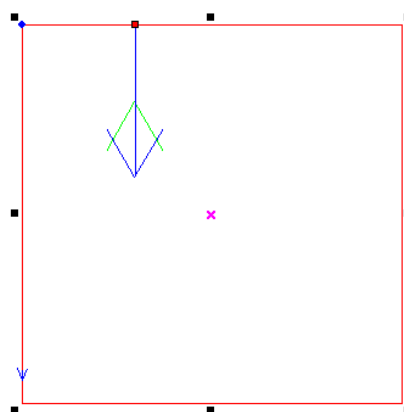


Figure3-6-17 Outer (Center Guide)

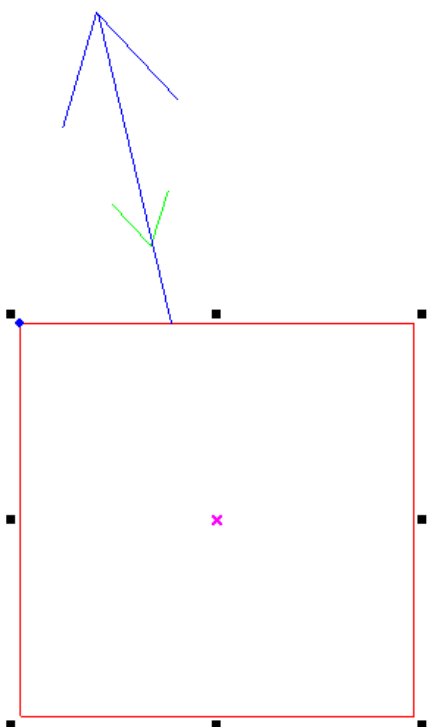
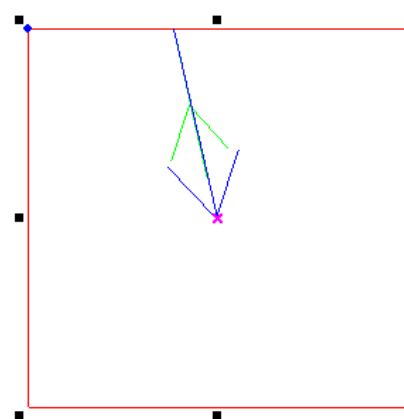


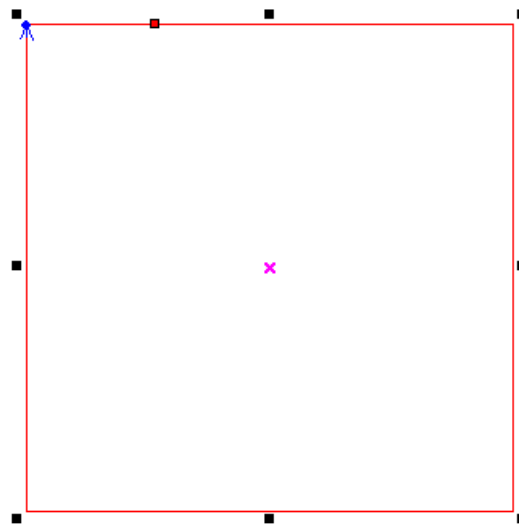
Figure3-6-18 Inner (Center Guide)



3.6.11 Edit Cutting Guide_Line

The cutting start point of graphics is marked with “■”, click **【Tool】 / 【Automatic order】**, then click the left button of mouse to change the cutting start point. The cutting direction is shown with “↖”.

Figure3-6-19 Cutting Start Point




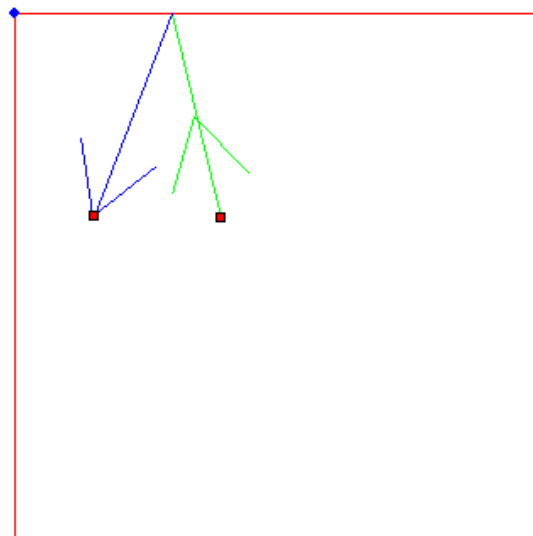
Click **【Tool】 / 【Edit Cutting Guide_Line】** or click “” to edit the guide line of graphics.

Figure3-6-20 Edit Cutting Guide_Line



3.6.12 Image Invert


Click **【Tool】 / 【Image Invert】** or click “” to invert the selected image. After Image Invert, do Image Dither process. Then during processing, the laser head will not emit light at the point position and emit light in the blank of grid.

Figure3-6-21 Image Invert



3.6.13 Image Dither


Image Dither makes image display in the form of grid. During processing, the laser head emits light at the point position, but there is no light in the blank of the grid, which makes the processed graphics have a 3D sense. Click **【Tool】 / 【Image Dither】** or click “” to dither the selected image.

Figure3-6-22 Image Dither Parameter

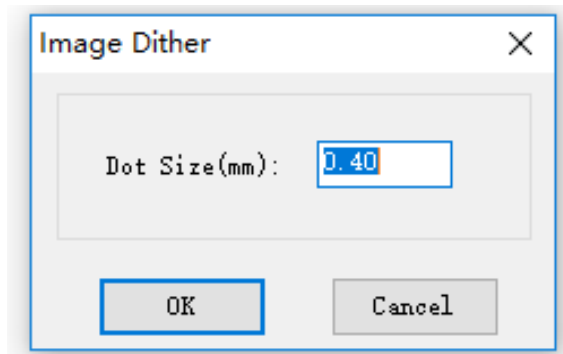


Figure3-6-23 Image Dither



3.6.14 Create Image Block

【Create Image Block】 is used to copy or cut part of image. Import image first, then draw an image block which need to be copied or cut, click **【Tool】** / **【Create Image Block】** , choose **【Copy datas to create block】** or **【Cut datas to create block】** according to need.

Figure3-6-24 Choose Copy or Cut

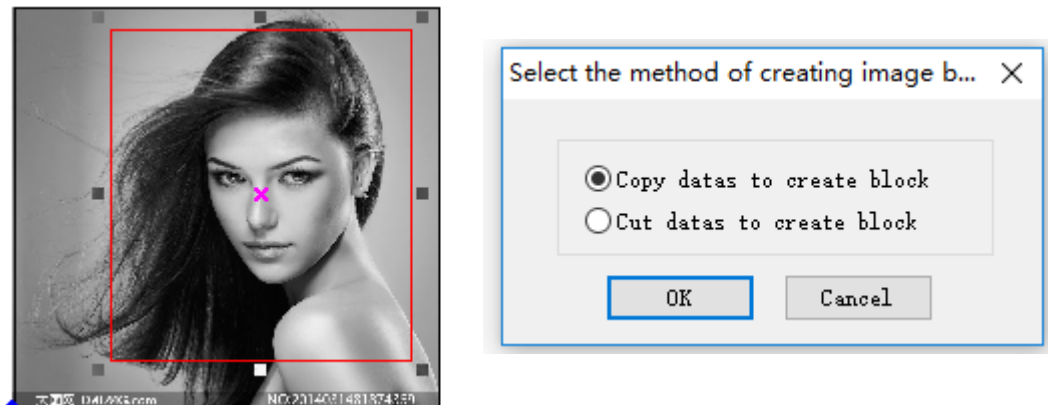
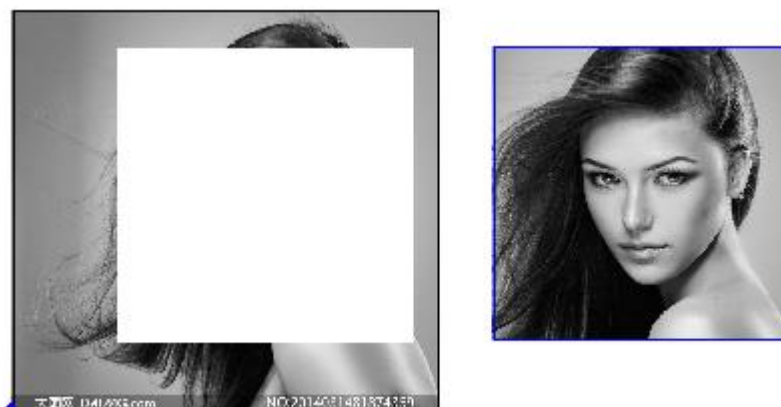


Figure3-6-25 Copy Datas to Create Block



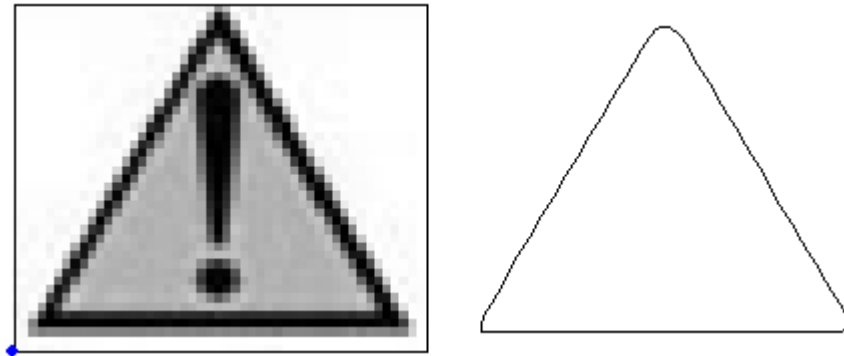
Figure3-6-26 Cut Datas to Create Block



3.6.15 Create Image Outline

Click **【Tool】 / 【Create Image Outline】** to create outline of the selected image.

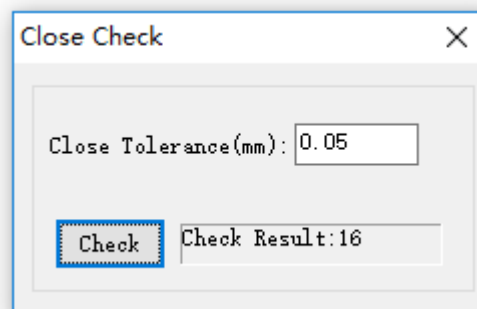
Figure3-6-27 Create Image Outline




3.6.16 Close Check

Click **【Tool】 / 【Close Check】**, input the suitable **【Close Tolerance】**. Then the software will check and select all the graphics according to the close tolerance in current file.

Figure3-6-28 Close Tolerance



3.6.17 Parallel Offset

【Parallel Offset】 is used to expand or indent vector graphics. Select a graphics, click 【Tool】 / 【Parallel Offset】 or click “”. Set the parameters as required, click 【OK】 to generate the parallel line and set up a new layer automatically.

If check 【Auto inner or outer offset】 the external graphics will expand and the internal graphics will indent. The positive or negative 【Offset】 has no influence as Figure3-6-30. If this function is not checked, when the offset distance is positive, all the selected graphics expand outward as Figure3-6-31, and when the offset distance is negative, all the selected graphics indent inward.

Figure3-6-29 Parallel Offset Parameters

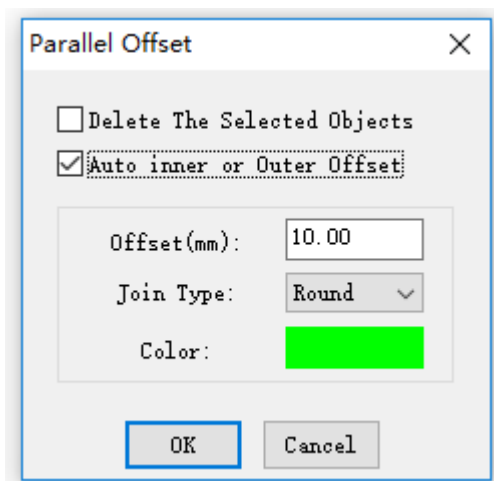


Figure3-6-30 Auto Inner or Outer Offset

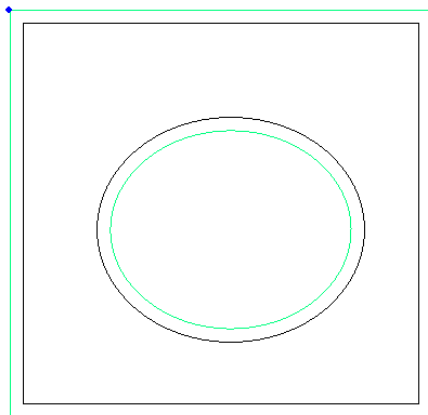
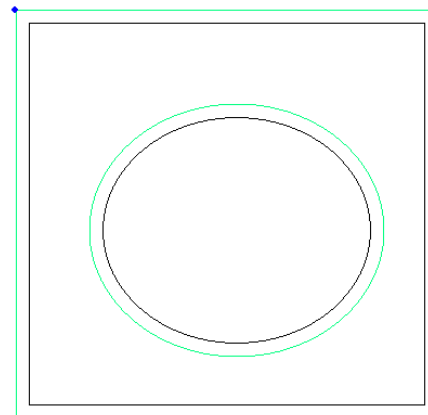


Figure3-6-31 Expand



If check **【Delete the selected objects】**, after parallel offset, the software will delete the origin graphics automatically.

The join type can be set to “Round”, “Square” or “Miter”. Square: the top angle of graphics turns into a straight line. Round: the top angle turns into an arc. Miter: the top angle doesn’t change, as shown in figure 3-6-32/3-6-33.

Figure3-6-32 Square

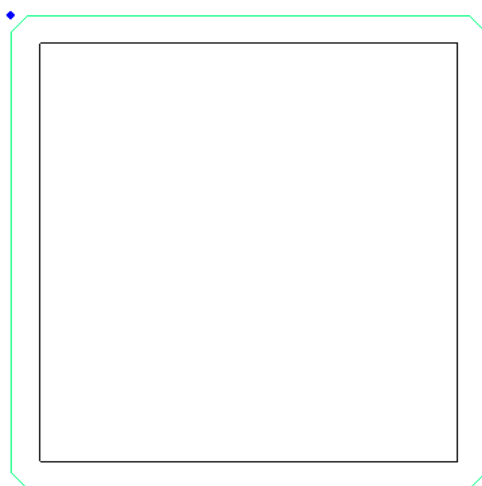
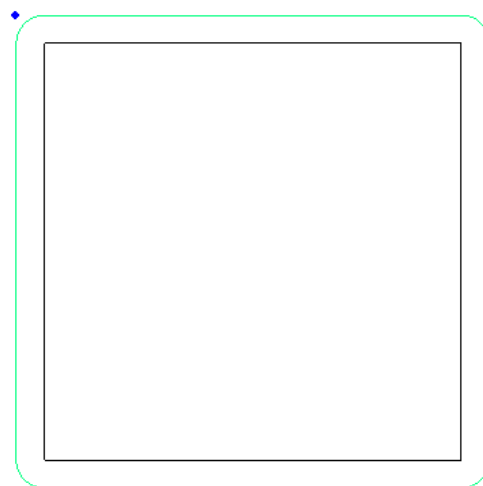


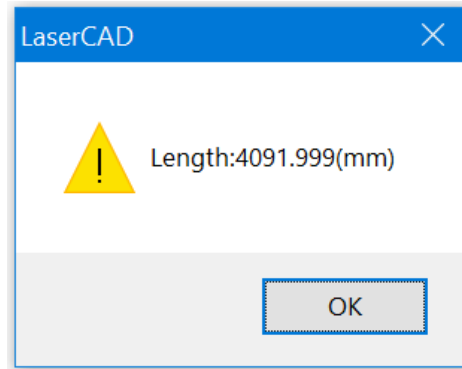
Figure3-6-33 Round



3.6.18 Measure Length

Click **【Tool】 / 【Measure Length】** to measure length of the selected graphics. If select several graphics, then the result is the sum of length.

Figure3-6-34 Measure Length



3.6.19 Estimate Work Time

【Estimate Work Time】 will pre-calculate the processing time precisely according the current parameter settings and graphics data size. The calculation will be very precise, with error no more than 1 min even for graphics data with heavy work loading.


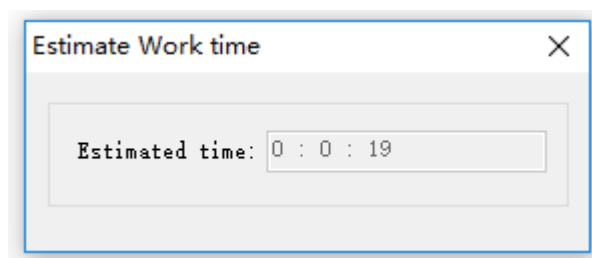
Click **【Tool】 / 【Estimate Work Time】** or click “” to estimate work time of the selected graphics.

Figure3-6-35 Estimate Work Time



3.6.20 Simulate



Click【Tool】/【Simulate】or click “” to simulate the graphics progressing.
Click “+/-” key on keyboard to increase simulating speed, click “-/-” to decrease simulating speed. Click “esc” to quit simulating.

Figure3-6-36 Simulate



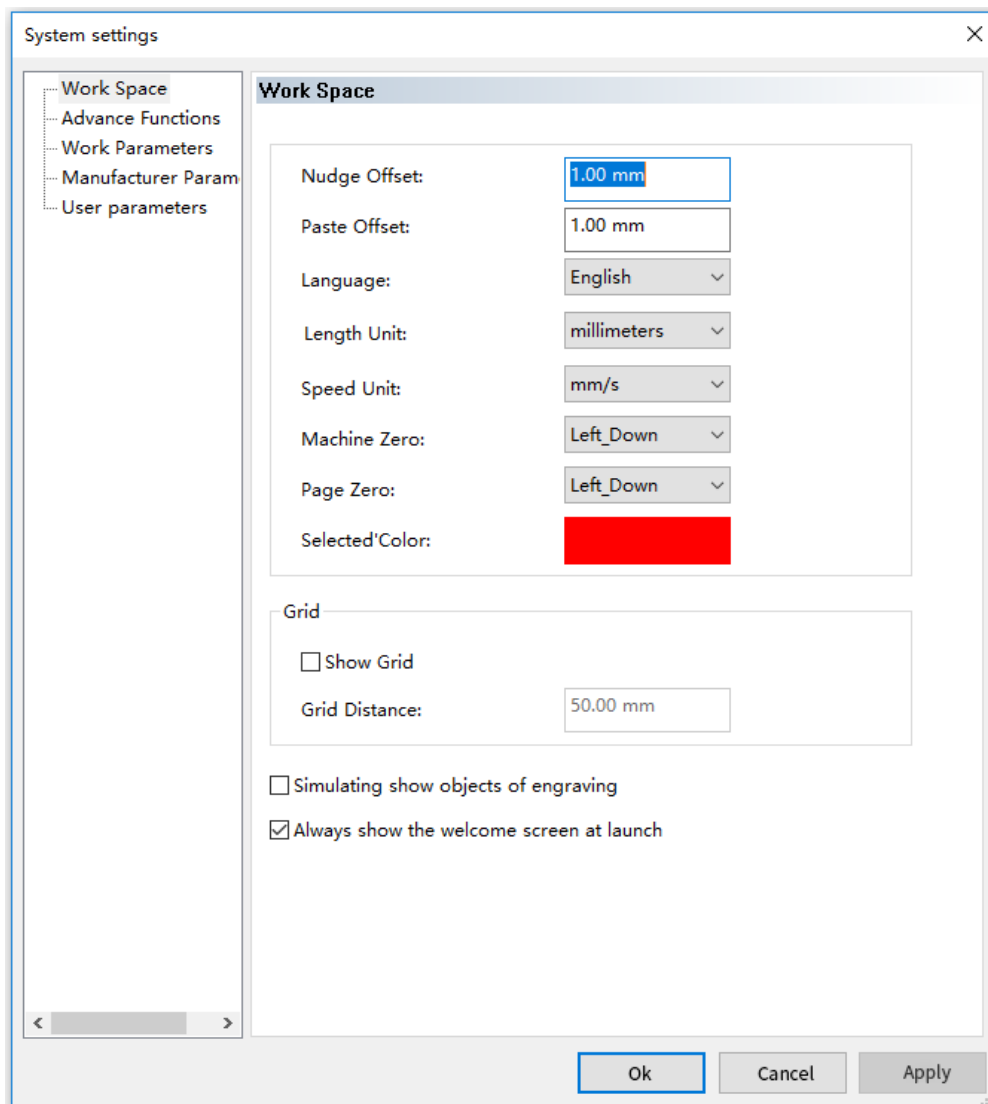
3.7 Options

3.7.1 System Options

Click **【Options】** / **【System Options】** or click “” to open the system settings interface.

3.7.1.1 Work Space

Figure3-7-1 Work Space Parameters



- **Nudge Offset**

The distance which the selected graphics moves when press “←” “→” “↑” “↓” on keyboard.

- **Paste Offset**

Copy the selected graphics, paste to the current view at the offset distance. This parameter is only used to【Copy】/【Paste】under【Edit】.

The hotkeys “Ctrl+C”, “Ctrl+V” is not available.

- **Language**

The language that software uses. After changing the language, you need to restart the software.

- **Length Unit**

The unit of all the lengths involved in software.

- **Speed Unit**

The unit of all the speed involved in software.

- **Machine Zero**

The zero point of machine (limit position), the parameter must be consistent with the actual zero point of machine, otherwise the processed graphics may be reversal.

- **Page Zero**

The zero point in the view.

- **Selected Color**

The color that the graphics outline displays when the graphics is selected.

- Show Grid

Check this function, the view will show will grid.

- Grid Distance

When the view shows with grid, this parameter is the width of grid.

- Simulating show objects of engraving

The view will simulate the display of engraving layer by filling it.

- Always show the welcome screen at launch

When start the software, the welcome screen will be shown in the view.

3.7.1.2 Advance Functions

Figure3-7-2 Advance Functions Parameters

1. Two_Head Control (Only for Independent_Two_Head Machine)

a) Enable

Check this function to enable two head control.

b) Objects Divide

When the two heads work asynchronously, check objects divide to make the two heads cut asynchronously. If this function is not checked, the machine will only work with the main laser head.

c) X Direction for Two_Head

Select according to the installation direction of machine beam.

d) Y Direction for Two_Head

Select according to the installation direction of machine beam.

e) Two_Head Distance

The distance between two heads.

2. Divided Cutting (Only for Feeding Machine)

a) Enable

Check to enable divided cutting function.

b) Auto Control of Two LaserHead

Check to enable auto control of two laserhead function.

c) Divided Page Size

The laser head will cut in sections according to the segment length

d) Additional Feed Dis

Before the formal processing, customers conduct trial processing, observe the error of feeding once, and set the corresponding compensation.

e) X Offset

Before the formal processing, customers conduct trial processing, observe the error of feeding once in X direction, and set the

corresponding compensation.

3. Speed Optimize of Cutting

a) Enable

Check to enable cutting anti-jitter processing.

b) Small Object Optimize

Check to enable cutting anti-jitter processing for small graphics.

c) All Object Optimize

Check to enable cutting anti-jitter processing for all graphics.

3.7.1.3 Work Parameters

Figure3-7-3 Work Parameters

System settings

Work Space
Advance Functions
Work Parameters
Manufacturer Param
User parameters

Work Parameters

Curve Disperse(mm): 0.050

Circle Speed

Diameter	Speed
1.00	10.00
2.00	15.00
3.00	20.00
4.00	25.00
5.00	30.00
6.00	35.00
7.00	40.00

☐ Enable

Add
Delete
Modify

Engrave Reverse offset

Speed	Reverse Offset
-------	----------------

☐ Enable

Add
Delete
Modify

Cutting Backlash

X(mm): 0.00000 Y(mm): 0.00000

Ok Cancel Apply

- **Curve Disperse**

Set the smoothness of curve. The smaller the value, the higher the precision of graphics, the slower the calculation speed, it also affects the processing speed. Generally, you can choose a smaller value when

cutting plexiglass, and use the default value "0.10" when cutting other materials.

- Circle Speed

In work, the system automatically determines whether the processing graphics is a speed limit circle. Processing the circle at the corresponding speed according to its diameter. If the parameters are set properly, the cutting quality of the small circle will be greatly improved. Users can set this parameter by clicking **【Add】**, **【Delete】** and **【Modify】**.

- Engrave Reverse Offset

When the laser head engrave graphics by X-swing or Y-swing, due to the return clearance of machine, it may cause the edge of scanned graphics jagged, so it needs to increase the reverse clearance to correct. Generally, the larger the speed, the larger the reverse clearance. The reverse clearance value can be positive or negative.

a) The speed is 200mm/s and the reverse clearance is 0.30mm. If the speed is less than 200mm/s, the reverse clearance is proportional to the speed. When the speed is 100mm/s, the reverse clearance is $0.30 \times (100/200) = 0.15\text{mm}$.

b) The speed is 300mm/s, and the reverse clearance is 0.50mm. When the speed is between 200 and 300mm/s, the reverse clearance is proportional to the speed. When the speed is 250 mm/s, the reverse clearance is $0.30 + (300-250) / (300-200) \times (0.5$

0.3) = 0.40 mm.

- c) If the speed is larger than 300mm/s, the reverse clearance is equal to the reverse clearance of 300mm/s (i.e. 0.50mm).

3.7.1.4 Manufacture Parameters

Figure3-7-4 Manufacture Parameters

System settings

- Work Space
- Advance Functions
- Work Parameters
- Manufacturer Param**
- User parameters

Manufacturer Parameters

X_Axis		Y_Axis	
Um/Pulse:	6.500000	Um/Pulse:	6.500000
Pulse edge:	Falling edge	Pulse edge:	Falling edge
Datum:	Negative	Datum:	Negative
Key direction:	Negative	Key direction:	Positive
LimitPolarity:	Negative	LimitPolarity:	Negative
Range:	1200	Range:	900
Start Speed:	15.000	Start Speed:	15.000
Max_Acc:	10000.000	Max_Acc:	3000.000
Max_Speed:	500.000	Max_Speed:	400.000

IO

☐ Water Protect ☐ Open Protect ☐ Foot switch **Z/U Axes Options**

Laser Parameters

Laser Mode: Glass tube

TTL Level: Low level effective

PWM Frequency: 20000

Max_Power: 98

Function config

☒ XY axis home OnPower

☐ Hardware limit

☒ Return origin after work

Other Options

Buttons: Import, Export, Read, Save, Ok, Cancel, Apply

Z axis is lifting axis, U axis is feeding axis. Click **【Z/U Axes Options】** to set the parameters of Z axis and U axis.

1. XY Axis

a) Um/Pulse

When the controller sends a pulse signal, the relevant axis moves the absolute distance (unit: um). If set incorrectly, the graphics will change.

b) Pulse edge

Effective edge for driver to drive motor, Falling Edge or Rising Edge. If set incorrectly, it may cause the cutting dislocation during processing.

c) Datum

The direction in which the machine moves when reset. If set incorrectly, the axis moves against origin direction.

d) Key direction

The direction in which the axis moves when press keys on the panel. When set incorrectly, the axis moves opposite direction.

e) LimitPolarity

The control level that limiter passes to control panel. When set incorrectly, the limit will fail.

f) Range

The working range of machine. Users can make reasonable adjustment according to mechanical characteristics, and the

typical setting is within the range of 5~20mm/s.

g) Start Speed

The initial speed at which the axis moves from rest to motion.

h) Max ACC

The maximum acceleration value of the motion axis when the axis increases or decreases speed. If the max acc is set too high, the motor may lose step and shake. Setting too small will slow down the graphics processing speed. For the axis with large inertia, such as Y axis corresponding to beam, the typical setting range is 800 ~ 3000mm/s²; for the axis with small inertia, such as X axis, the typical setting range is 10000 ~ 20000mm/s².

i) Max Speed

The drive capacity of motor and the inertia of motion axis determine the maximum speed of motion axis. During engraving, the engraving speed can't exceed the maximum speed value. During cutting, the combined speed can't exceed the maximum speed of X and Y axes. If the speed is set too high, the controller will automatically keep the speed within the maximum speed.

2. IO

a) Water Protect

Water protect switch. If check this function, the machine will stop working when machine detects the signal of water stopping.

b) Open Protect

Open protect switch. If check this function, the machine will stop working when machine detects the signal of low level.

c) Foot Protect

Foot protect switch. If check this function, the machine will continue to work when machine detects the signal that changes from high level to low level.

3. Z/U Axes Options

a) Z axis home OnPower

Check this function, when start machine, the Z axis will reset automatically.

b) Z axis for autofocus

This function is used to control the distance between laser head and work platform.

c) Z axis for TwoHead

This function is used for two heads working synchronously.

d) Head Space

The distance between two heads when two heads working synchronously.

e) U axis home OnPower

Check this function, when start machine, the U axis will reset automatically.

f) Check this function, when start machine, the U axis will reset automatically.

g) U axis for feeding

U axis works as feeding axis.

4. Laser Parameters

a) Laser Mode

This parameter is selected according to the type of the external laser. The LaserCAD software supports three types of lasers: glass tube, RF laser (no preignition) and RF laser (preignition).

b) TTL Level

This parameter is selected according to the switching signal of the external laser power. When **【Low level effective】** is selected, the low level will emit light. When **【High level effective】** is selected, the high level will emit light.

c) PWM Frequency

The PWM frequency of the control signal used by the external laser. In generally, set between 20,000 and 80,000. If the value is too small, the power will be unbalanced.

d) Max Power

The limit power that the laser can set. The power set by users can't be higher than this value during processing.

5. Function Config

a) XY axis home OnPower

Check this function, when start machine, the XY axis will reset automatically.

b) Hardware Limit

Check this function, the machine will detect the hardware limit signal according to the direction of motion. When a hardware limit signal is detected, the ongoing work will stop and the LCD panel displays "Touch Limit!". If you have set the **【Range】** accurately, you do not need to check this function.

c) Return Origin after Work

If check this function, the laser head will return to origin point after work. If do not check this function, the laser head will stop at current position after work.

6. Other Options

a) HeadPenSpace X

The distance between pen and laser head in X direction.

b) HeadPenSpace Y

The distance between pen and laser head in Y direction.

7. Import/Export/Read/Save Manufacture Parameter Config

a) Import

Import manufacture parameter config file, the suffix of file is "cf5".

b) Export

Export current manufacture parameters settings.

c) Read/Save

Read manufacture parameter settings from mainboard to LaserCAD software. After reading, click **【Save】** to save the config

to LaserCAD software. The default password is “608111”.

3.7.1.5 User Parameters

Figure3-7-5 User Parameter Settings

The screenshot shows the 'System settings' dialog box with the 'User parameters' tab selected. The left sidebar lists 'Work Space', 'Advance Functions', 'Work Parameters', 'Manufacturer Param', and 'User parameters' (which is highlighted). The main area is divided into two sections: 'Work control parameters' and 'System config parameters'.

Work control parameters:

Space_Speed:	300.00	Min_Acc:	300.00
Start_Speed:	10.00	Cut_Acc:	3000.00
Speed_Factor:	3.00	Space_Acc:	3000.00
Space_Jerk:	80000.00	Engrave_Acc:	10000.00
Cut_Jerk:	50000.00		

Below these parameters are two buttons: 'Instant recovery:' and a dropdown menu labeled 'Noraml Params'.

System config parameters:

X/Y_Home_Speed:	50.00	Key_Move_Speed:	200.00
Z_Home_Speed:	40.00	RunBox_Speed:	200.00
U_Home_Speed:	50.00	ClipBox_Speed:	50.00
Z_Work_Speed:	80.00		
U_Work_Speed:	200.00		

At the bottom of the dialog are four buttons: 'Import', 'Export', 'Read', and 'Save'. At the very bottom are 'Ok', 'Cancel', and 'Apply' buttons.

1. Work control parameters

a) Space Speed

The movement speed of laser head when there is no laser output.

This parameter cannot be larger than **【 Max Speed 】** under **【 Manufacture Parameters 】**.

b) Start Speed

The initial speed of laser head from rest to motion. This parameter cannot be larger than **【 Start Speed 】** under **【 Manufacture Parameters 】**.

c) Speed Factor

Parameter changes throughout the system. Low speed is filled in with 0.5 or 1, while regular speed with 2 and high speed with 3 or 4. It also has an impact on smoothness when turning.

d) Space Jerk

The variation of movement acc when there is no laser output and it increases or decreases in unit of 10 thousand each time.

e) Cut Jerk

The variation of cutting acc increases or decreases in unit of 10 thousand each time.

f) Min Acc

The acceleration of laser head when it turns, it increases or decreases in unit of 50 or 100 each time.

g) Cut Acc

The acceleration of laser head when it cuts, usually set under 4000.

h) Space Acc

The motion acceleration of laser head when there is no light, usually set below 4000.

i) Engrave Acc

The acceleration of laser head when it engraves, usually set above 8000 and it is only effective to engrave.

j) Instant recovery

According to the cutting material and quality requirements, users can choose "Slower Params", "Normal Params", "Faster Params", "Fastest Params".

2. System config parameters

a) X/Y Home Speed

The reset speed of X/Y axis, usually set between 40 and 80.

b) Z Home Speed

The reset speed of Z axis.

c) U Home Speed

The reset speed of U axis.

d) Z Work Speed

The work speed of Z axis.

e) U Work Speed

The work speed of U axis.

f) Key Move Speed

The motion speed of axis when press the direction keys on panel.

g) RunBox Speed

The speed at which the laser head runs along the outer frame of graphics without laser output.

h) ClipBox Speed

The speed at which the laser head cuts along the outer frame of graphics.

3. Import/Export/Read/Save

a) Import

Import user parameter config.

b) Export

Export user parameter config.

c) Read/Save

Click **【Read】** to read user parameter config from mainboard to LaserCAD software, then click **【Save】** to save this config to software.

3.7.2 Array Output Options


For the graphics that need to be processed by array, the automatic layout can be set through array parameter settings, avoiding layout of manual calculation, reducing workload and saving materials. Click **【Options】** / **【Array output options】** or click “” to set array parameters.

Figure3-7-6 Array Output Options

Array output options [X]

Auto_conver Calculation

Cell height(Y): 0.00

Cell width(X): 0.00

Height(Y): 0.00

Width(X): 0.00

Count(Y): 1

Count(X): 1

☒ Odd Interval(Y): 0.00 [Auto]

☐ Even Interval(Y): 0.00

☐ Odd Interval(X): 0.00 [Auto]

☐ Even Interval(X): 0.00

☐ Offset(X): -0.00 [Auto]

☐ Offset(Y): -0.00 [Auto]

Pulse Distance: 1.00

Up

Left Right

Down

Line Mirror

☐ X ☐ Y

Row Mirror

☐ X ☐ Y

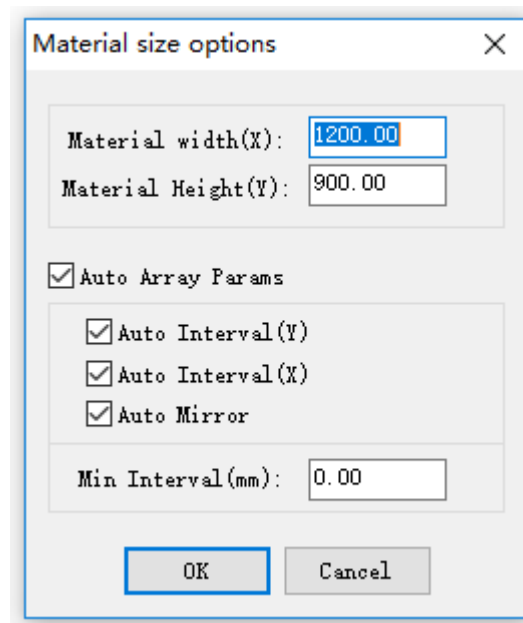
Convert To Solidline

F2: Zoom to Objects

F4: Zoom to page

Click **【Auto cover Calculation】**, the LaserCAD software can cover the whole platform automatically with the selected graphics according to the work range and graphics size, by the most economical consumable way.

Figure3-7-7 Auto Cover Calculation Settings



Set up an array, the parameters set as Figure 3-7-8. Do not check any mirror function.

Figure3-7-8 Array Parameters

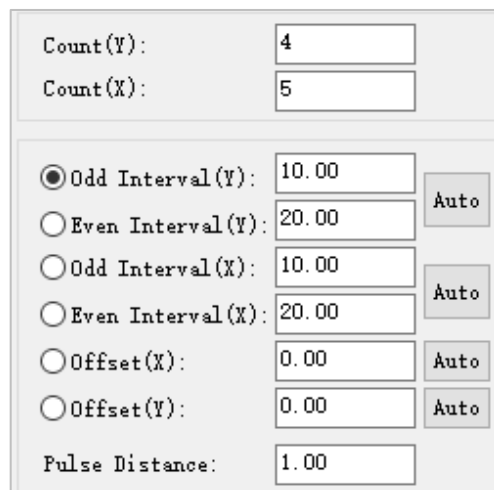
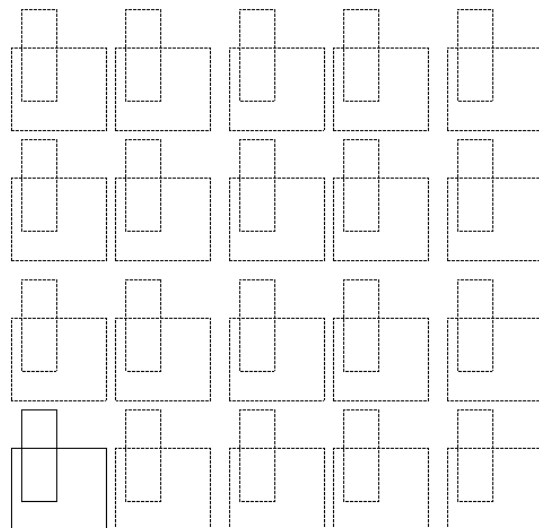


Figure3-7-9 Array Graphics



Set up an array, the parameters set as Figure 3-7-8. Check **【Line Mirror X/Y】** , **【Row Mirror X/Y】** , there are some figures for example, users can try more different combinations, like “Line Mirror X & Row Mirror X” etc.

Figure3-7-10 Line Mirror X

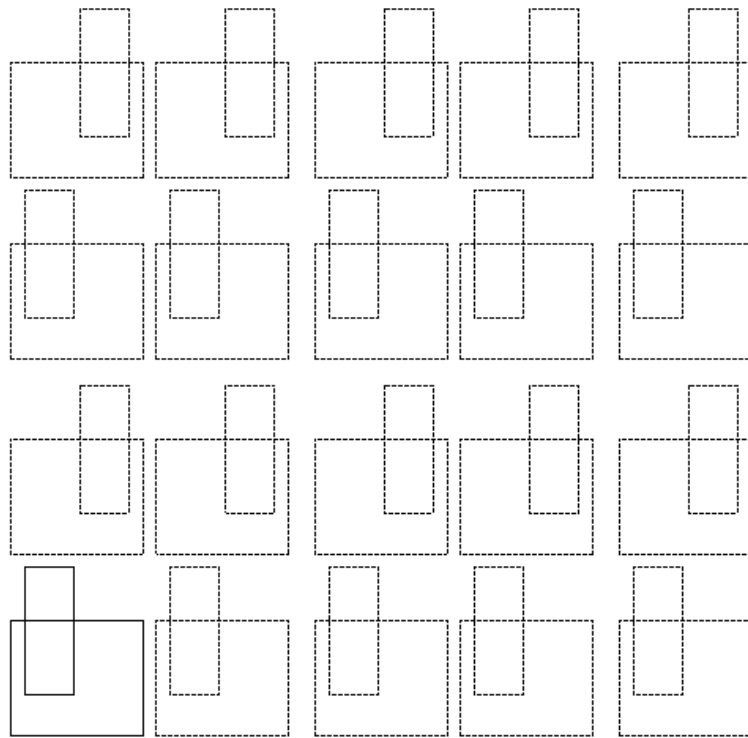


Figure3-7-11 Line Mirror Y

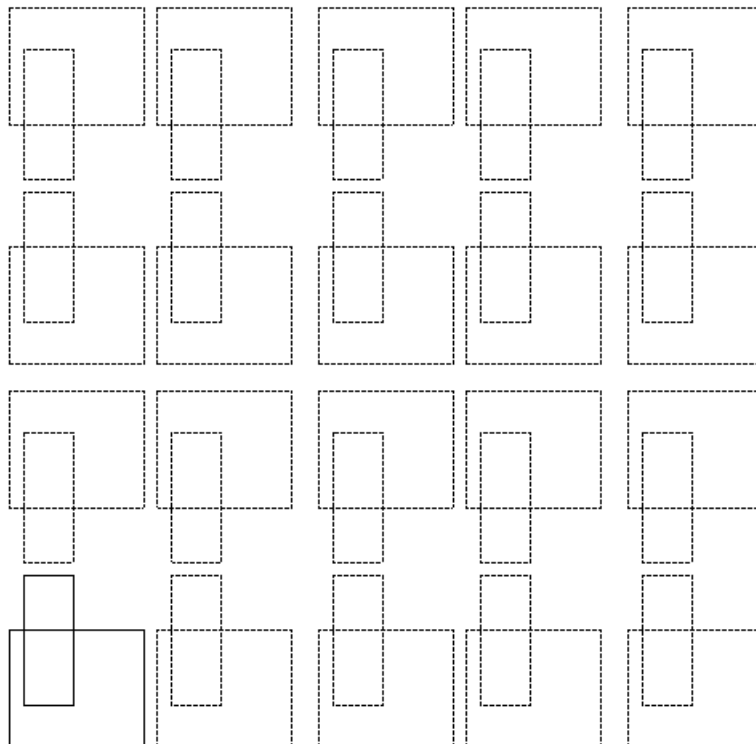


Figure3-7-12 Row Mirror X

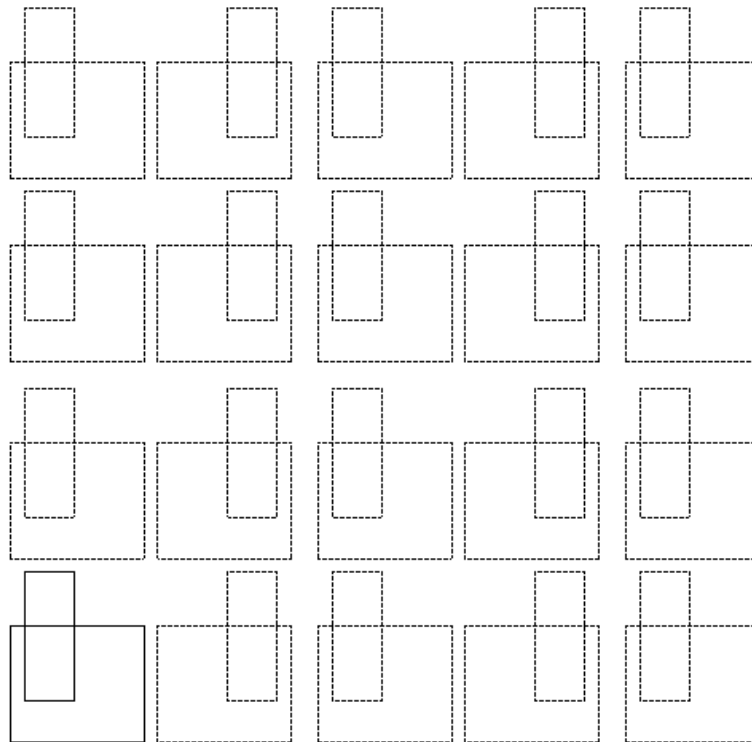


Figure3-7-13 Row Mirror Y

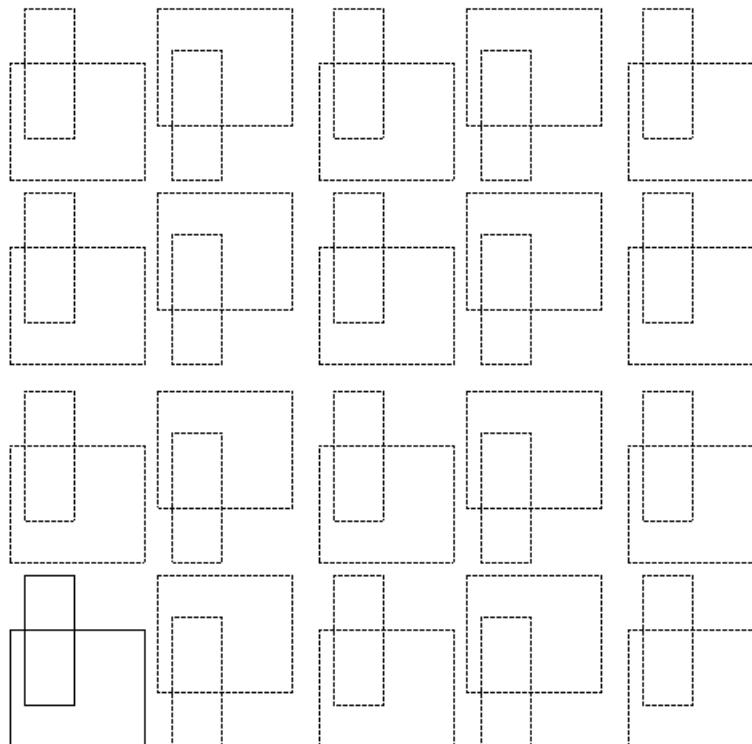


Figure3-7-14 Line Mirror X & Y

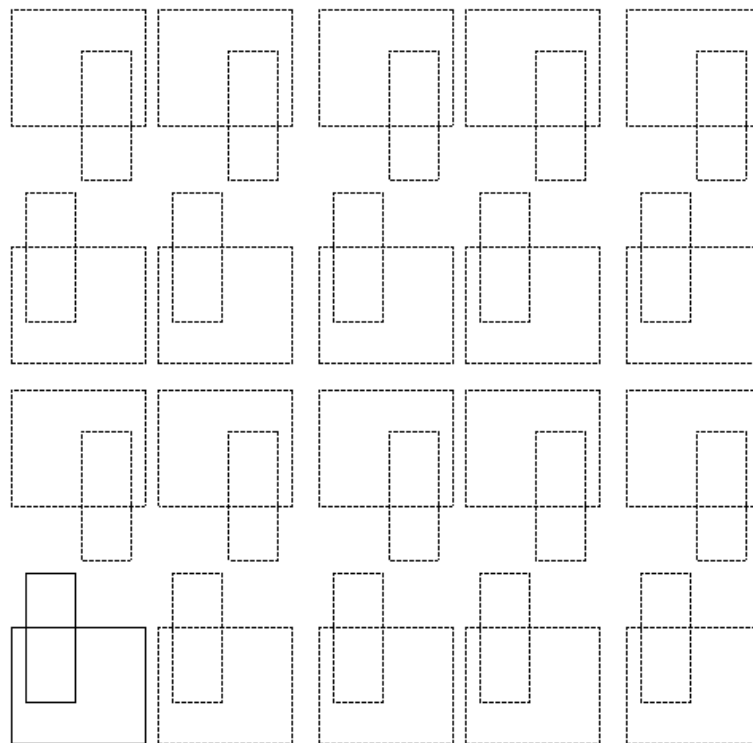
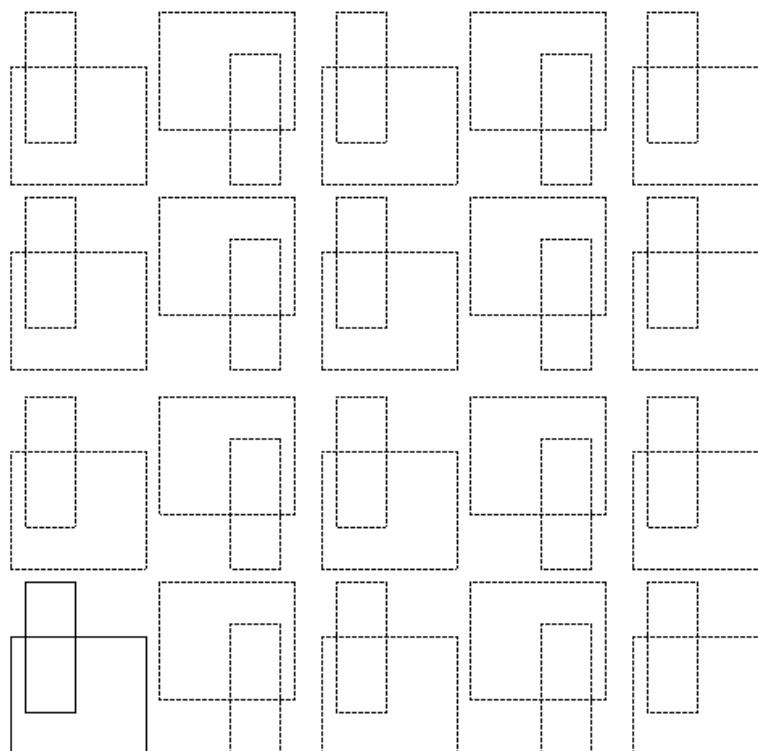


Figure3-7-15 Row Mirror X & Y



Set **【Pulse Distance】** , then click **【Up】** , **【Down】** , **【Left】** or **【Right】** , the relevant interval will increase or decrease.

For example, set the **【Pulse Distance】** to “10”, then click **【Up】** one time, then the odd interval will change to “20”.

Figure3-7-16 Pulse Distance

☒ Odd Interval(Y): 10.00 Auto
☐ Even Interval(Y): 20.00 Auto
☐ Odd Interval(X): 10.00 Auto
☐ Even Interval(X): 20.00 Auto
☐ Offset(X): 0.00 Auto
☐ Offset(Y): 0.00 Auto
 Pulse Distance: 10
 Up
 Left Right
 Down

3.7.3 Position Relative


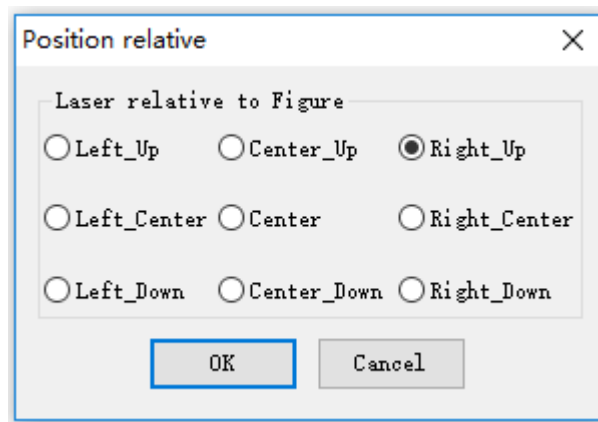
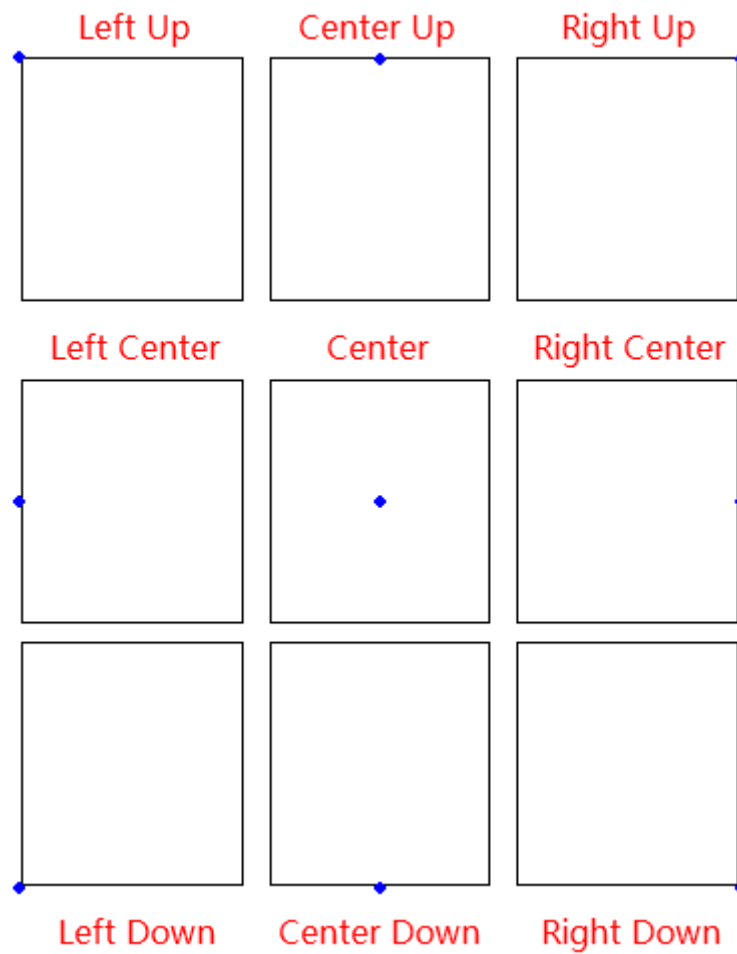
【Position Relative】means relative position between the graphics and the laser head. Click 【Options】 / 【Position Relative】 or click “” to open the relative position setting page. Check the required relative position and click “OK”.

Figure3-7-17 Position Relative



The relative positions are shown below.

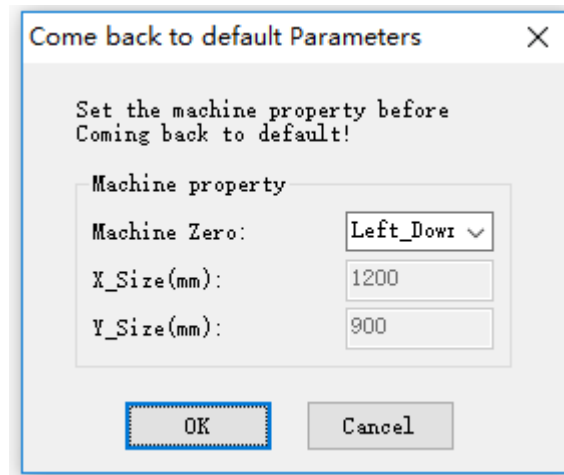
Figure3-7-18 Relative Positions



3.7.4 Default Parameters

When restoring the default parameters of software, set the accurate machine origin and click “OK”.

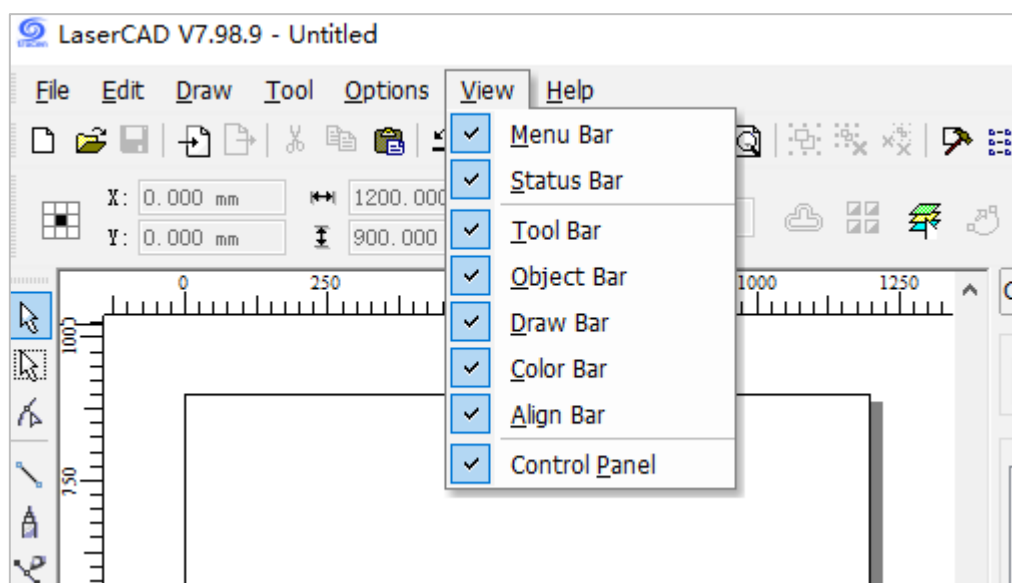
Figure3-7-19 Default Parameters



3.8 View

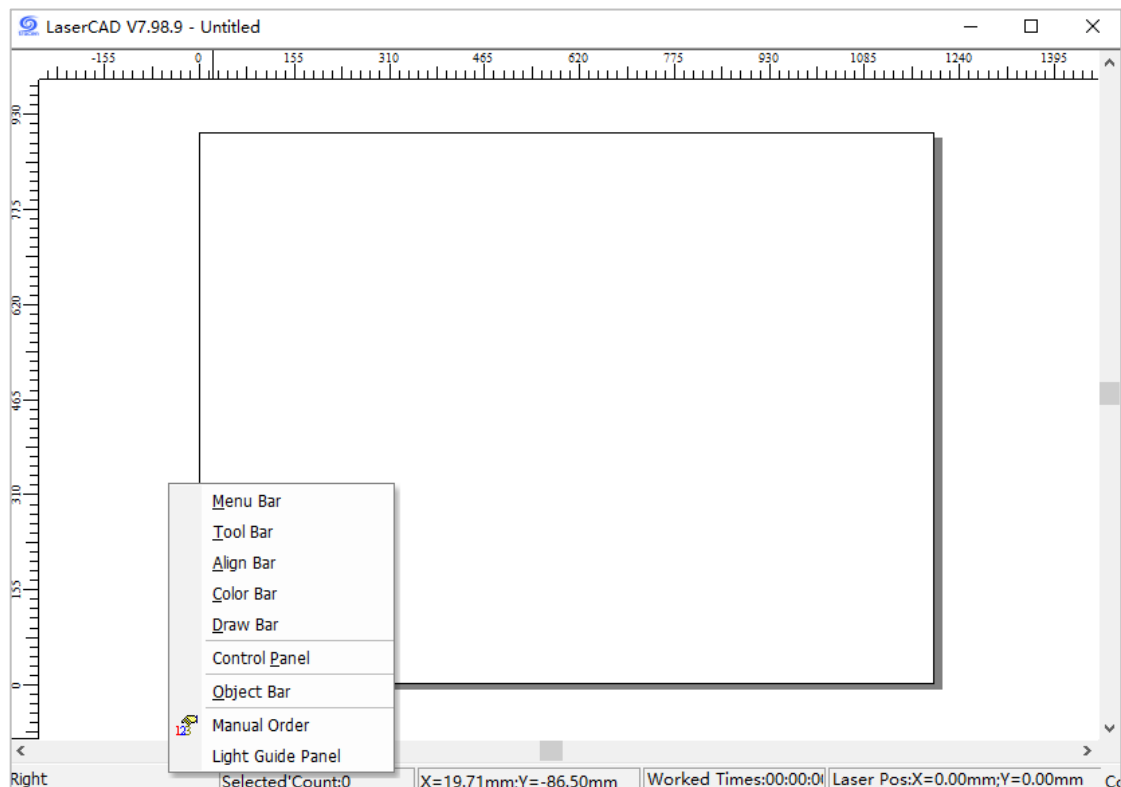
View menu is used to bring up or hide toolbars.

Figure3-8-1 View



When the menu bar is not hidden, you can click **【View】** and check the corresponding options to bring up the toolbar. If all the toolbars are hidden, you can click the right button of mouse on the blank of the status bar and select the corresponding options to display the hidden toolbar.

Figure3-8-2 Display & Hide the Toolbar

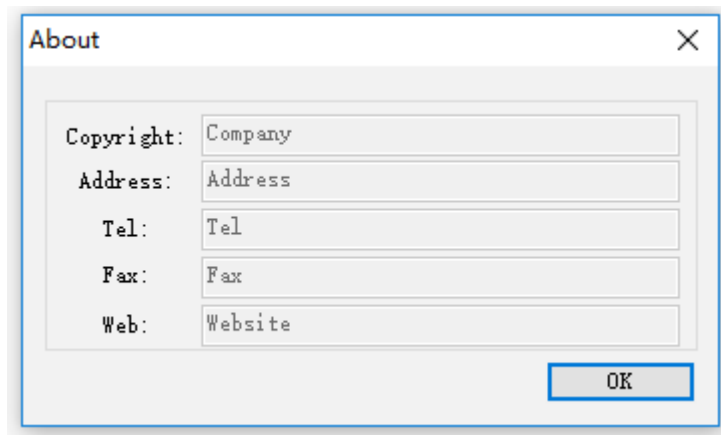


3.9 Help

3.9.1 About

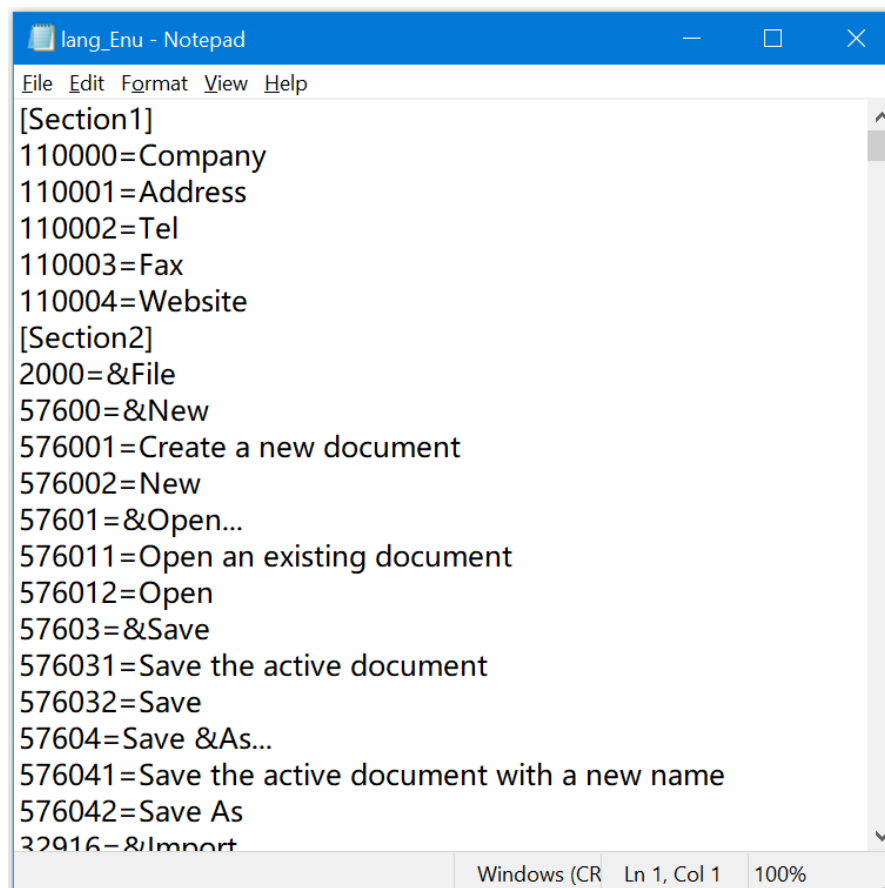
Manufacturers can customize the information about the software package, and the initial information is shown as figure 3-9-1.

Figure3-9-1 About



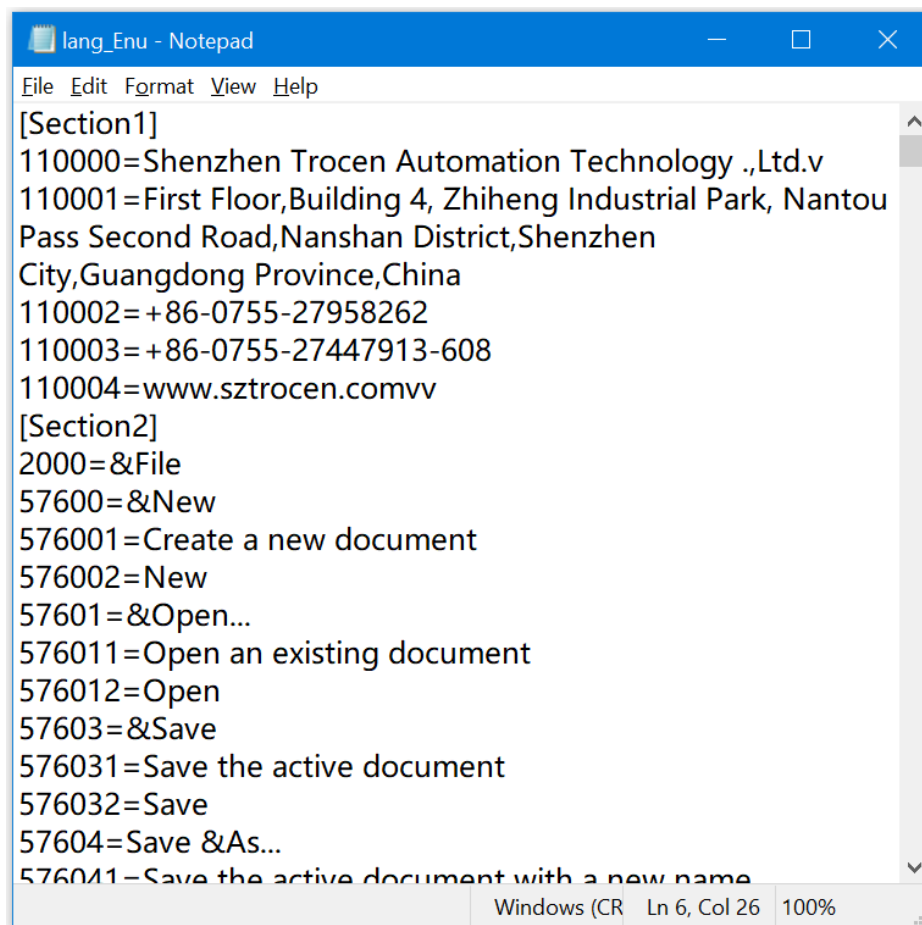
Enter the software installation package directory, open the “AWCLanguage” folder, and double-click to open the “lang_Enu” file, as shown in figure 3-9-2.

Figure3-9-2 lang_chs File



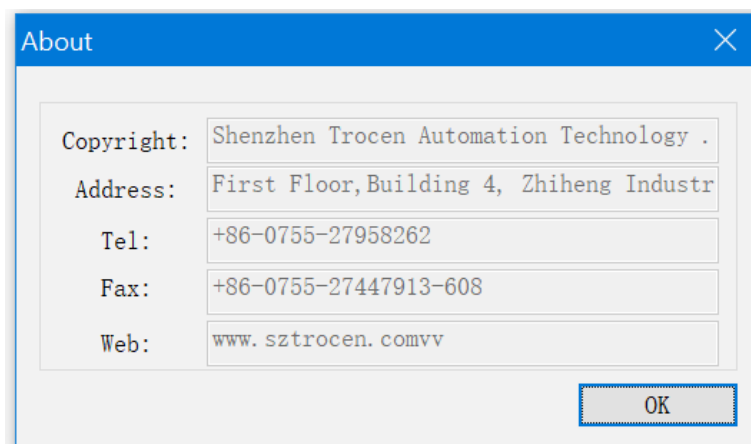
Modify the information in lang_chs file according to need.

Figure3-9-3 Modify lang_chs File



Restart the software, click **【About】** .

Figure3-9-4 About Info



3.9.2 Modify Icon

Manufacturers can replace the icon of the software. Enter the software installation directory, open “AWCRes” folder, name the prepared icon with “title” and replace the original icon file. The software icon is 32*32 px in size and its suffix is “ico”.

4. Control Panel

Computers can communicate with mainboard by USB and network to operate the laser machine.

4.1 Communicate by USB

Click **【Select Mode】** on the Control Panel.

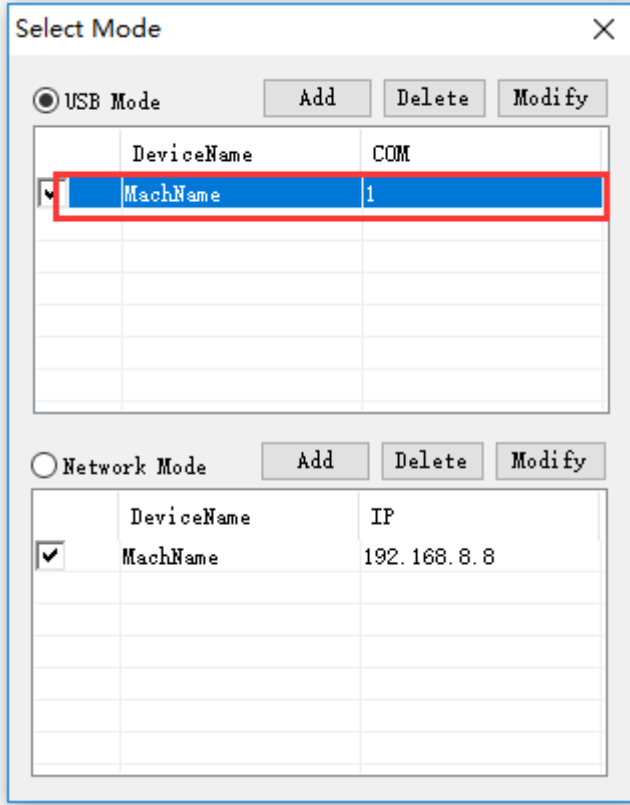
Figure4-1-1Control Panel

The screenshot shows a 'Control Panel' window with the following sections:

- Communication mode:** A 'Select Mode' button (highlighted with a blue box) and a 'MachName: COM21' dropdown menu.
- Layer Options:** A table with columns: Layer, Mode, Speed, Power, Output. Below the table are 'Up', 'Down', 'Top', and 'Bottom' buttons.
- Machine Control:** A grid of buttons including 'Origin', 'Run Box', 'Clip Box', 'Light', 'Download', 'Start', 'Use/Contin', 'Stop', and directional buttons (X-, X+, Y-, Y+, Z-, Z+) along with 'Datum' buttons for X and Z axes.
- Mark Cut:** A single button.
- Position Fields:** 'Read Current Pos:' with X= 0.00 and Y= 0.00, and 'Move to Pos:' with X= 0.00 and Y= 0.00.

Select **【USB Mode】** , double-click the position in the red box as shown in Figure4-1-2 to open the USB Com interface. Users can set the **【DeviceName】** as their like, then click **【FindCom】** . If the connection fails, the system prompt is shown in Figure4-1-4.

Figure4-1-2 USB Mode



The 'Select Mode' dialog box contains two sections: 'USB Mode' (selected) and 'Network Mode'. Each section has a table for device configuration. In the 'USB Mode' section, the first row of the table is highlighted with a red box, showing 'MachName' in the 'DeviceName' column and '1' in the 'COM' column.

	DeviceName	COM
<input checked="" type="checkbox"/>	MachName	1
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

	DeviceName	IP
<input checked="" type="checkbox"/>	MachName	192.168.8.8
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

Figure4-1-3 FindCom

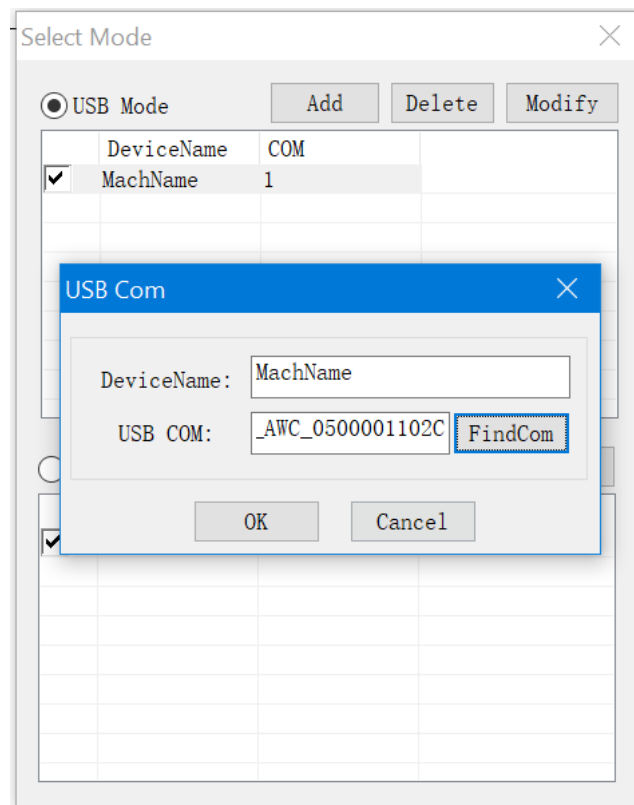
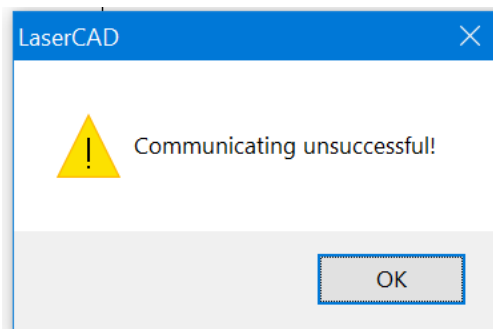


Figure4-1-4 Communicating Unsuccessful



4.2 Network Mode

4.2.1 Communicate by Network

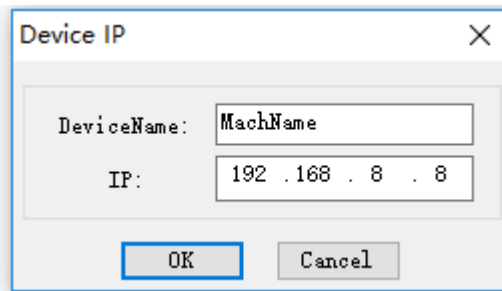
Select【Network Mode】, double-click any position in the red box as shown in Figure4-2-1 to open the Device Ip interface. Users can set the 【DeviceName】 as their like, then input the default IP address of mainboard with “192.168.8.8”.

Figure4-2-1 Network Mode

The screenshot shows a 'Select Mode' dialog box with two sections: 'USB Mode' and 'Network Mode'. The 'Network Mode' section is selected with a radio button. Below it is a table with columns for checkboxes, DeviceName, and IP. The first row is highlighted with a red border and contains a checked checkbox, 'MachName', and '192.168.8.8'.

	DeviceName	IP
<input checked="" type="checkbox"/>	MachName	192.168.8.8
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

Figure4-2-2 Modify Ip Address



4.2.2 Modify the IP Address of Computer

Take Windows10 system as an example to explain how to modify computer IP address. Click Network & Internet Settings→Change Adapter Options → double-click WLAN → Properties → double-click Internet protocol version 4 (TCP/IPv4). Chose “Use the following IP address” and enter the IP address. The first 3 segments must be the same as the IP address of mainboard (192.168.8.x). The last segment of the IP address can be selected as any number between 0-255 except “8”.

Figure4-2-3 Network & Internet Settings

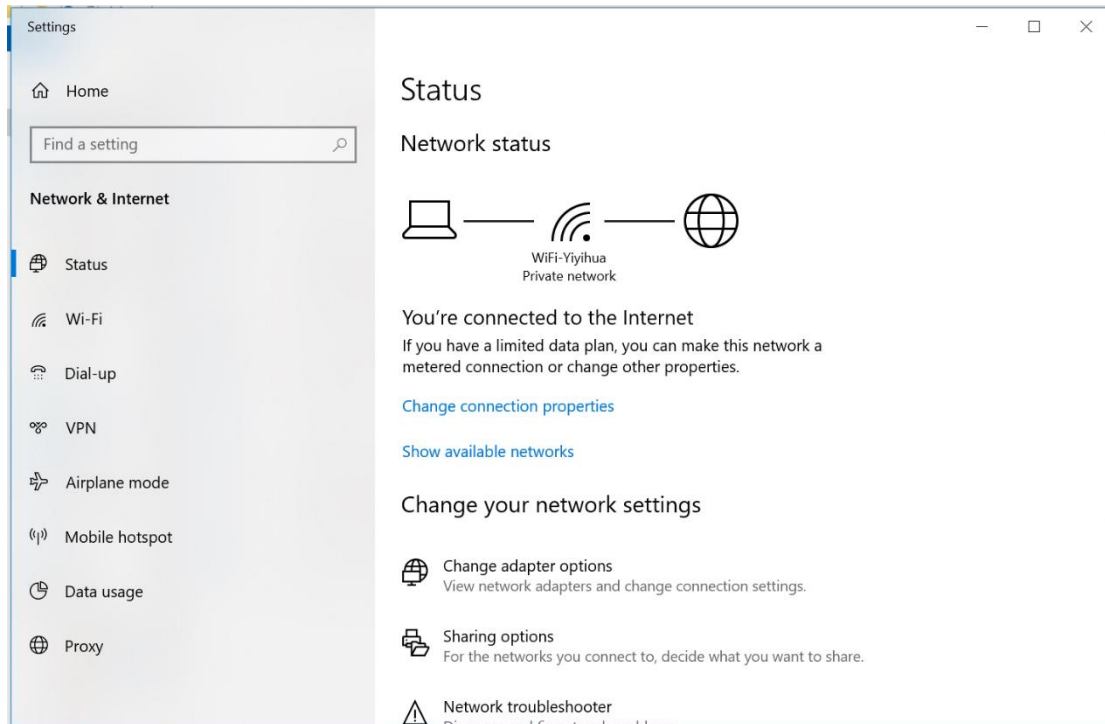


Figure4-2-4 Change Adapter Options

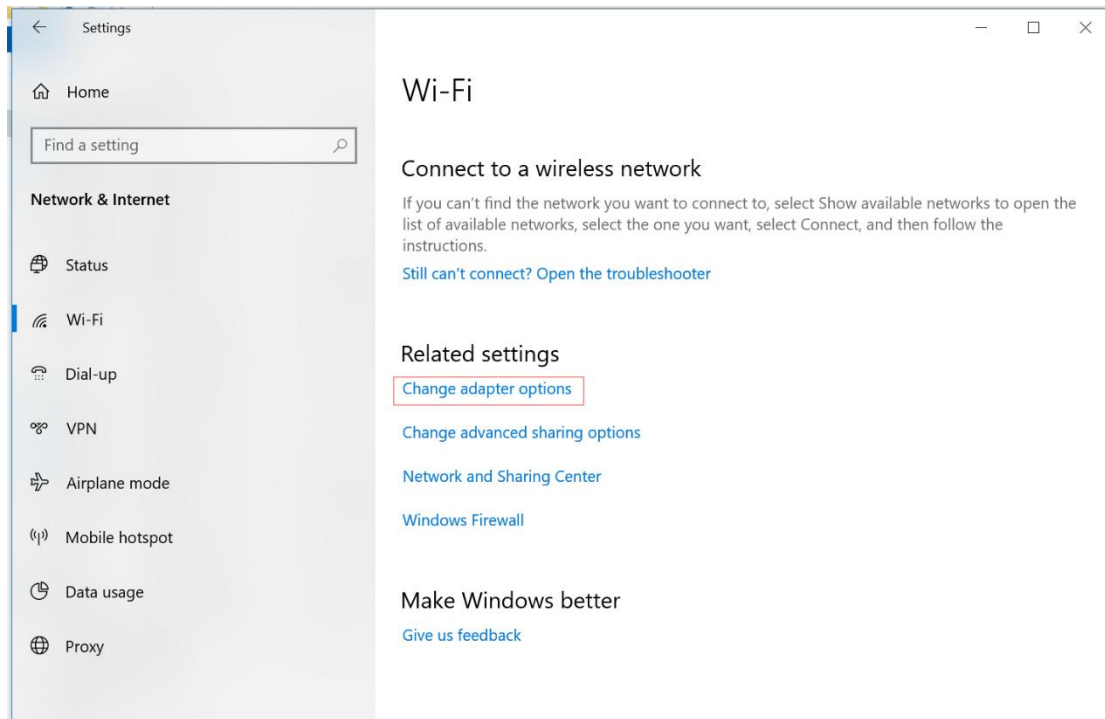


Figure4-2-5 WLAN Properties

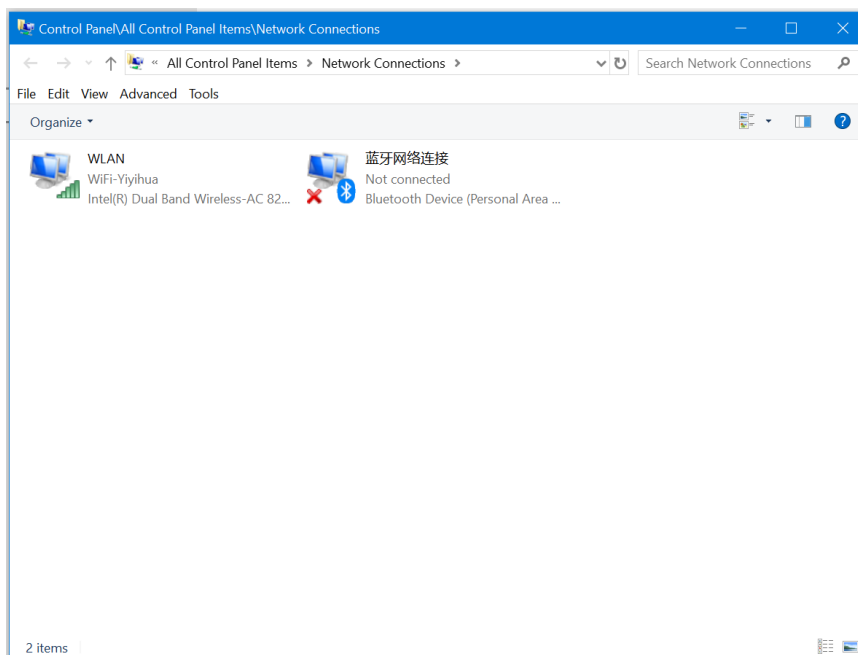


Figure4-2-6 Internet protocol version 4 (TCP/IPv4)

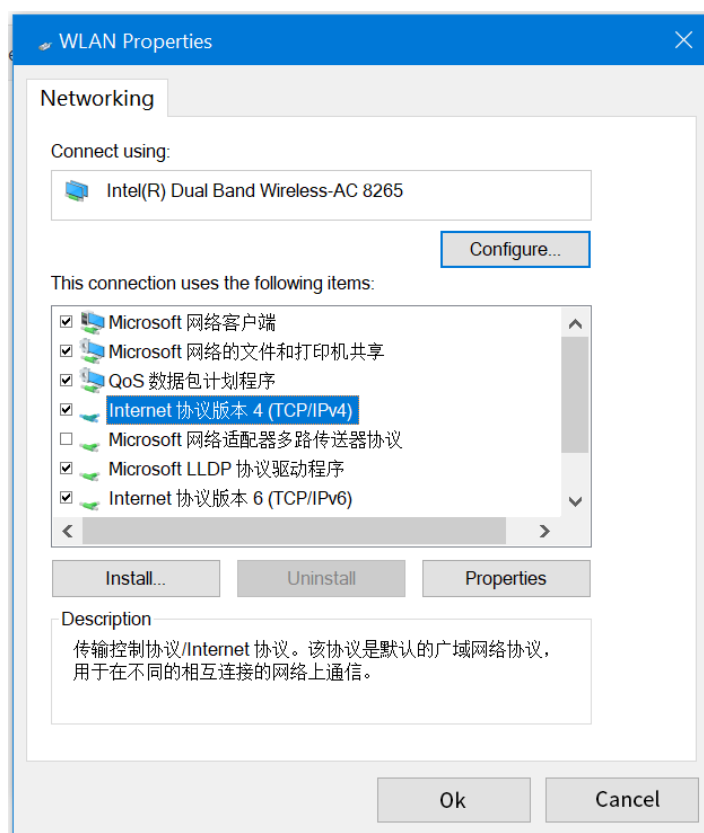
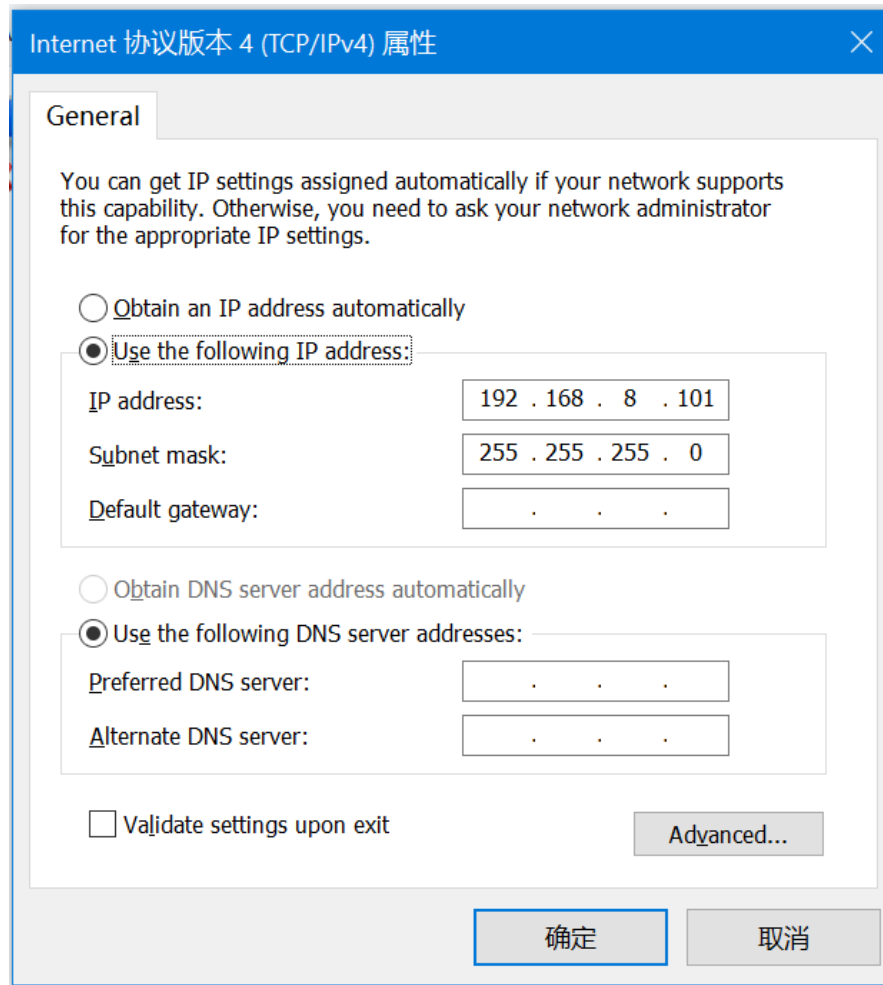


Figure4-2-7 Modify IP Address



4. 2. 3 Check IP Address

Take Windows10 system as an example to explain how to check the computer IP address. Click Network & Internet Settings→Change Adapter Options→double-click WLAN→Details....

Figure4-2-8 Network & Internet Settings

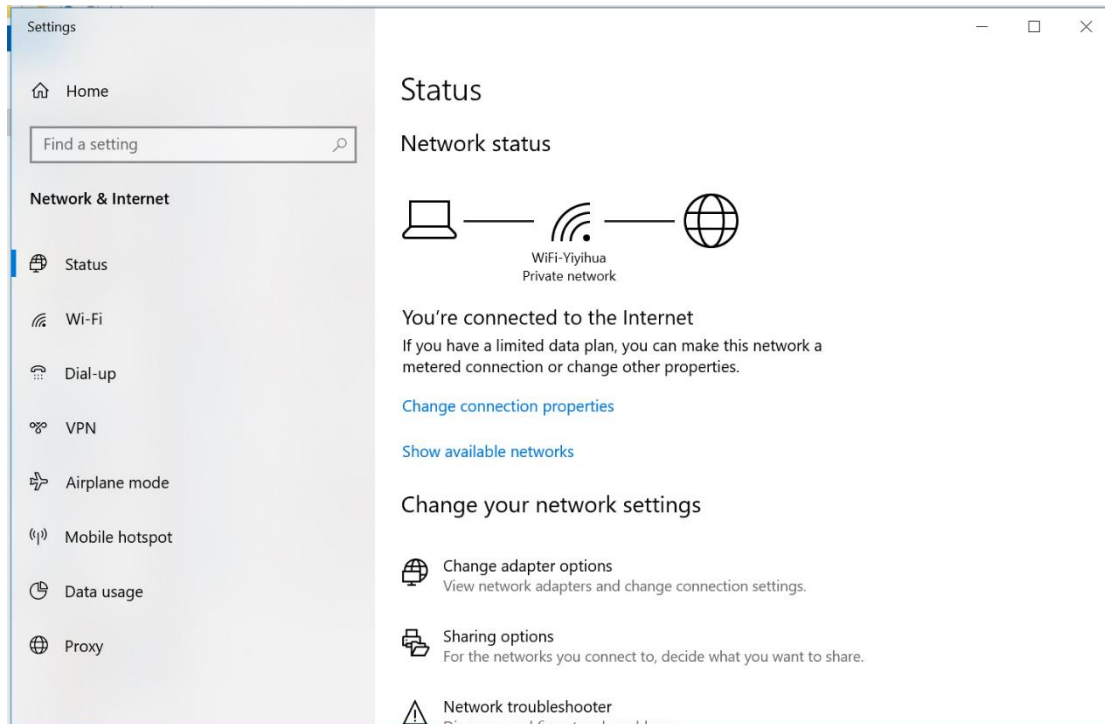


Figure4-2-9 Change Adapter Options

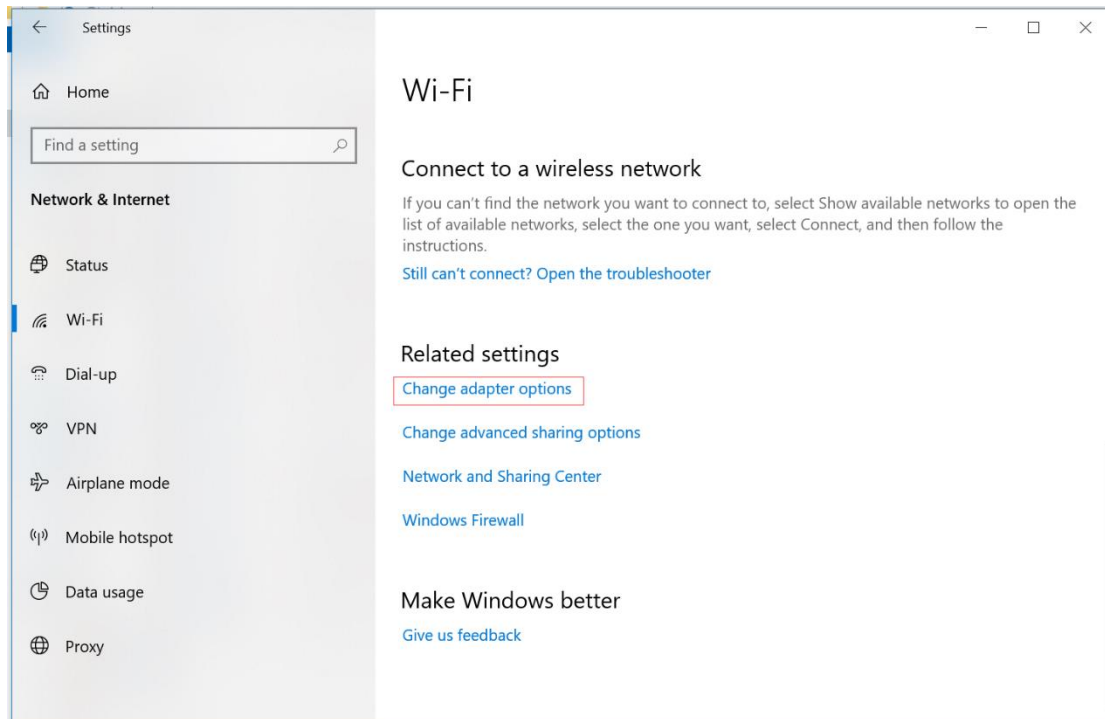


Figure4-2-10 WLAN Properties

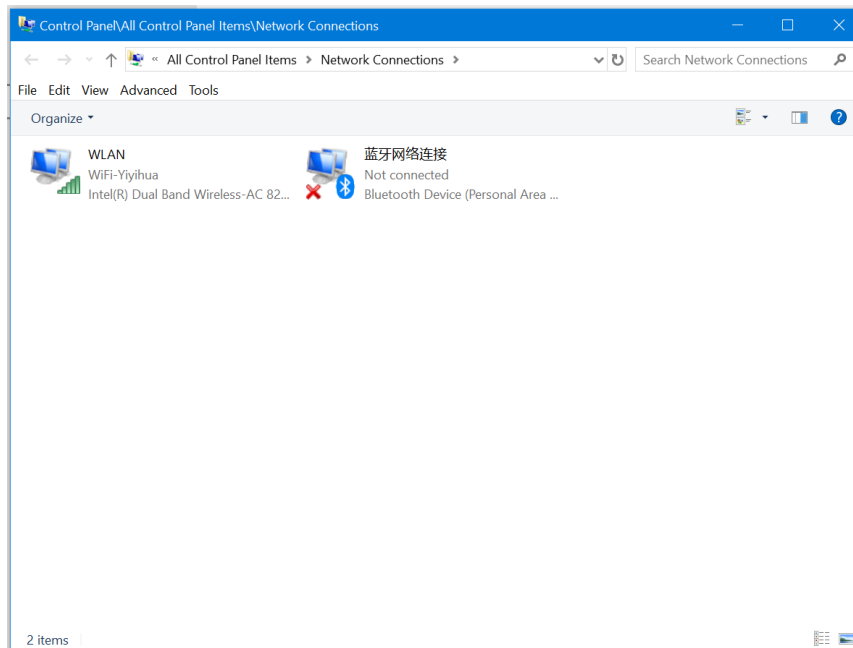
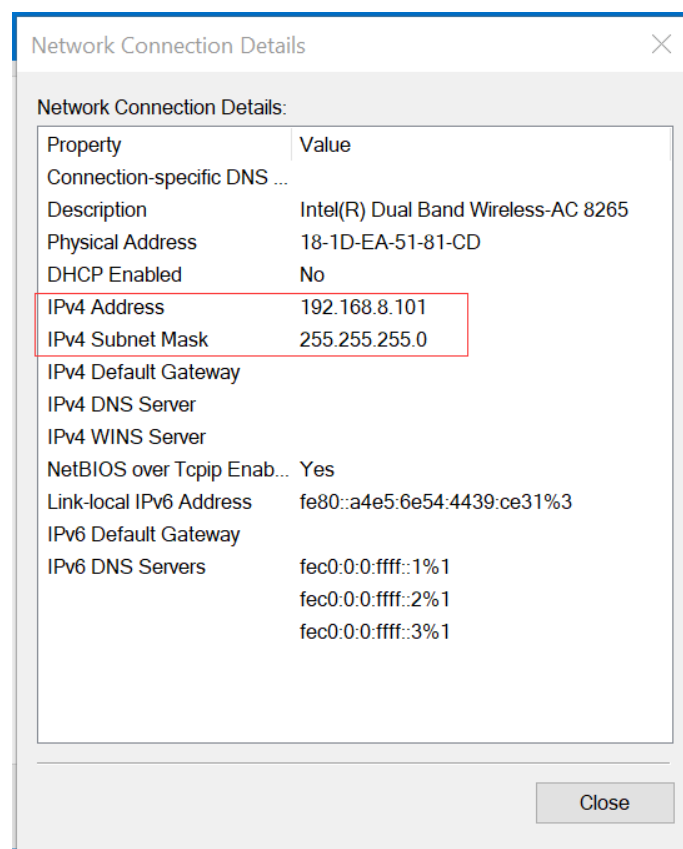


Figure4-2-11 Detail



4.3 Layer Options Settings

4.3.1 Layer Options

Check **【output】** to select whether the layer should be processed. “☒” indicates the layer output, and “☐” indicates the layer is not output. Double-click any position in the red box to open the layer parameter setting interface.

Figure4-3-1 Select the Processed Layer






Layer Options				
Layer	Mode	Speed	Power	Output
	Cut	100.00	50.00	<input checked="" type="checkbox"/>
	Cut	100.00	50.00	<input checked="" type="checkbox"/>
	Cut	100.00	50.00	<input type="checkbox"/>
	Cut	100.00	50.00	<input checked="" type="checkbox"/>
	Cut	100.00	50.00	<input checked="" type="checkbox"/>

Figure4-3-2 Layer Parameter Settings

Layer Parameters

Parameters Library...

Pen	Color
0	Blue
1	Black
2	Green
3	Red
4	Yellow

Layer: Blue

Work Mode: Cut

Work Count: 1

☐ Laser PPI: 200

☐ If Air Switch Open

Cut Parameters

Laser1 Laser2 Laser3 Laser4

MaxPower(%): 50.00

MinPower(%): 40.00

Pressure(%): 50.00

Speed: 100.00

...

Engrave Parameters

Laser1 Laser2 Laser3 Laser4

Power(%): 50.00

MinPower(%): 40.00

Pressure(%): 50.00

Speed: 300.00

Scan gap(mm): 0.10000

Engrave Mode: X_swing

VertWiden(mm): 0.00

HoriWiden(mm): 0.00

BMP Optimize: ☒ Yes ☐ No

...

Hole Parameters...

Pen Parameters...


OK

Cancel

1. Layer

Displays the layer that users want to change the parameters. Click the layer bar on the left to switch layer.

2. Work Mode

Set the processing mode: Cut, Engrave, Cut after engrave, Hole, Pen run. If current layer is BMP (), users only can choose “Engrave” or “Gray Engrave”.

3. Work Count

The default is “1”, and cannot be modify.

4. Laser PPI

The higher PPI value means the density of display is higher and more detail of picture will be shown. The software PPI parameter defaults to “200” and cannot be modified.

5. If Air Switch Open

Set whether to blow air when cutting this layer.

4.3.2 Cut Parameters

When the **【Work Mode】** set to “Cut” or “Cut after engrave”, these parameters will come to effect.

1. Max Power

The power during processing current layer (unit: %).

2. Min Power

The power of turning.

3. Pressure

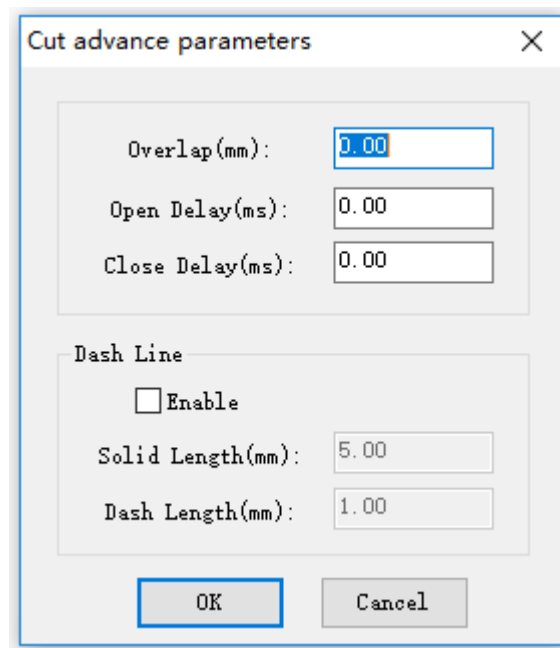
The pressure during processing current layer.

4. Speed

The cutting speed of laser head during processing.

Click “...” to set cut advance parameters.

Figure4-3-3 Cut Advance Parameters



1. Overlap

Due to tolerance of machine, probably it will happen that closed image can't be cut off. This parameter can help to solve this problem. But this parameter should not be too large. Suggest adjusting precision of machine to solve this problem.

2. Open Delay

Set the delay time before opening laser.

3. Close Delay

Set the delay time after closing laser.

4. Enable

Cut the graphics in a dash line.

5. Solid Length

The distance of laser head cutting with light when cutting in a dash line.

6. Dash Length

The distance of laser head moving without light when cutting in a dash line.

4.3.3 Engrave Parameters

When the **【Work Mode】** set to “Engrave” or “Cut after engrave” or “Gray engrave”, these parameters will come to effect.

1. Power

The power during processing current layer (unit: %).

2. Min Power

Adjust the min power of laser during grade engrave.

3. Pressure

The pressure during processing current layer.

4. Speed

Scanning speed during engraving.

5. Scan Gap

Gap between scanning line.

6. Engrave Mode

Including “X_swing”, “Y_swing”, “X_unilateralism”, “Y_unilateralism”.

1) X_swing

Laser head releases laser to scan image back and forth in horizontal direction.

2) X_unilateralism

Laser head releases laser to scan image in horizontal direction, but only release laser when it's scanning in one direction. Such as: it releases laser when it's scanning from right to left, or it releases laser when it's scanning from left to right.

3) Y_swing

Laser head releases laser to scan image back and forth in vertical direction.

4) Y_unilateralism

Laser head releases laser to scan image in vertical direction, but only release laser when it's scanning in one direction. Such as: it releases laser when it's scanning from top to bottom, or it releases laser when it's scanning from bottom to top.

7. VertWiden

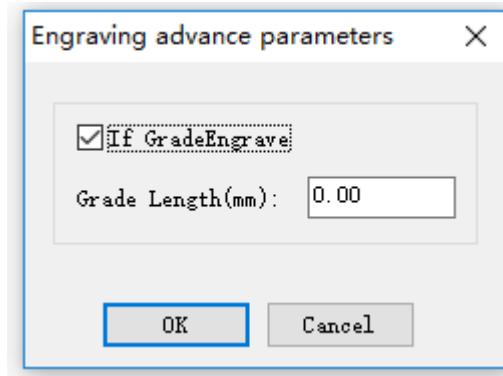
Only valid for text engrave.

8. HoriWiden

Only valid for text engrave.

Click “...” to set engraving advance parameters.

Figure4-3-4 Engraving Advance Parameters



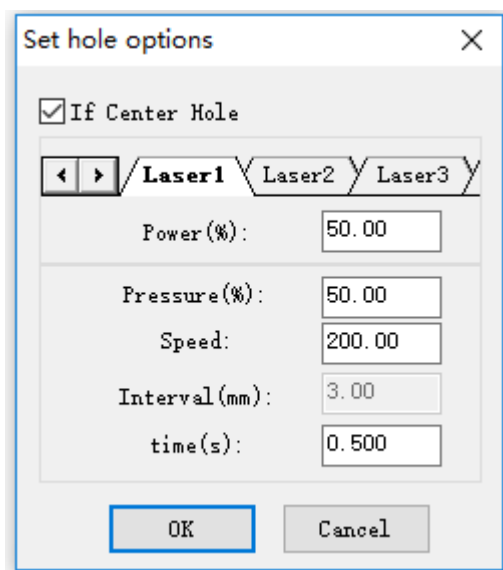
1. Grade Engrave

Check **【Grade Engrave】**, the **【Grade Length】** and **【Min Power】** will come to effect.

4.3.4 Hole Parameters

Select “Hole” in **【Work mode】**, hole parameters are available.

Figure4-3-6 Hole Parameter Settings



1. Power

The power during processing current layer (unit: %).

2. Pressure

The pressure during processing current layer.

3. Speed

Moving speed of laser head.

4. Interval

Distance between holes.

5. Time

Waiting time of laser head when punching holes.

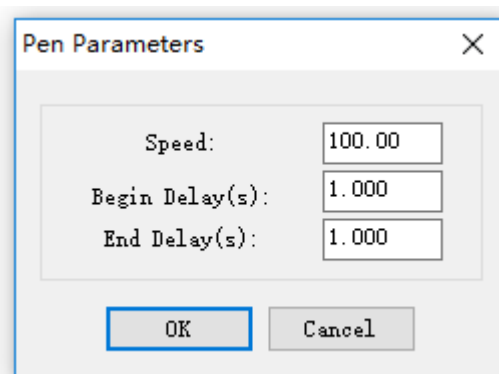
6. If Center Hole

Check this function, the laser head will punch holes in the center of graphics. If not checking this function, the laser head will punch holes along the edge of graphics.

4.3.5 Pen Parameters

Select "Pen Run" in **【Work mode】**, pen parameters are available.

Figure4-3-6 Pen Parameter Settings



1. Speed

Moving speed of pen.

2. Begin Delay

The delay time of pen dropping.

3. End Delay

The delay time of pen lifting.

4.3.6 Adjust Layer Processing Order

Processing sequence in layer list is from top to bottom. If need to change the processing sequence, just need to select one row of them and then

click “     ”.

Only when the **【Order by layer】** function is selected from **【Automatic Order】** , the layer working sequence can be available.

4.3.7 Parameter Library

After setting the parameters of current layer, click **【Parameter Library】** to add a new config file to parameter library. Click **【Add to Parameter Library】** and input names.

Choose one file name, and click **【Select as Current Parameters】** to change the parameters of current layer.

4.4 Machine Control

【 Machine control 】 is used to finish downloading graphics, start processing and do some simple machine operation control.

Figure4-4-1 Machine Control

The Machine Control dialog box contains the following elements:

- Buttons:** Origin, Run Box, Clip Box, Light, Download, Start, Pause/Continue, Stop (highlighted in blue), X-, Datum, X+, Y-, Y+, Z-, Z+, Datum, Mark Cut.
- Position Input Section:**
 - Read Current Pos: X= 0.00
 - Move to Pos: Y= 0.00

4.4.1 Download

Click **【Download】** to open Download Document interface.

Figure4-4-2 Download Document

1. Current Document Options

1) Name

Document name to be downloaded to main board.

2) Work times

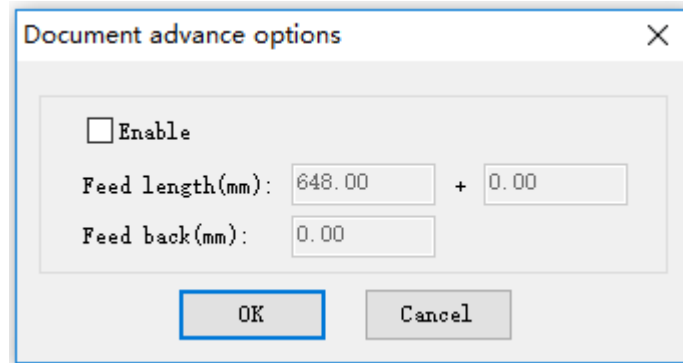
The times of system repeating processing the document automatically when started.

3) Repeat Delay

When repeat processing, the time interval from one processing to the next.

2. Click “...” to set document advance options.

Figure4-4-3 Document Advance Options



Check **【Enable】** to start the feeding function.

- 1) Feed length: The moving distance of feeding axis after work completed one time. The default length is the same as graphics size, and users can input values in “+ 0.00” to add feed length.

- 2) Feedback: Input values in “Feed back(mm): 0.00” to decrease the feed length.

3. Document Data Optimize

1) Auto Group Engrave

Check this option, the system will automatically carve the graphics into blocks according to the position.

2) Gap Optimize

Select this option, system will confirm the cutting direction automatically to offset mechanical reverse clearance when cutting complicated image, but will increase the space work move distance greatly, so generally the option is not recommended to be

selected.

3) Re-Order Objects

System will apply **【Automatic Order】** to document data when this option is selected. Click “...” to open automatic order interface.

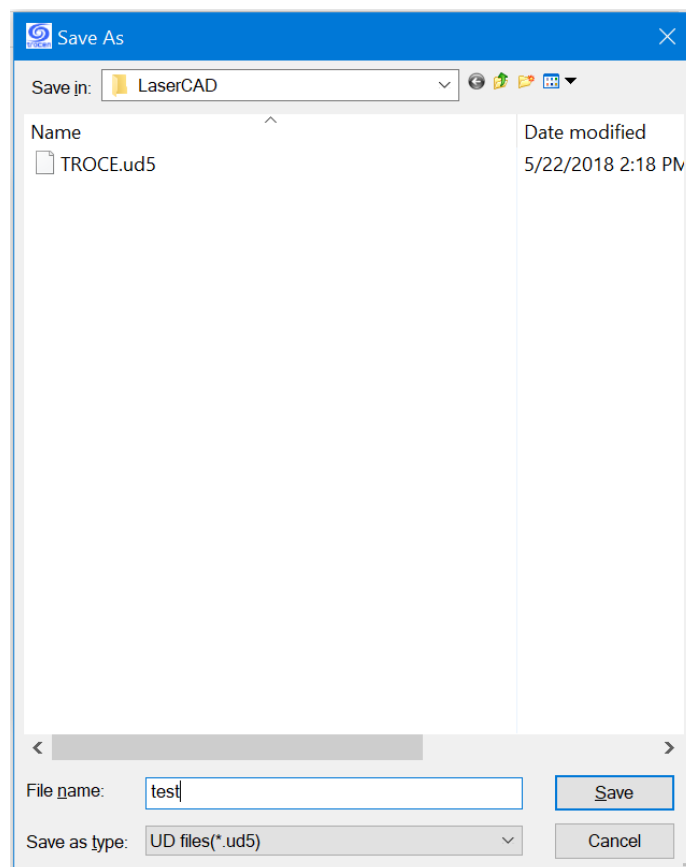
[The more detail about automatic order, please refer to the Chapter3.6.6.](#)

4. Document Export

1) Save Document to UFile

Click **【Save Document to UFile】** and input file name, click **【OK】** to save current file to UFile, the suffix is “UD5”.

Figure4-4-5 Save Document to UFile



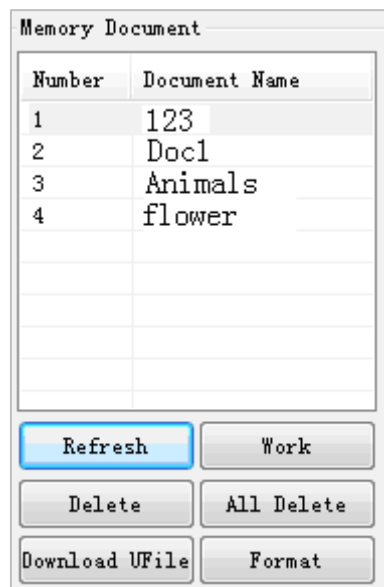
2) Download Document

Click **【 Download Document 】** to download current file to mainboard by USB or network communication.

5. Memory Document

Memory the files saved in mainboard.

Figure4-4-6 Memory Document



1) Refresh

Check all files saved in the mainboard.

2) Work

Select one file in the file list, click **【 Work 】** to start the work.

3) Delete

Select one file in the file list, click **【 Delete 】** to delete the file in the mainboard.

4) All Delete

Delete all files saved in the mainboard.

5) Format

Format mainboard memory. All files saved in mainboard will be lost.

6) Download UFile

Download offline files (ud5 file) saved in computer to the mainboard. Click **【Download UFile】**, select the file to be loaded to mainboard, then click **【OK】**.

4.4.2 Other Machine Control

1. Origin

Set the current laser head position as origin.

2. Run Box

The laser head will run a rectangle in the outer space of the graphics at a certain distance according to the size of the processed graphics. This function is mainly used to confirm the real position of workpiece to be processed.

3. Clip Box

The laser head will cut a rectangle in the outer space of the graphics at a certain distance according to the size of the processed graphics. This function is mainly used to confirm the real size of workpiece to be processed.

4. Light

Press/release **【Light】** to turn on or turn off the laser.

5. Start

Start work for the current selected file in control panel.

6. Use/Continue

Click **【Use/Continue】** to suspend or continue the work.

7. Stop

Stop working of machine.

8. Datum

Click the button, laser head or (z-axis) will move to machine origin, when reach the limit position of machine, it will move to located position. This function can get rid of accumulative errors, and shall be operated before starting work normally.

9. **【X-】【X+】【Y-】【Y+】【Z-】【Z+】**

Move laser head (or Z-axis). Click the direction keys to move laser head (or Z-axis). Press to move, release the button, laser head (or Z-axis) stops moving.

10. Mark Cut

Click "" to start mark cut function.

11. Read Current Pos

Get the coordinate values of current position.

12. Move to Pos

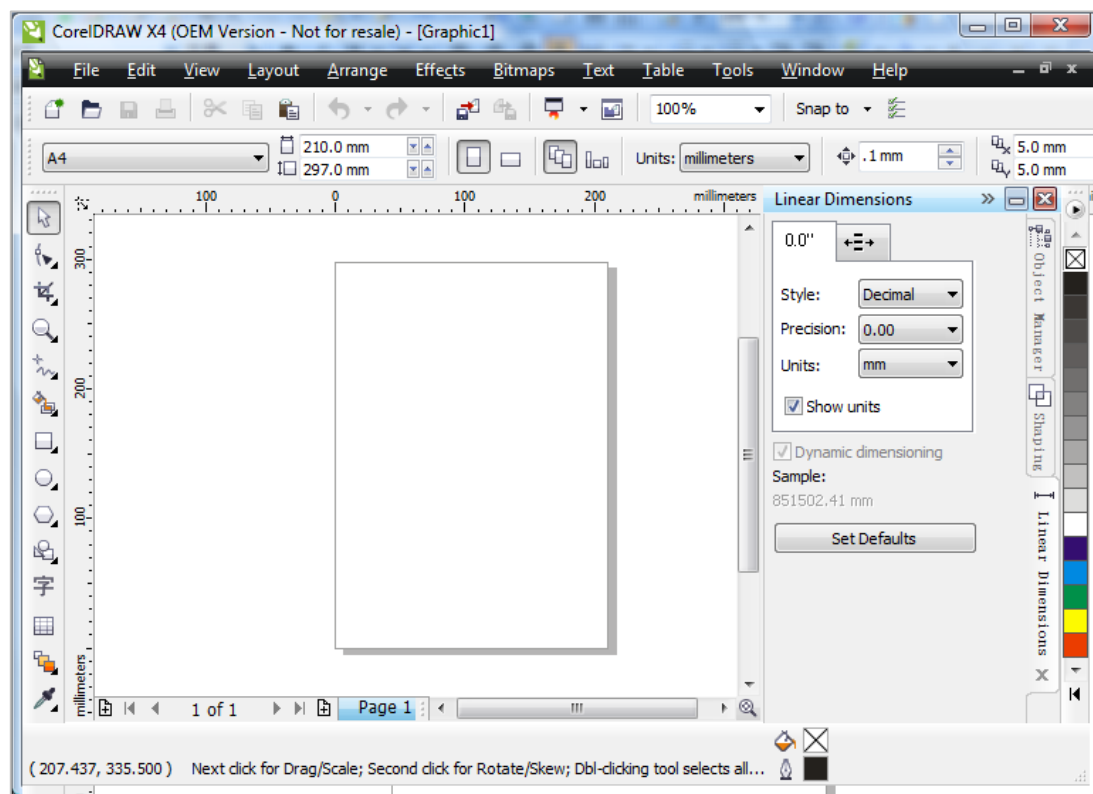
Input values in "", click **【Move to pos】**, and the laser head will move to this position.

5. CorelDraw Based Software

5.1 Manual Download Tool “AWCLaserCut”

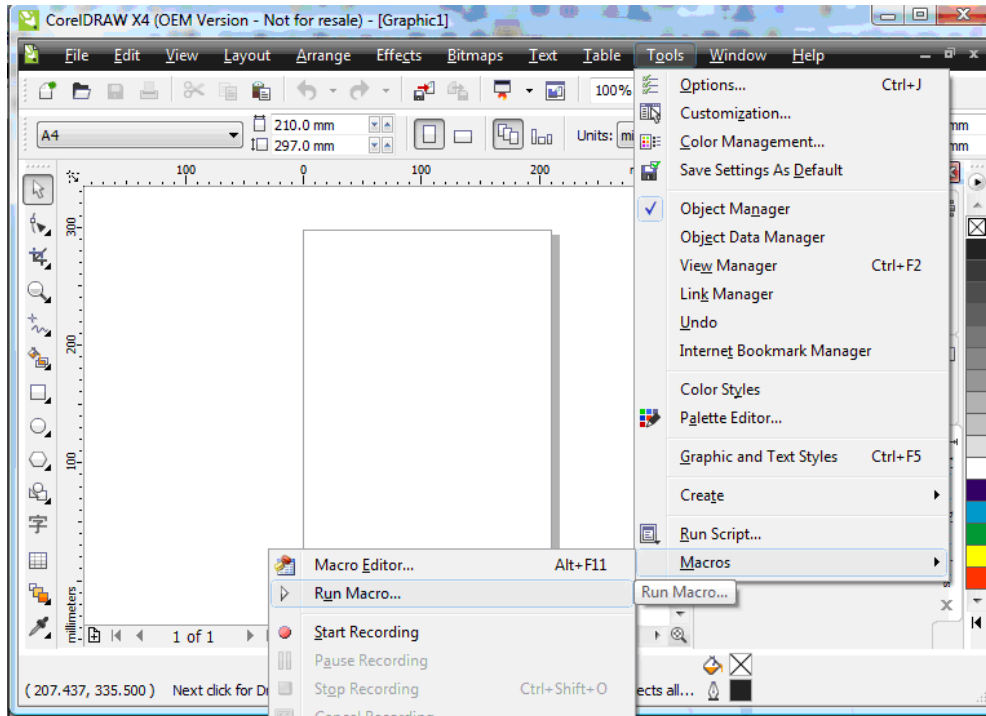
After installing CorelDraw direct output, (refer to Chapter 2 Installation of Software), start CorelDraw, Main interface of CorelDraw12 shown as Figure5-1-1.

Figure5-1-1 CorelDraw Main Interface



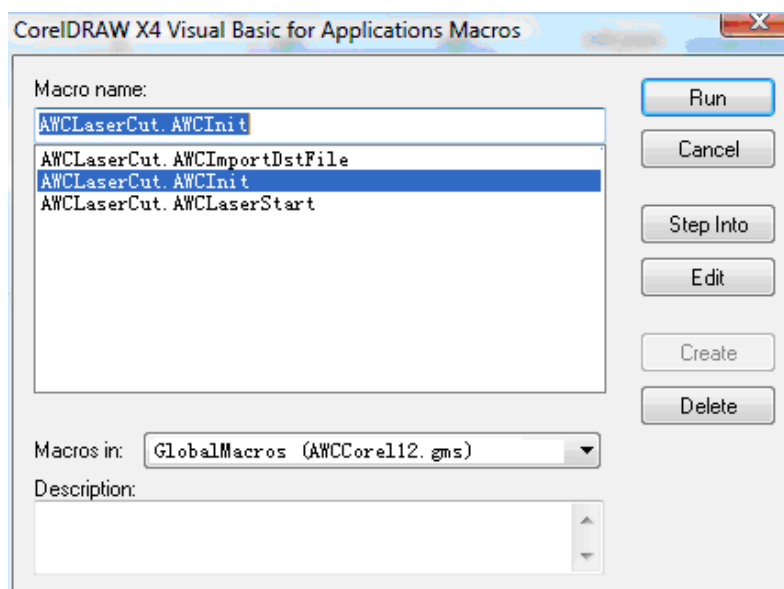
Click **【Tool】 / 【Macro】 / 【Run Macro】** .

Figure5-1-2 Run Macro Interface



Select **【 GlobalMacros (AWCCorel12.gms) 】** in **【 Macros in 】** , select **【AWCLaserCut.AWCInit】** in **【Macros name】** , then click **【Run】** .

Figure5-1-3 Macros Settings

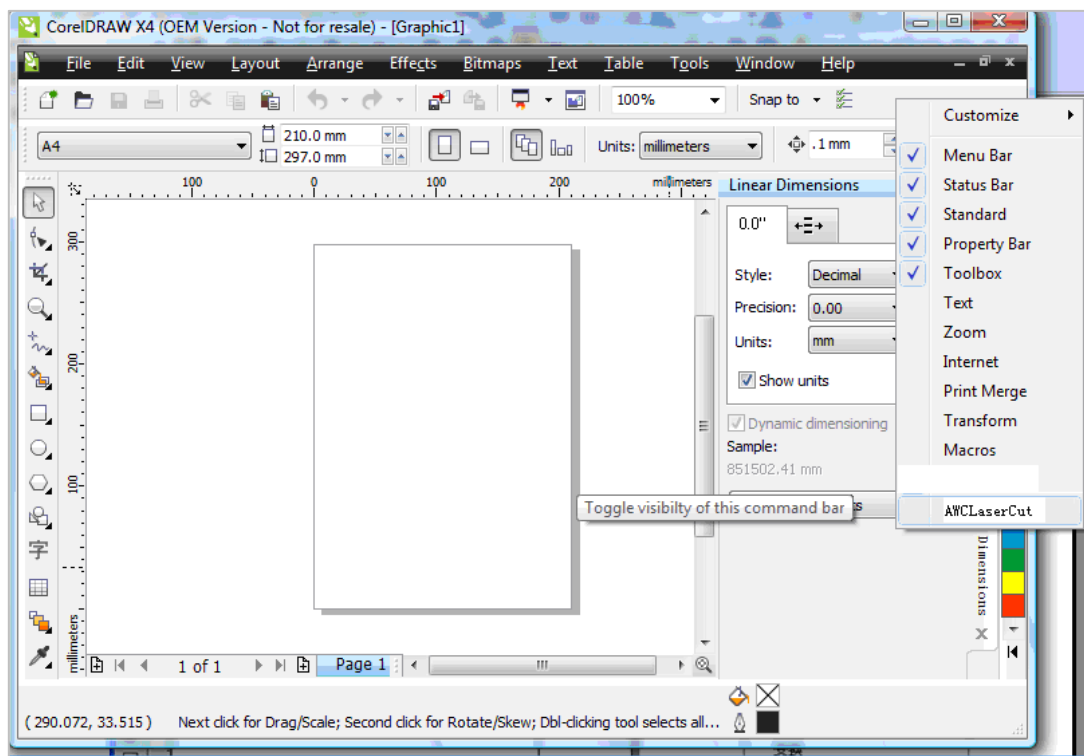


5.2 Display Hidden Toolbar “AWCLaserCut”

User will close toolbar “AWCLaserCut” carelessly during using CorelDraw, so hidden tool should be displayed.

Click the right button of mouse on the toolbar to display a list, then check **【AWCLaserCut】** .

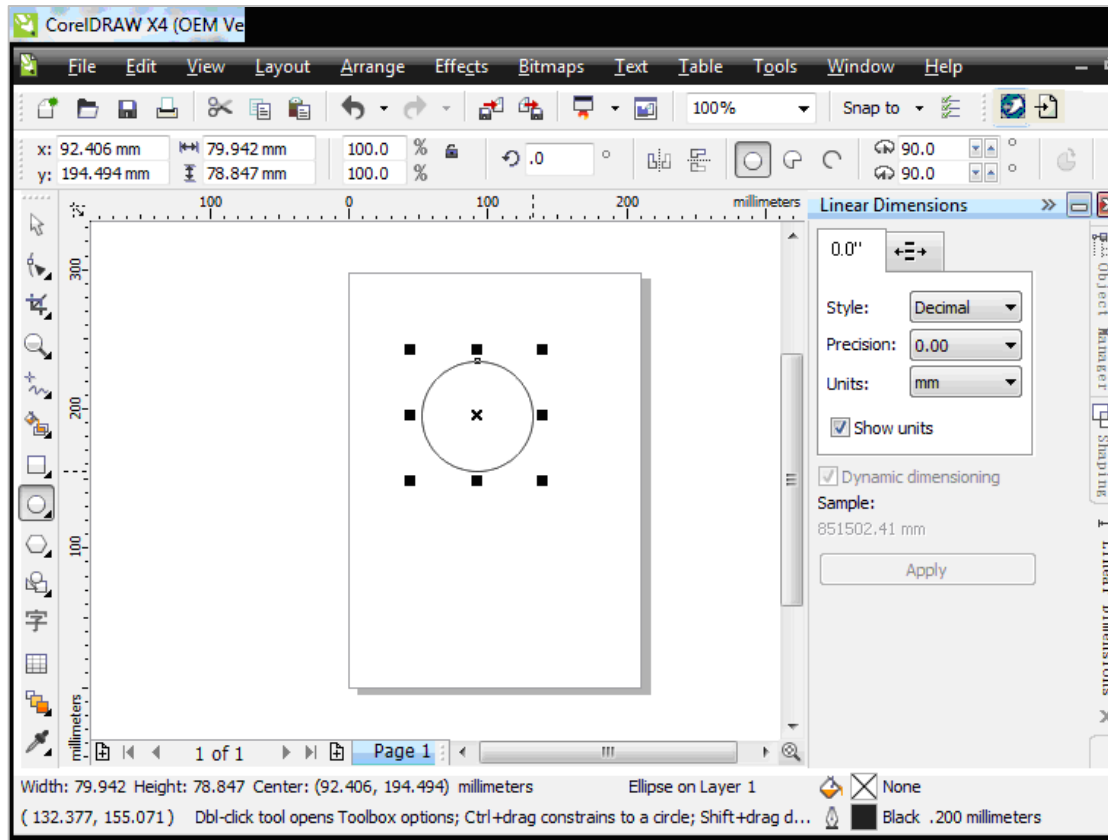
Figure5-2-1 Display Hidden Toolbar



5.3 Switch CorelDraw to LaserCAD

Edit graphics in CorelDraw.

Figure5-3-1 Edit Graphics




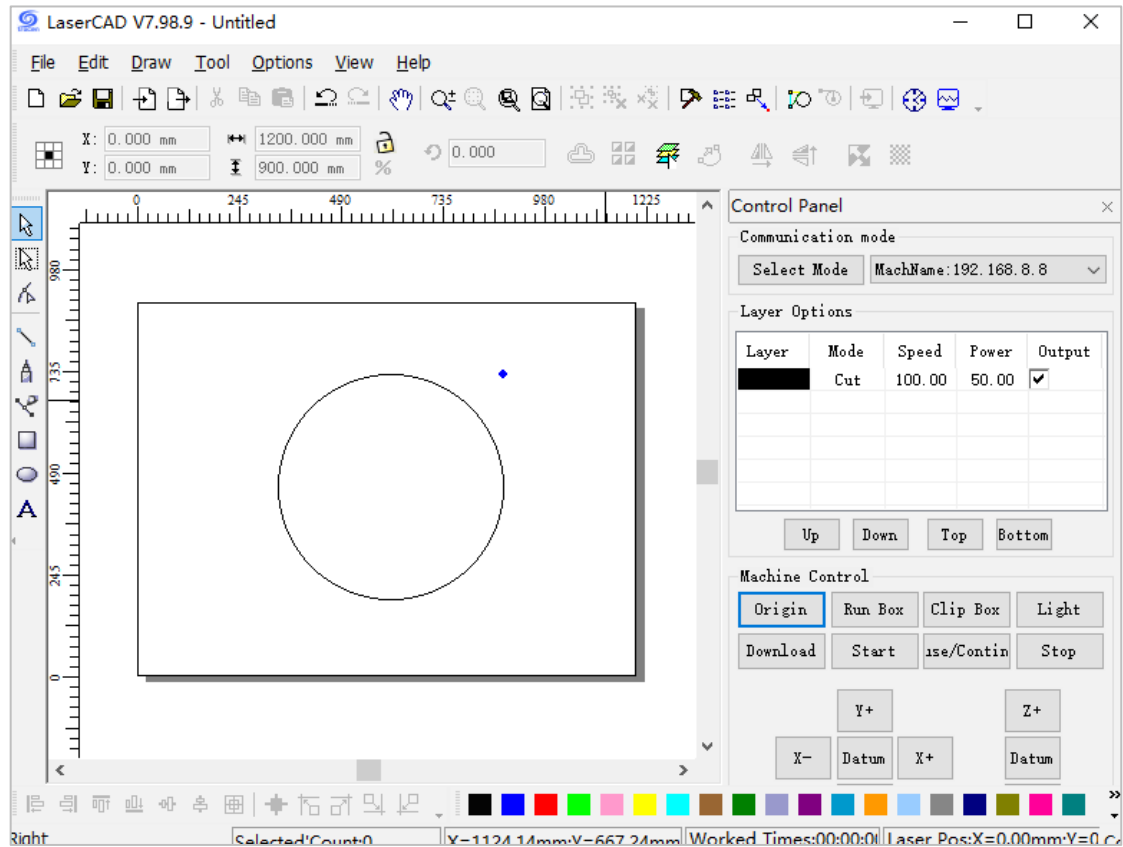
Click “” to switch to LaserCAD directly. And edited graphics in CorelDraw will display in the view of LaserCAD.

Figure5-3-2 CorelDRAW Switch to LaserCAD



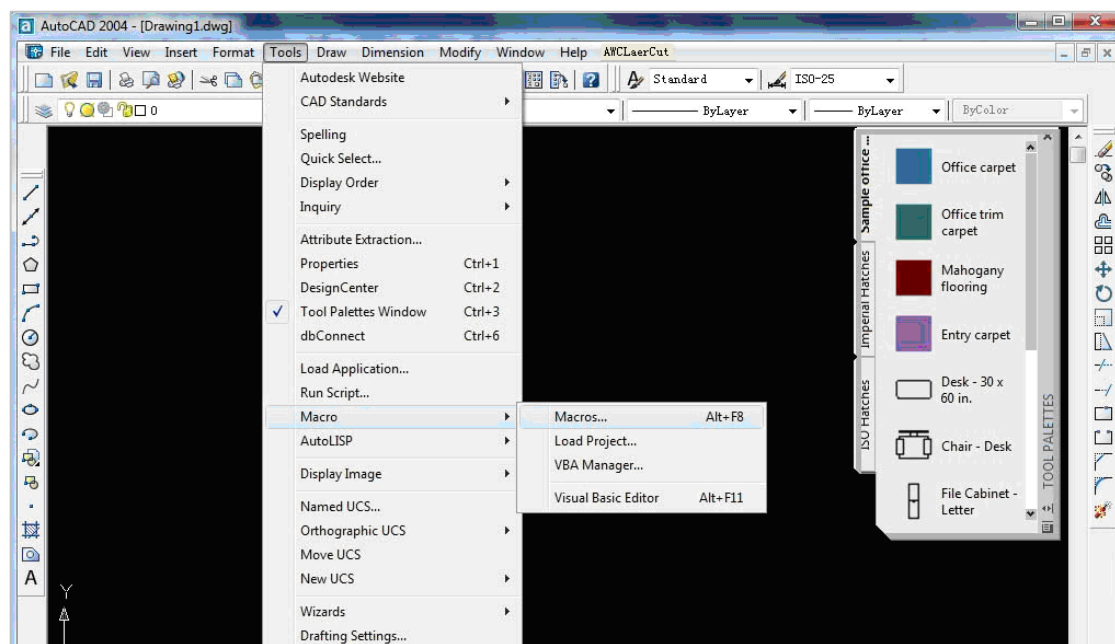
6. AutoCAD Based Software

6.1 ADD AWCLaserCut Toolbar.

After installing AutoCAD direct output, (refer to: Chapter 2 Installation of Software), start AutoCAD, the main interface doesn't display **【Laser machining】** and toolbar **【Laser machining】**, it should be downloaded manually.

Click **【Tools】 / 【Macro】 / 【Macro】** .

Figure6-1-1 Add AWCLaserCut Toolbar



In **【Macro name】** to select "...AWCLaserCut.AWC_Init_EN", and then click **【run】** ,menu "AWCLaserCut" and tool "AWCLaserCut" will display.

Figure6-1-2 Macros Settings

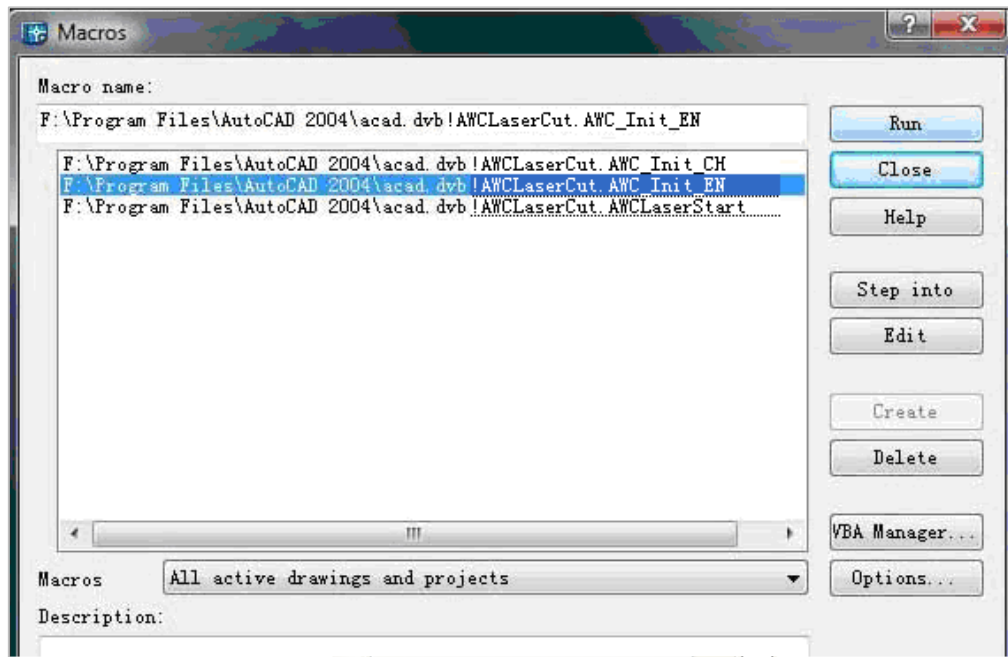
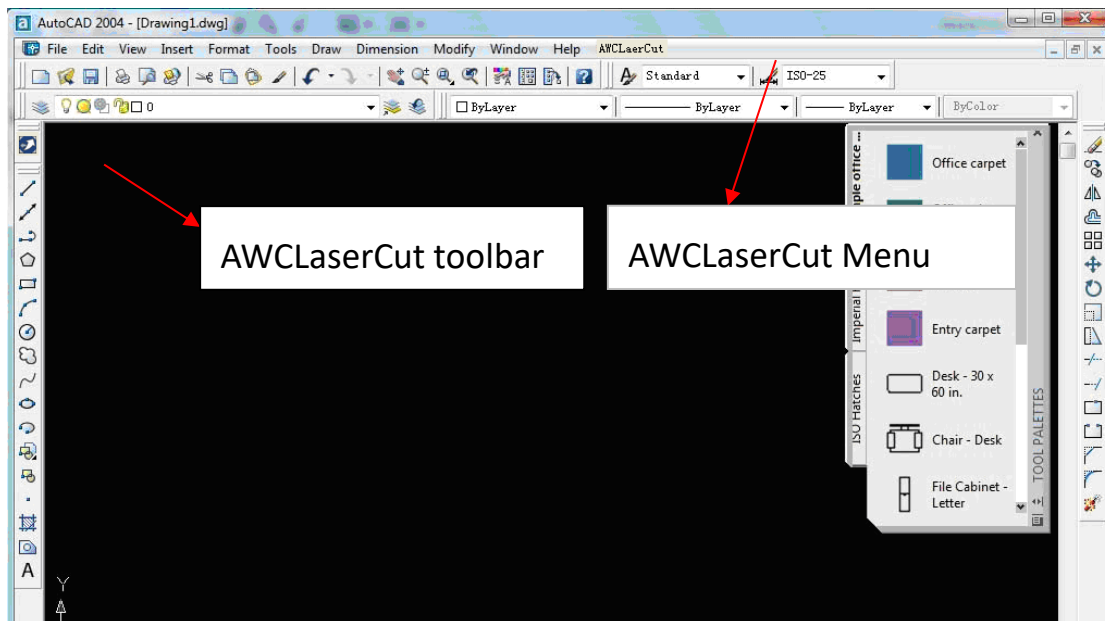


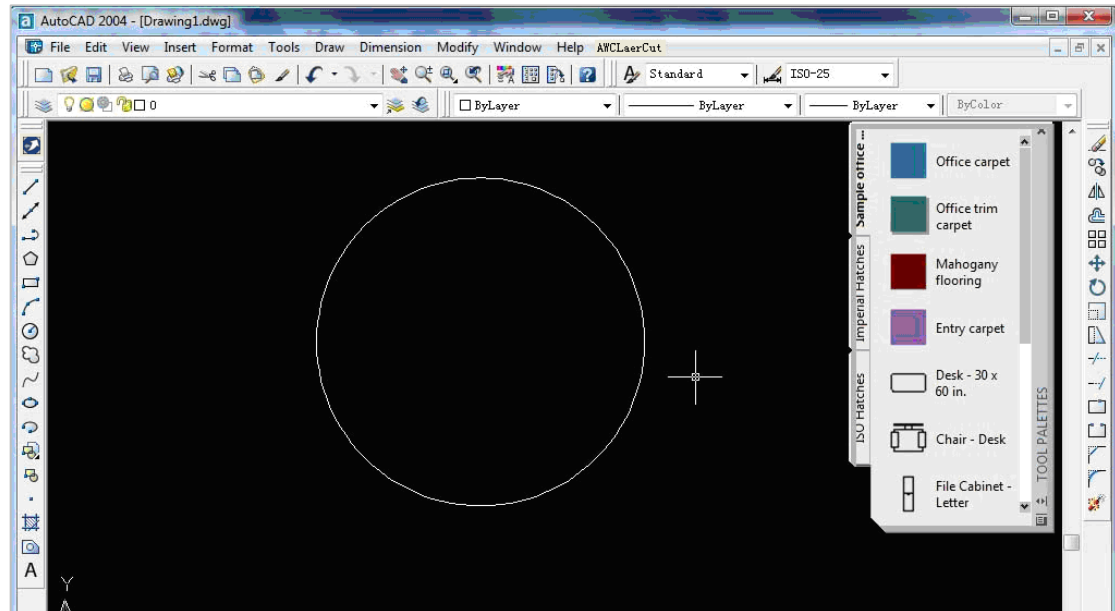
Figure6-1-3 AutoCAD Interface



6.2 Switch AutoCAD to LaserCAD

Edit graphics in AutoCAD.

Figure6-2-1 Edit Graphics




Click menu 【AWCLaserCut】 / 【LaserCut】 ,or click “” to switch to LaserCAD and the edited graphics in AutoCAD will display in the view of LaserCAD.

Figure6-2-2 Switch to LaserCAD

