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1. Profile

1.1 Introduction

LaserCAD is Trocen Laser Control System specialized windows version software. This manual is to introduce how to use software to complete machining task.

1.2 Software Versions

It includes three versions: General Version (LaserCAD), CorelDraw based version, AutoCAD based version.

1.3 Software Features

- Friendly interface, easy to learn, simple to operate.
- Be compatible with AI、BMP、PLT、DXF、DST formats
- Can create simple graphics, characters and edit & layout imported data.
- Can machine 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 function during working.
- Multiple saving modes of image and working parameter, and can be recycle.
- Function of estimating working time and cost budget, intelligent input.
- Array input, immediately output and go back to origin to output orientation mode.
- Unique double laser systems working intermittently, working independently and motion trial with function of offset and control
- Set the working start point, working path, dock position of laser head according to different requirement.
- Be compatible with multiple communication modes. User can use USB communication and network communication according to situation.
- Support CorelDraw direct output version, AutoCAD direct output version.
- Engrave photograph directly, support rotating engraving.
- Support slope engraving.

1.4 Operating System Environment Requirement

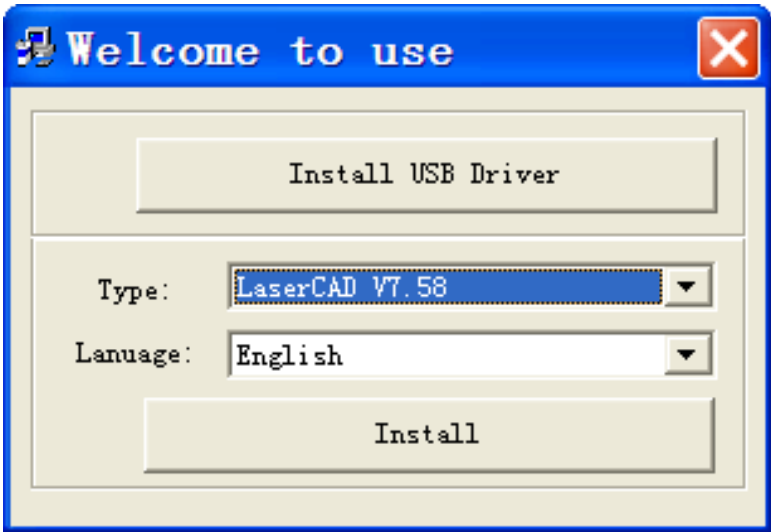
Run on Windows(Window XP、Vista、Win7、Win8、Win10) system

2. Installation

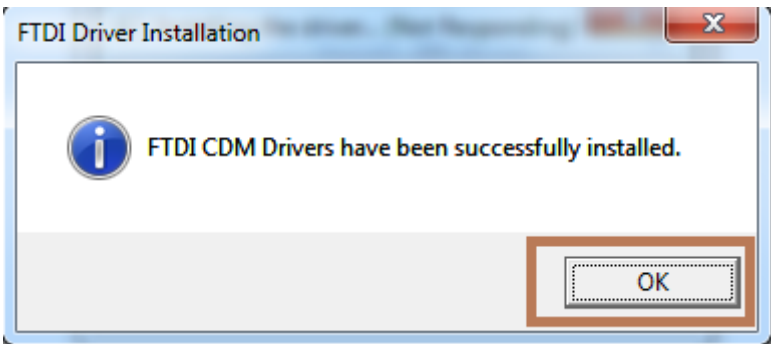
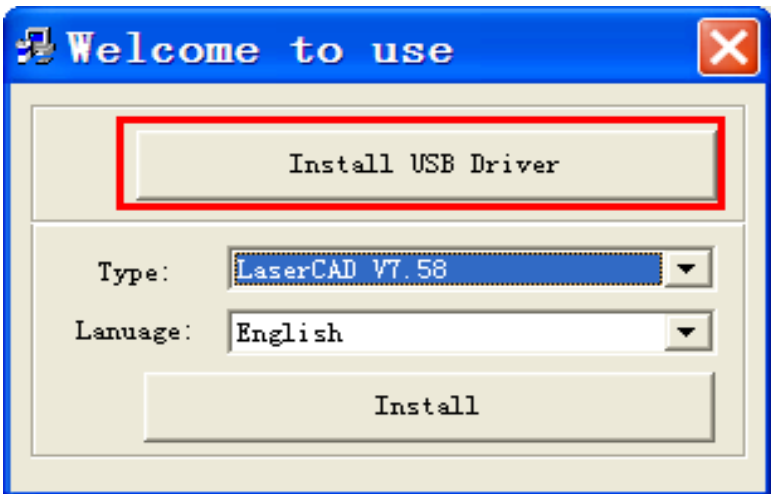
2.1 Access to installation directory

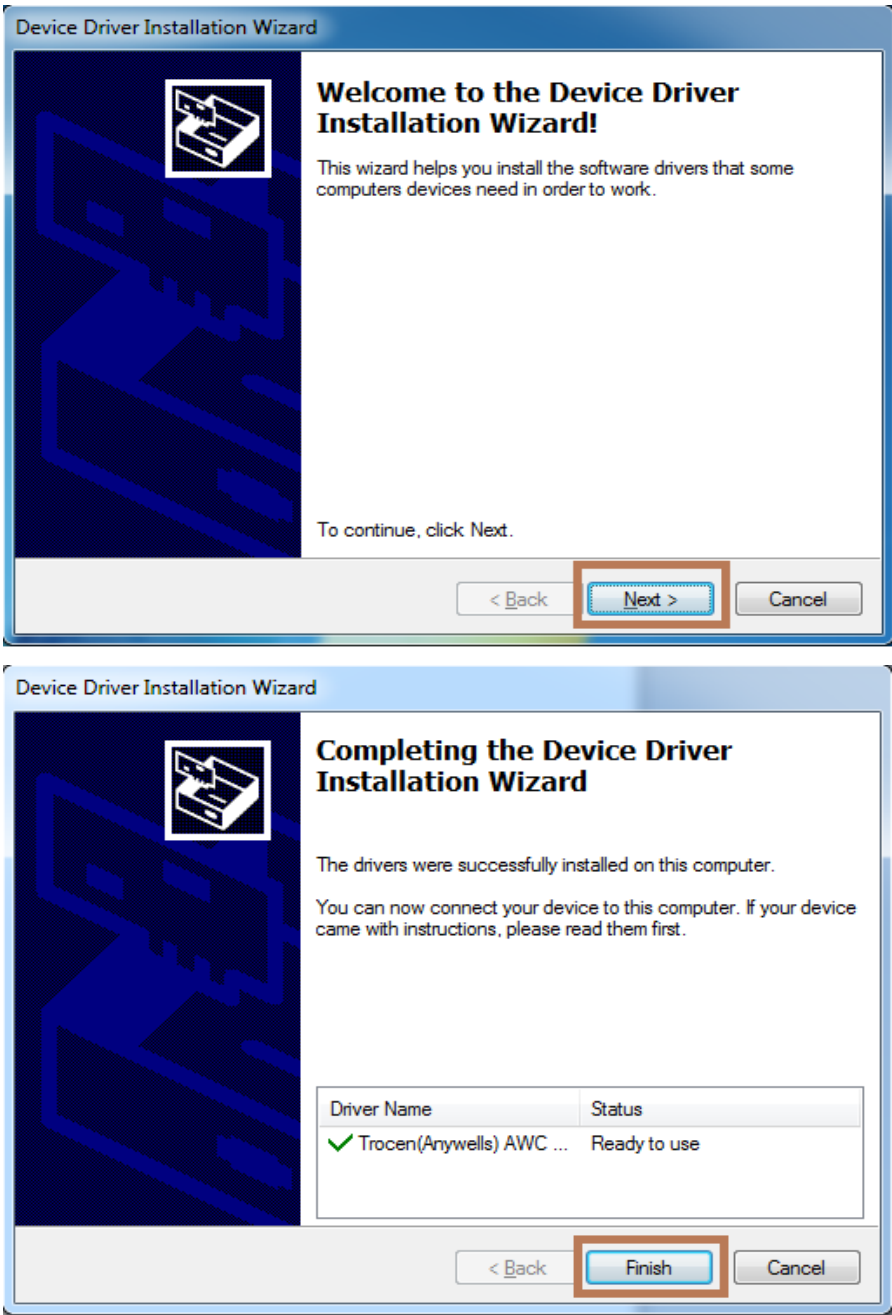


Double click “Setup.exe”:



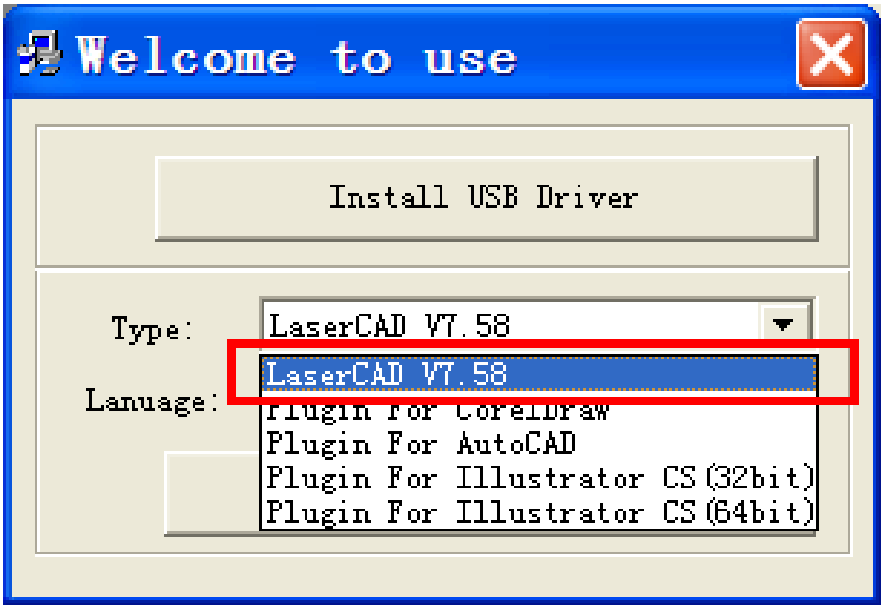
2.2 Install USB Host

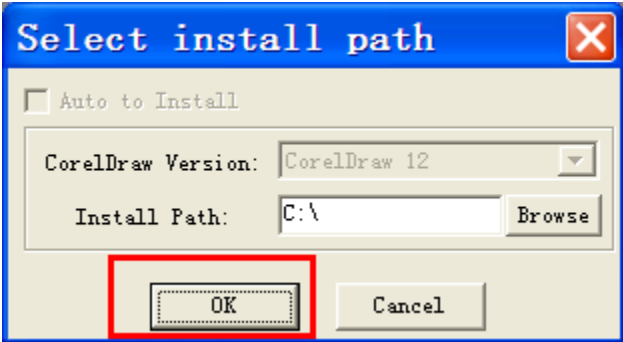
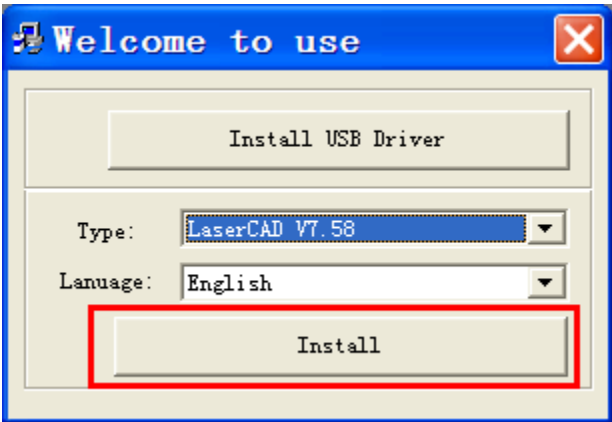




2.3 Install LaserCAD software independently

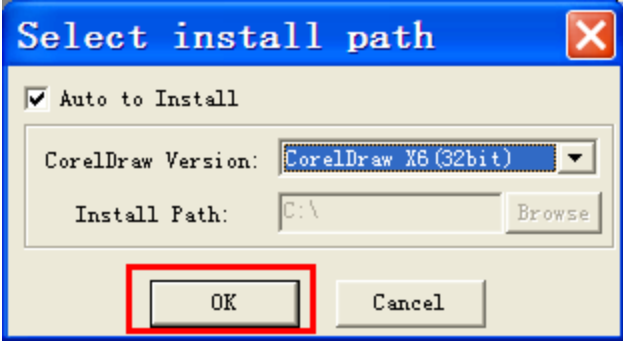
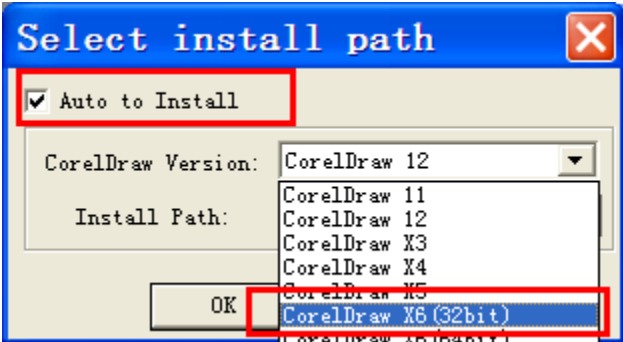
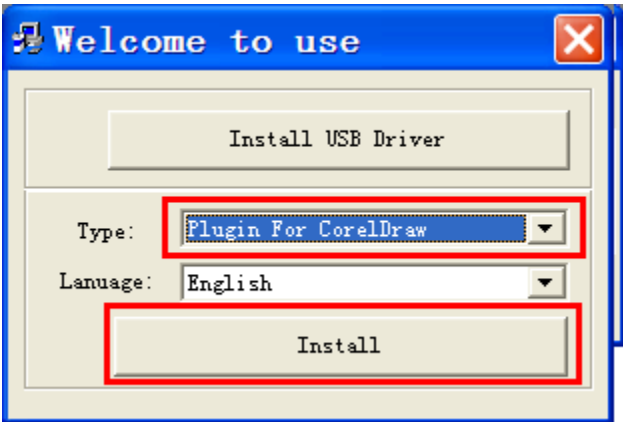
as follow:





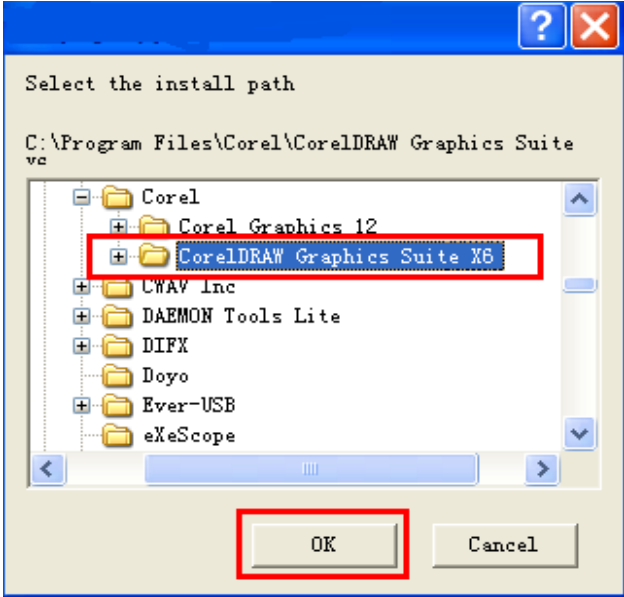
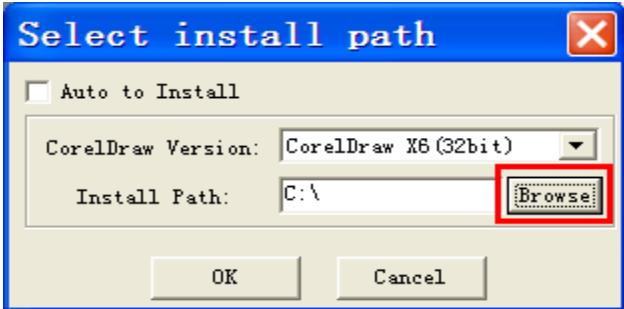
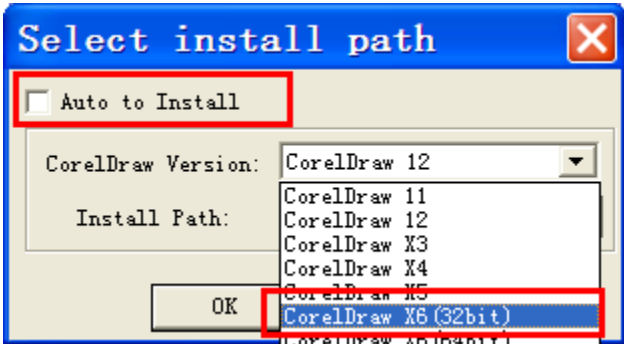
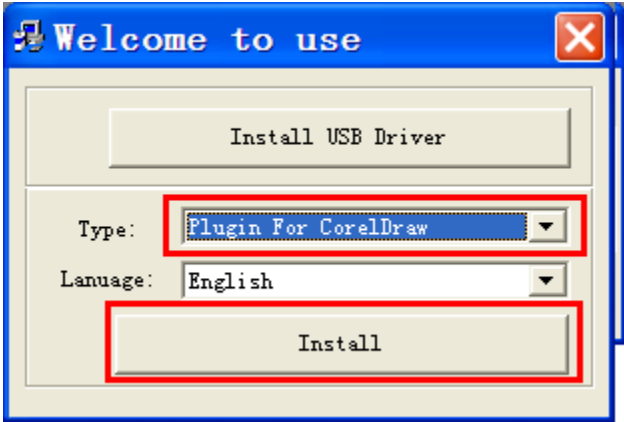
2.4 Automatically search Coreldraw categories installation

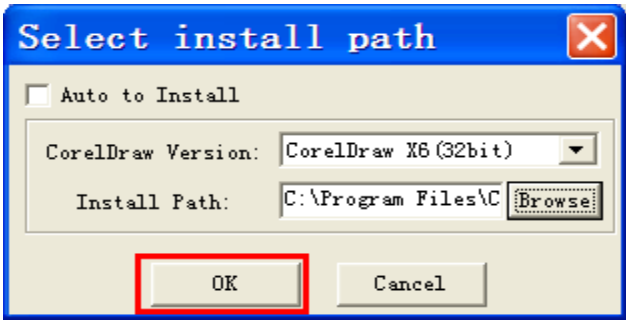
as follow:



2.5 Manually install Coreldraw plugin

as follow:



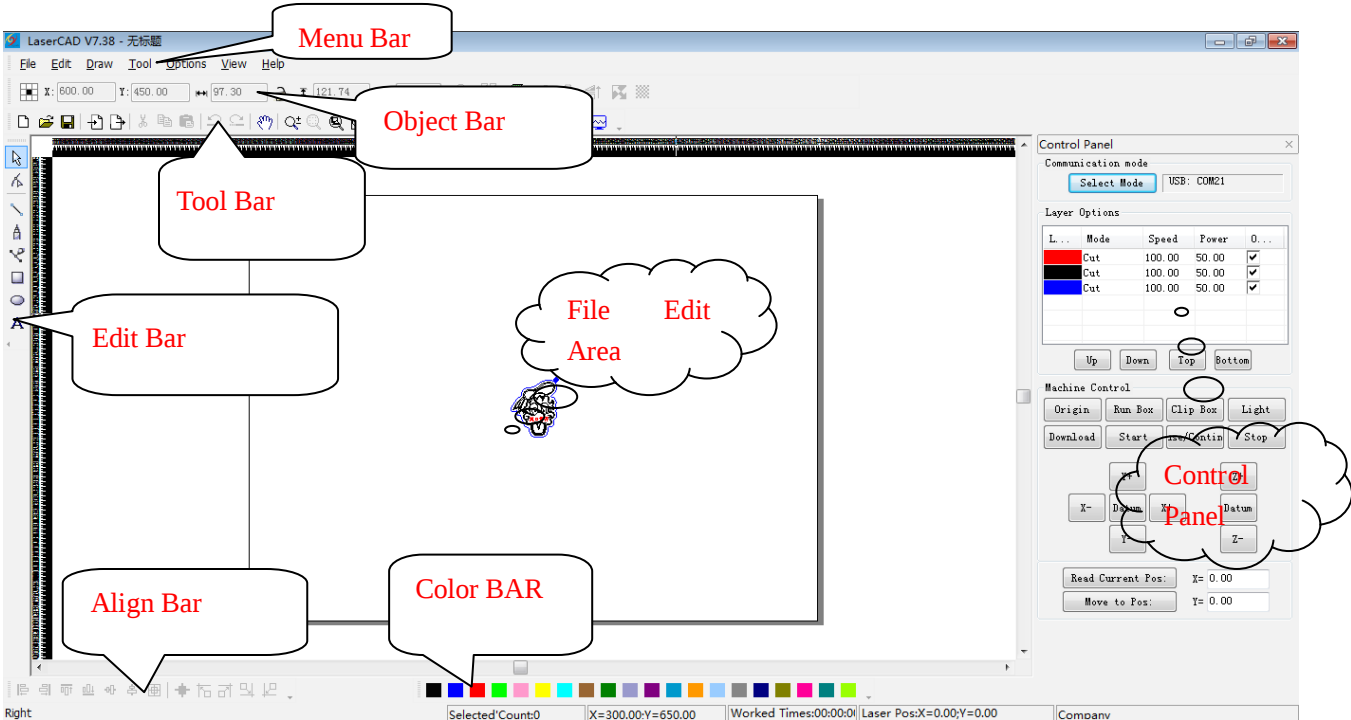


2.6 Similar Coreldraw plugin installation

please refer chapter 2.4 and 2.5

3. Software Application

3.1 Software Main Interface Introduction



- **Menu bar**
Main function is to execute command options in menu bar. Executing command options is the basic operation; Menu bar includes 7 functions like file, edit, draw, tool, options, view and help.
- **Tool bar**
There are some functions completed by command buttons in tool bar. Most of these functions are sorted from menu bar.
- **Object bar**
Provide selecting object during operation and relevant properties during using tool. It can control the change of object by setting relevant properties in property bar.
- **Draw bar**
It's on the left of working area. With draw tool in draw bar, it makes operation more flexible and convenient.
- **Align bar**
Make align multi objects to perfect the layout of page.
- **Color bar**

Alter the color of selected object

- **Control panel**

Use control panel to finish several tasks of laser machining, including  setting communication IP, setting layer parameter, loading graphic and so on.

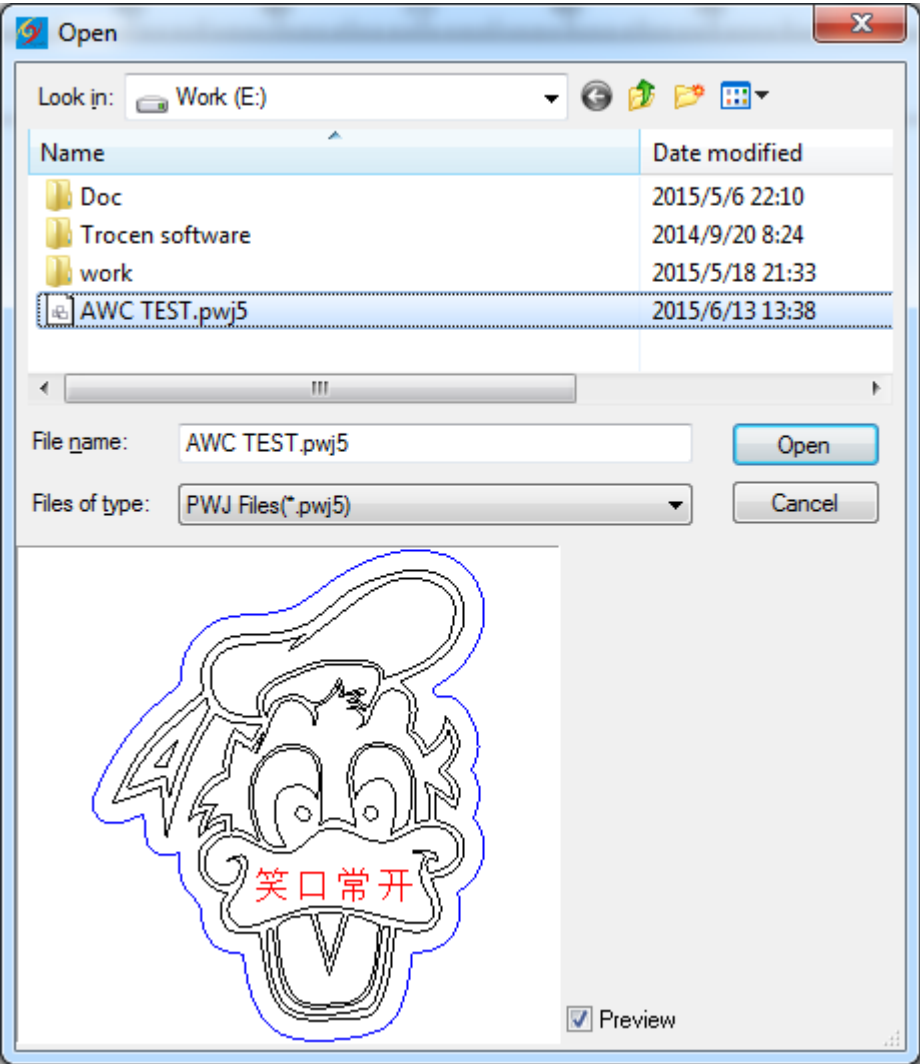
3.2 File Management

3.2.1 New File

Click File menu and select “New File” option or click system tool bar icon  to create a new file.

3.2.2 Open File

Click File menu and select “Open” option or click system tool bar icon  to find file category then select the file and double click. The opened file suffix is pwj5.

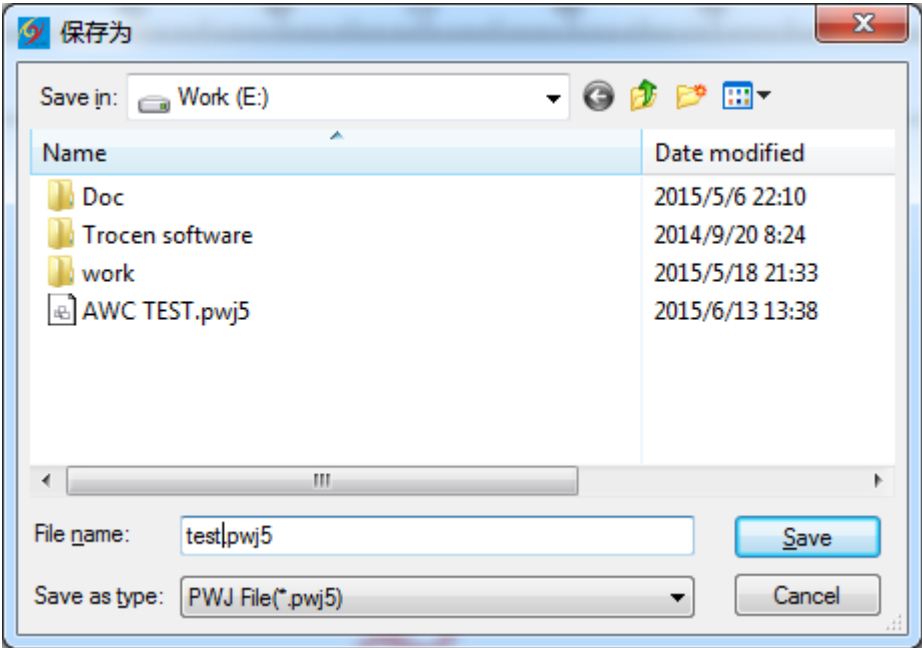


- **Preview**

graphic option help you to preview the file you selected.

3.2.3 Save File

Click File menu and select “save” option or click system tool bar icon  to find file saving category then import file’s name and click save it. The saved file suffix is pwj5.

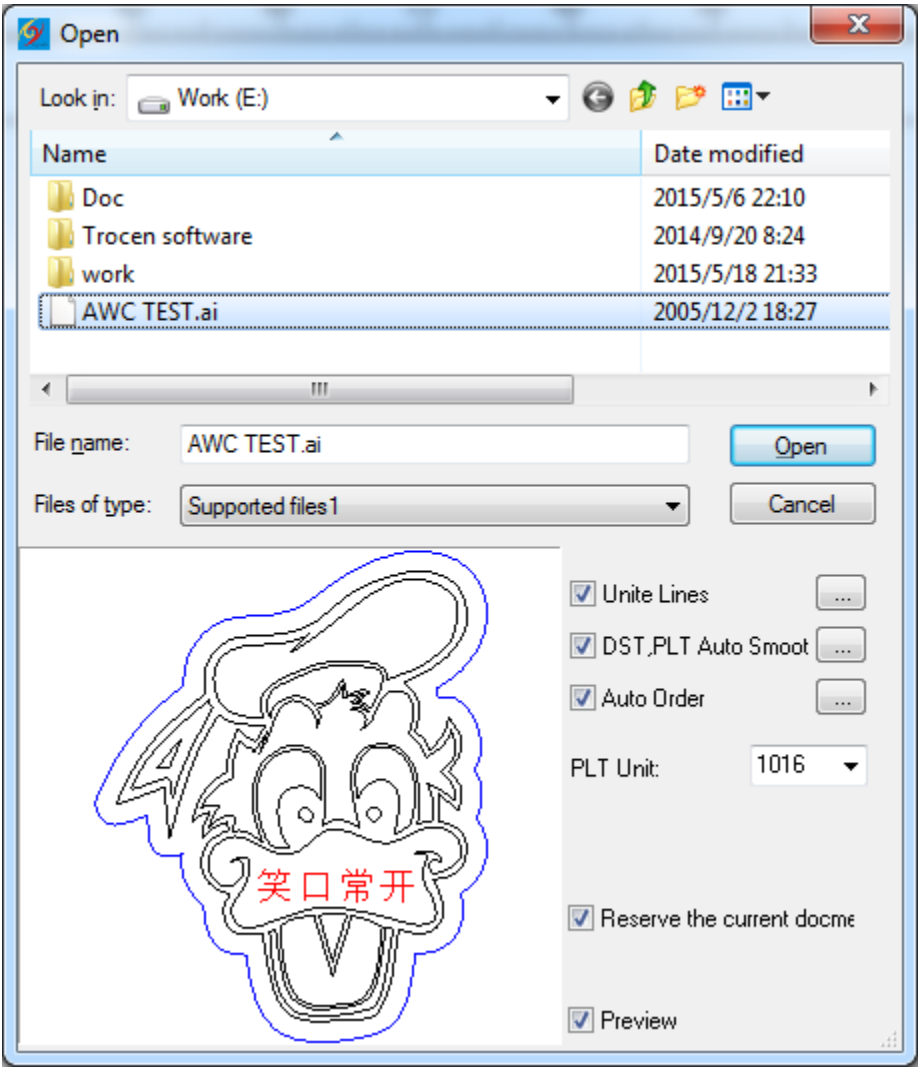


3.2.4 Save as...

Click File menu and select “save as”option to find file saving category then import file’s name and click save it.The saved file suffix is pwj5.

3.2.5 Import file

Click File menu and select “Import”option or click system tool bar icon  to find file saving category.Double click the file needed to be imported to finish it.This software support files with the following suffix:AI DXF PLT DST DSB BMP GIF JPG PNG MNG ICO TIF TGA PCX JBG JB2 JBC PGX RAS PNM SKA RAW.



- **Unite Lines**

Multiple connecting segments in graphic can be merged into a segment while importing the file.

- **DST,PLT Auto Smoothing**

Smoothing the curve to improve the cutting speed and stability while importing the graphical parameters of DST,PLT files.

- **Auto Order**

The graphic data objects will be automatically sorted while importing the file.After auto order,the laser processing head will go through the shortest path.

- **Reserve the current document**

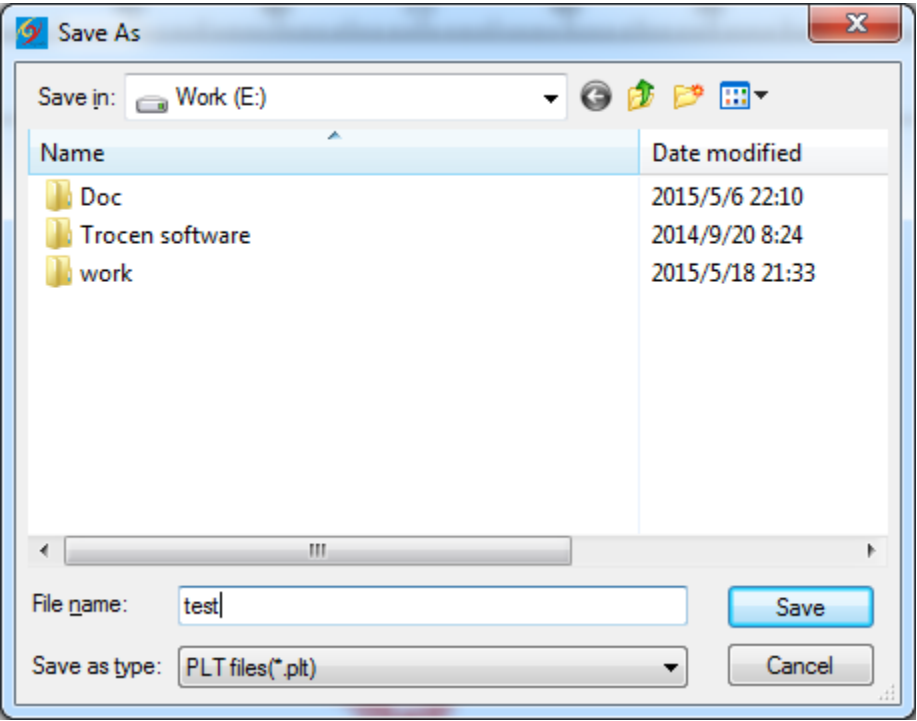
The file retained before importing new file.After importing file,the graphic data includes original graphic data files before and after importing.

- **Preview**

Displaying the graphic while a file was selected.

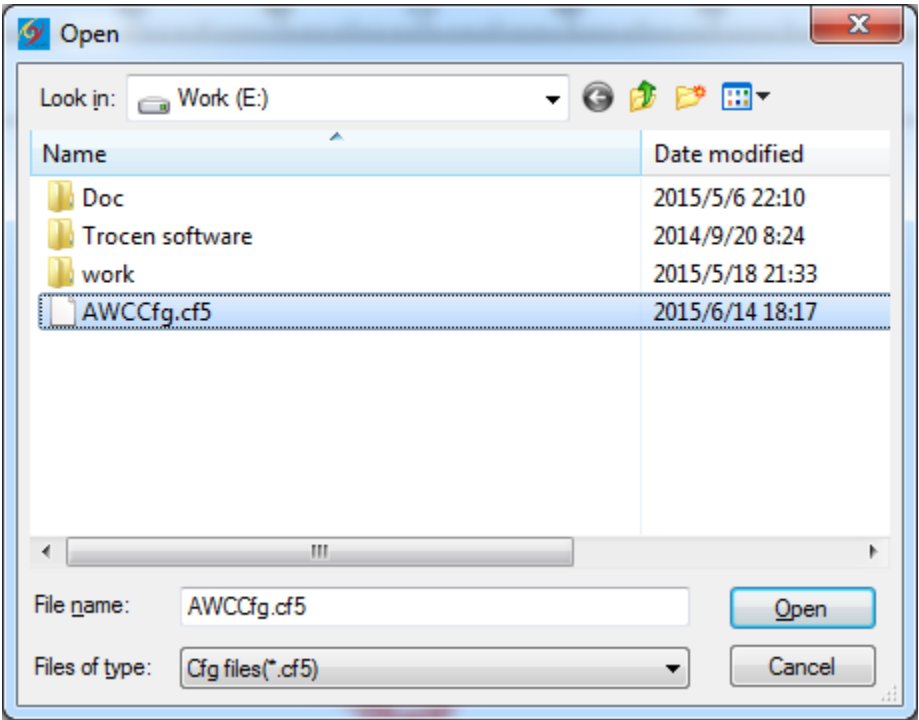
3.2.6 Export file

Click File menu and select “Export”option or click system tool bar icon  to find file exporting category then input file name and click save to finish it.The saved file suffix is PLT.



3.2.7 Import Machine Configuration

Click File menu and select “Import Machine Configuration”option to find the path of machine configuration file .Then double click machine configuration file to finish it.

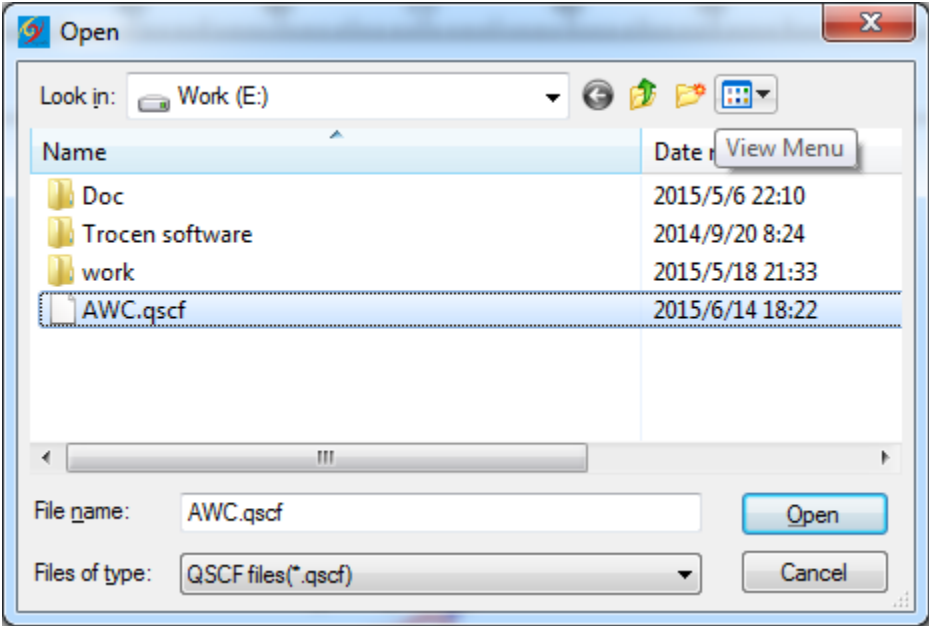


3.2.8 Export Machine Configuration

Click File menu and select “Export Machine Configuration”option to find the path of saving machine configuration file.Then input file name of the file,click save to finish it.The exported file suffix is CF5.

3.2.9 Import Software Configuration

Click File menu and select “Import Software Configuration”option to find the path of machine software file .Then double click software configuration file to finish it.The suffix of the software configuration is qscf.



3.2.10 Export Software Configuration

Click File menu and select “Export Software Configuration”option to find the path of saving machine configuration file.Then input file name of the file,click save to finish it.The exported file suffix is qscf.

3.3 Object Selection And Conversion

3.3.1 Object Selection

The first thing is selecting object when drawing and editing the graphic. When the object is in a selected state, there will be a “X”shaped mark in the center. Around it is 8 control points with the color of **【Selected Object Color】**

Click the **【Select】** in the **【Draw】** list or click edit tool bar  to switch into “Selection” state. In this state you can select object. Five objects selection way are as following:

Click **【 All Select】** in **【 Edit】** list (Shortcuts Ctrl+A) to select all objects.

Click to select single object

Click object with mouse as follow:

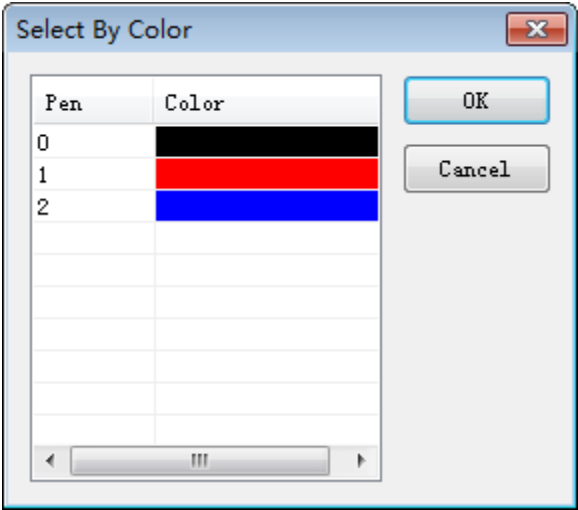


Frame selection

Hold down the mouse and move. All objects touched by the cursor will be selected.

Add /Reduce selection objects:

- Add
first select the first object and hold down shift. Then click (or frame select) other objects which you need to add.
- Reduce
Press shift and click (or frame select) the selected graphic files. Then the clicked (or frame selected) object will be reduced from selected objects.
- Select object by layer color
-  Click object operation bar



Select the object color and press **【OK】**. It means all objects with this color layer will be selected.

3.3.2 Change Object Color

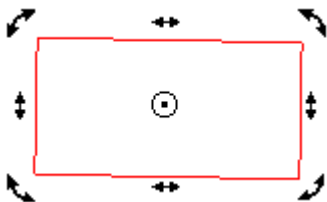
Object color is the outline color of object.It can be changed by clicking random color tool button in the layer tool bar.



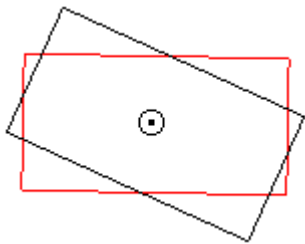
3.3.3 Rotate Object

Use object operation bar  to rotate the object.Input rotate angle you need in .Then click  to finish it.

Select Edit tool bar ,double click the object which you need to rotate or tilt and enter the relative mode.At this moment the control point around the object exchanged into . Rotate control arrow and  tilt control arrow.As follow:



Move the cursor to rotate arrow and drag the control points along the direction of the arrow controls;during the process,some outline frame wires will follow to rotate.Like the following picture:



Rotate it to properly position and loose the mouse to finish it.

3.3.4 Change Object Size

Use  (Select tool)click to select object which need to be zoomed or changed.And move control points of object to change the object size.This method is easy but with low precision.

In object operation bar    (zoom size)text frame input horizontal size number and vertical size number and press “Enter”to finish.

Click  to ,any changes on one number,another will be changed with According to the proportions of the object.

3.4 File edit

3.4.1 Undo

Click **【Undo】** in **【Edit】** list or click  to cancel the last operation.

3.4.2 Redo

Click **【Redo】** in **【Edit】** list or click  To recover the cancel action.

3.4.3 Cut

Select one object and click **【Cut】** in  **【Edit】** list or click  to cut a file part.

3.4.4 Copy

Select one object and click 【Copy】 in 【Edit】 list or click  to copy a file part.

3.4.5 Paste

Select one object and click 【Paste】 in 【Edit】 list or click  to paste a file part

3.4.6 Delete

Select one object and click 【Delete】 in 【Edit】 list to delete a file part

3.4.7 All Select

Click 【All Select】 in 【Edit】 list to select all file parts in one graphic.

3.4.8 Group

Select needed file parts and click 【Group】 in 【Edit】 list or click  to build a graphic group with separated selected graphics.

3.4.9 Ungroup

Select needed graphic group and click 【Ungroup】 in 【Edit】 list or click  to split a completed graphic file group into separated graphics.

3.4.10 All Ungroup

Select needed graphic group and click 【All Ungroup】 in 【Edit】 list or click  to split All file group into separated graphics.

3.4.11 Move

Click  【Move】 in 【Edit】 list or click  and cursor changes into  size. hold down mouse left button and you can move the graphic.

3.4.12 Zoom

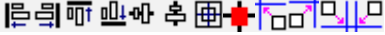
Click 【Zoom】 in 【Edit】 list or click . And mouse left button click graphic to enlarge it; right button click graphic to narrow it.

Click 【Zoom to selected】 in 【Edit】 list or click  to make the selected objects completed displayed.

Click 【Zoom to all】 in 【Edit】 list or click  to make all objects completed displayed.

Click 【Zoom to page】 in 【Edit】 list or click  to make a full page in graphic completed displayed.

3.4.13 Align

Select graphic and click 【Align】 in 【Edit】 list on relative list options or click  to finish it.

3.4.14 Nudge Offset

Select graphic and click 【Align】 in 【Edit】 list on relative options to make a tiny adjustment for the graphic.

3.4.15 Convert To Leftover

Convert to leftover belongs to affiliated graphics of array file. It is used for add other graphics in empty places in array layout. Normal application is electric double laser head array processing. In the blank area of array graphic add cutting box file to save materials.

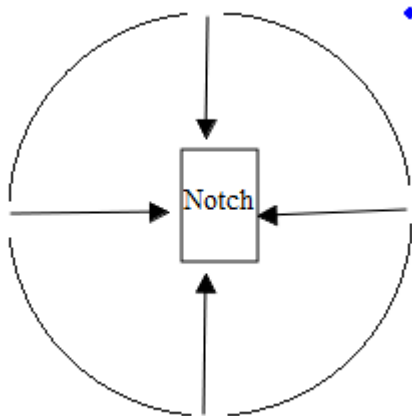
3.4.16 Convert LastRow To Leftover

This option is used to add other graphics in the last row of an array of typesetting.

3.4.19 Manual Notch

When work piece is being cut,A part of it will be remained in the edge in case that it falls down.We call this part as Notch.

Select graphic and click 【 Manual Notch 】 in 【 Edit 】 list.Input notch width.Then move cursor to graphic edge.After the cursor become “+”,double click to add notch.



3.5 Draw

3.5.1Select

Select graphic and click 【 Select 】in 【 Draw 】list or click  button to change edit state into select mode.

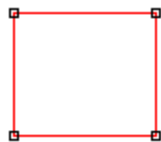
3.5.2 Edit Node

Click 【 Edit Node 】 in 【 Draw 】 list or click  button .In the right side of object operation bar will

appear tools :  (add node)  (delete node)  (connect node)  (separate node).

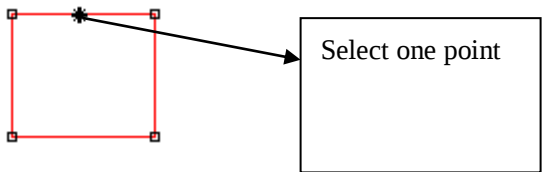
Use mouse to select items.Node point of selected file will be presented as small rectangle“□”

A selected rectangle as follow:



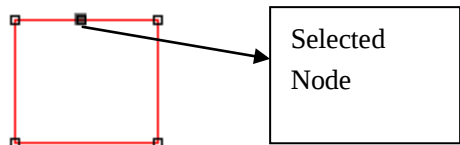
Select points of file

Click selected file or select one point of this file.It is marked as “✱”.



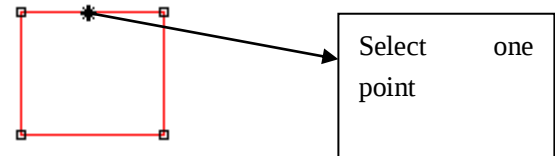
Select node of file

Click the node point of file to select it.It will be marked as “■”as follow:

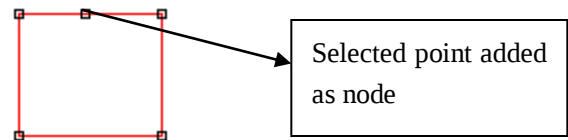


※Click the selected node of file.At the same time,press “Shift”button to select multi nodes of file.

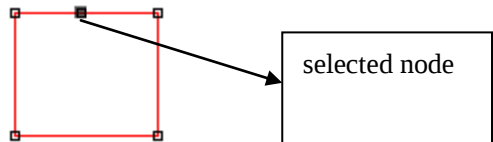
Add Node
Select one point of selected file,as follow:



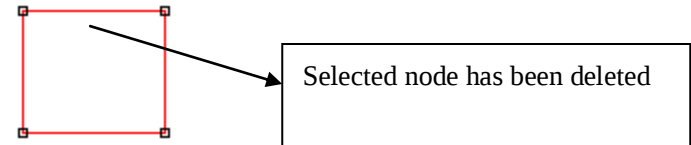
Click 【 Add Node 】in 【 Edit 】list or click  in object operation bar and selected point is the added node of file.As follow:



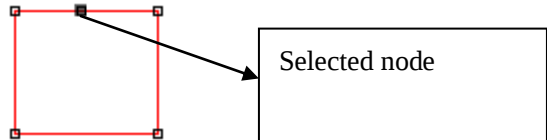
Delete Node
Select one node in the selected file as follow:



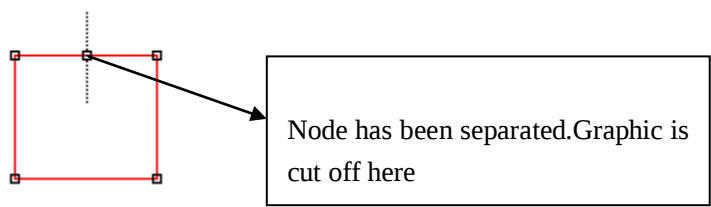
Click 【 Delete Node 】in 【 Edit 】list or click  in object operation bar and selected point is the added node of file.As follow:



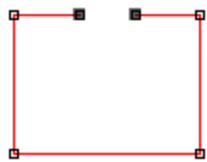
Separate Node
Select one node in selected file,as follow:



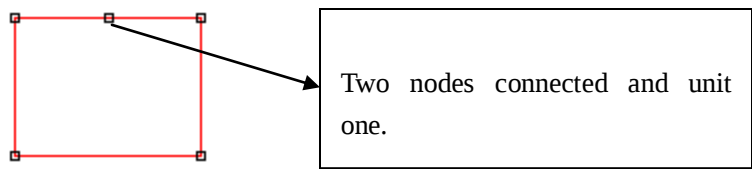
Then click 【 Separate Node 】 in 【Edit】 list or click object operation bar  to separate the node.As follow:



Unit Node
Select start node and end node in selected file,as follow:



Then click 【 Unit Node】 in 【Edit】 list or click object operation bar  to unit the node.As follow:



3.5.3 Line

Click 【Line】 in 【Draw】 list or click Edit Tool Bar .Then drag the mouse to draw any line.

※When drawing line,press “Ctrl”and move mouse to draw a level line.

3.5.4 Polyline

Click 【Polyline】 in 【Draw】 list or click Edit Tool Bar .Then drag mouse and click it to draw any line.

3.5.5 Rectangle

Click 【Rectangle】 in 【Draw】 list or click Edit Tool Bar .Then drag mouse to draw any rectangle.

※When drawing rectangle,press “Ctrl”and move mouse to draw a cube.

3.5.6 Ellipse

Click 【Ellipse】 in 【Draw】 list or click Edit Tool Bar .Then drag mouse to draw any ellipse.

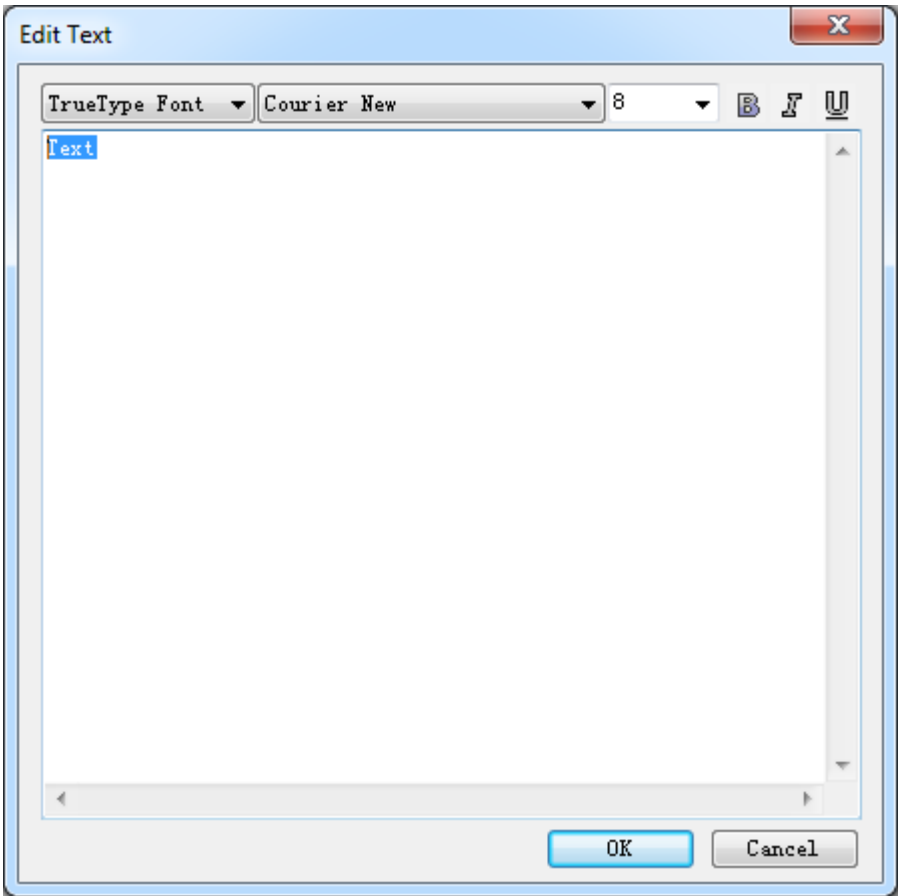
※When drawing ellipse,press “Ctrl”and move mouse to draw a circle.

3.5.7 Bezier

Click 【Bezier】 in 【Draw】 list or click Edit Tool Bar .Then drag mouse to draw a Bezier.

3.5.8 Text

Click 【Text】 in 【Draw】 list or click Edit Tool Bar .Then Double click mouse left button in screen ,a dialog as follow:

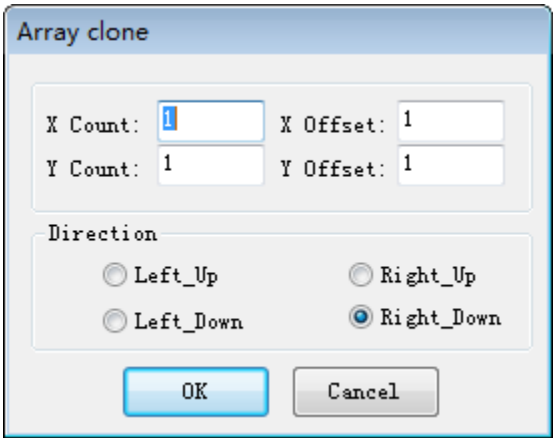


Input characters in dialog and set fonts and size. Then press OK to add a text to graphic.

3.6 Tool

3.6.1 Array Clone

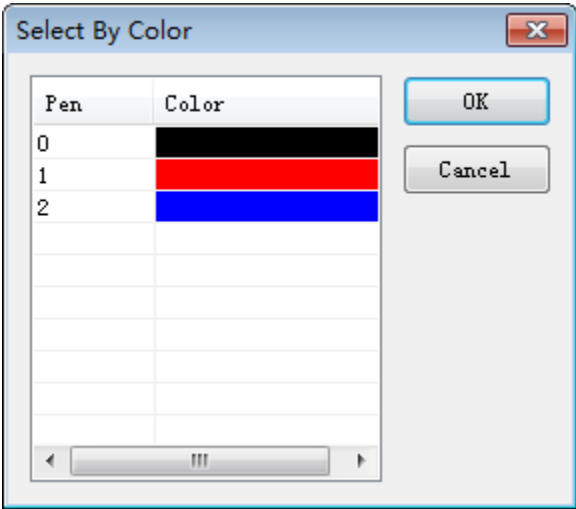
Select edit tool bar . Then select the clone file and press object operation bar  and a dialog as follow:



Input 【X Count】 , 【Y Count】 , 【X Offset】 , 【Y Offset】 and select 【Direction】 . Then Press OK to finish it.

3.6.2 Select by Color

Click object operation bar . A dialog as follow:



Select relative file color and press 【OK】 .Then all files belong to this color will be selected.

3.6.3 Mirror Horizontally

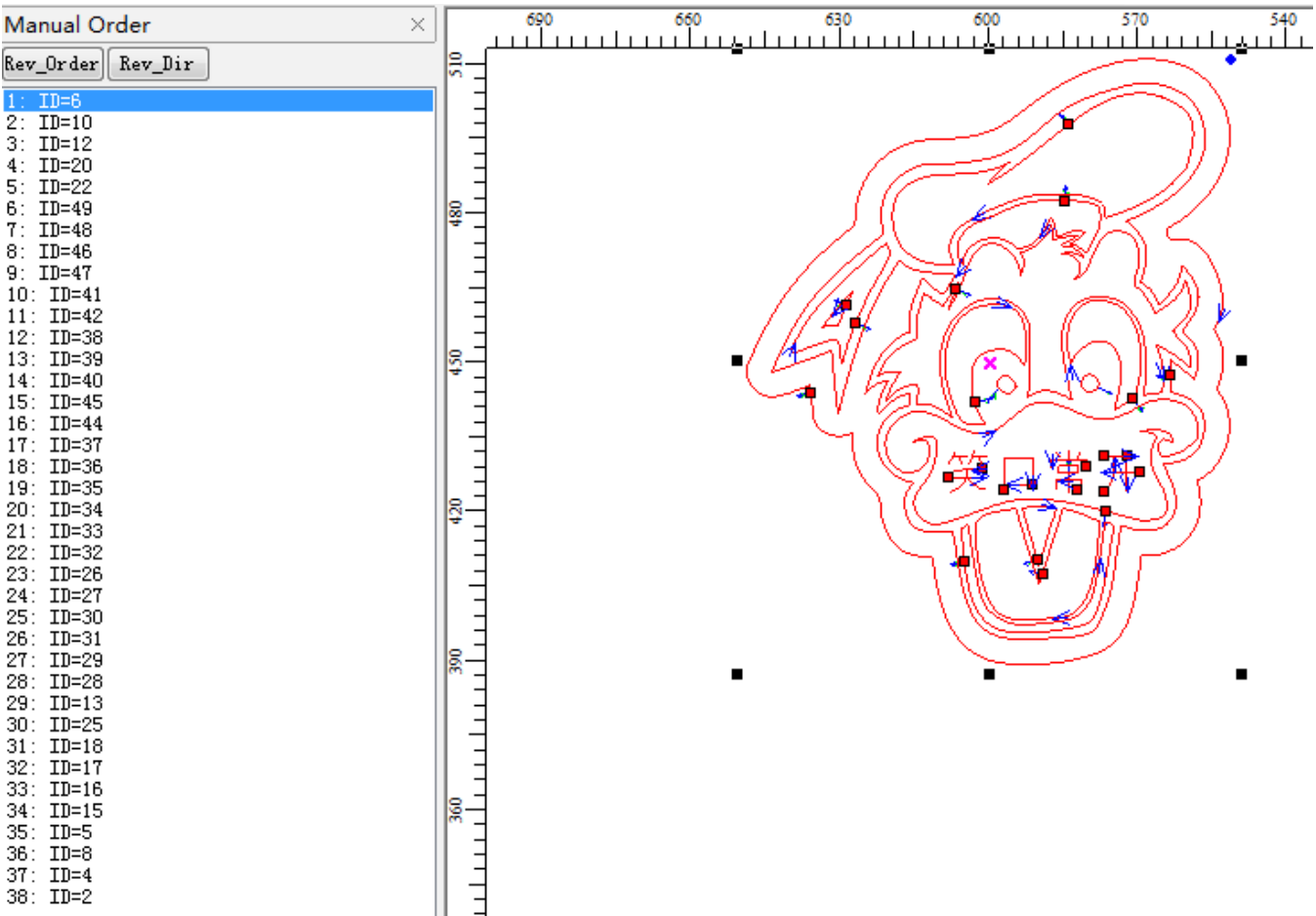
Select a file and click 【Tool】 / 【Mirror Horizontally】 or click  to finish a mirror horizontally graphic.

3.6.4 Mirror Vertically

Select a file and click 【Tool】 / 【Mirror Vertically】 or click  to finish a mirror Vertically graphic.

3.6.5 Manual Order

Select a file and click 【Tool】 / 【Manual Order】 to enter interface as follow:



1) Change serial number of cutting object.

Mouse drag option in 【Manual Order】 .Then you could move this option to the position of cursor.

Mouse double click option in 【Manual Order】 .Then it could be moved to top position.

Click 【Rev_Order】 in 【Manual Order】 could list all items in reverse order.

※Serial Number is with different file number in 【Manual Order】.The less the number is,the earlier the file to be processed.

Change The Start Point

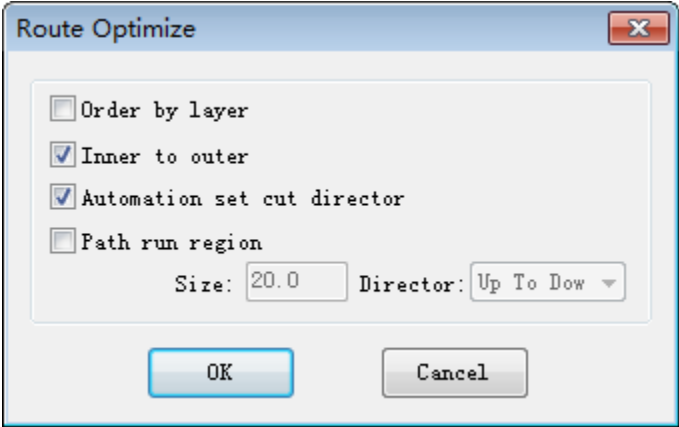
Start point in file is marked as “■”.Click file part and you may change the position.

Change Arrow Direction

Cutting direction of object is marked as “⇐”.Click 【Rev_Dir】 in 【Manual Order】 could make cutting direction opposite to origin.

3.6.6 Automatic Order

【Automatic Order】 tool is used for automatically ordering all the objects in the current document. After that, The motion path of output processing will be the theoretical shortest way.
Click 【Tool】 / 【Automatic Order】.A dialog is as follow.Then Press 【OK】



Order by layer: All file items with the same color will be continuously ordered.(It means some one color files will be processed all when laser cutting happens before the next color items.)

Inner to outer: Inner files (or included) will be ranked priority on outer files(includes).(It means some one inner files will be processed at first when laser cutting happens before the outer items.)

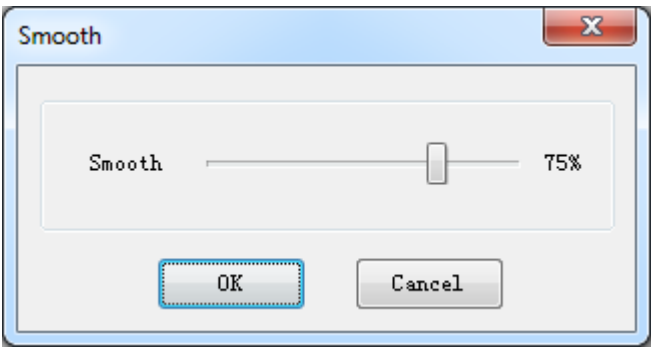
Automation set cut director: It means automatically ensure start point and cutting direction of the processed file when order graphics.

Path run region: Files will be ordered as 【Size】with setting 【Director】. 【Path run region】Is normally used for arrangement a regular array pattern (eg: circular array, a rectangular array).For these,the 【Size】 setting is the height of single graphic in ordered files.

3.6.7 Smooth Object(s)

To Smooth the curve and improve the cutting speed and stability.

Click 【Tool】 / 【Smooth Object(s)】.A dialog is as follow.Then Press 【OK】

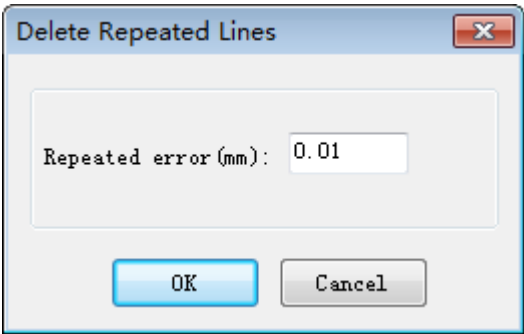


※The higher smoothing parameters turns to,the smoother the curve is.However with more file deformation.

3.6.8 Delete Repeated Lines

【Delete Repeated Lines】 can delete overlapping graphics in case of any repeating cutting.

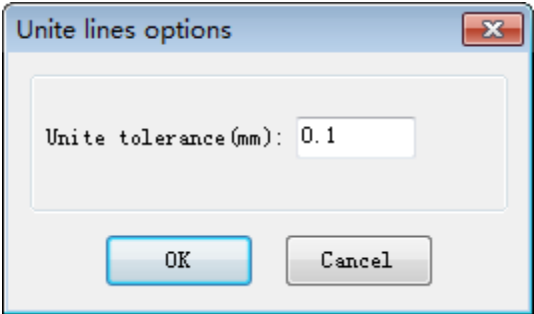
Click 【Tool】 / 【Delete Repeated Lines】 .A dialog is as follow.Then Press 【OK】



3.6.9 Unite Lines

【Unite Lines】 tool combine multiple segments into one segment.

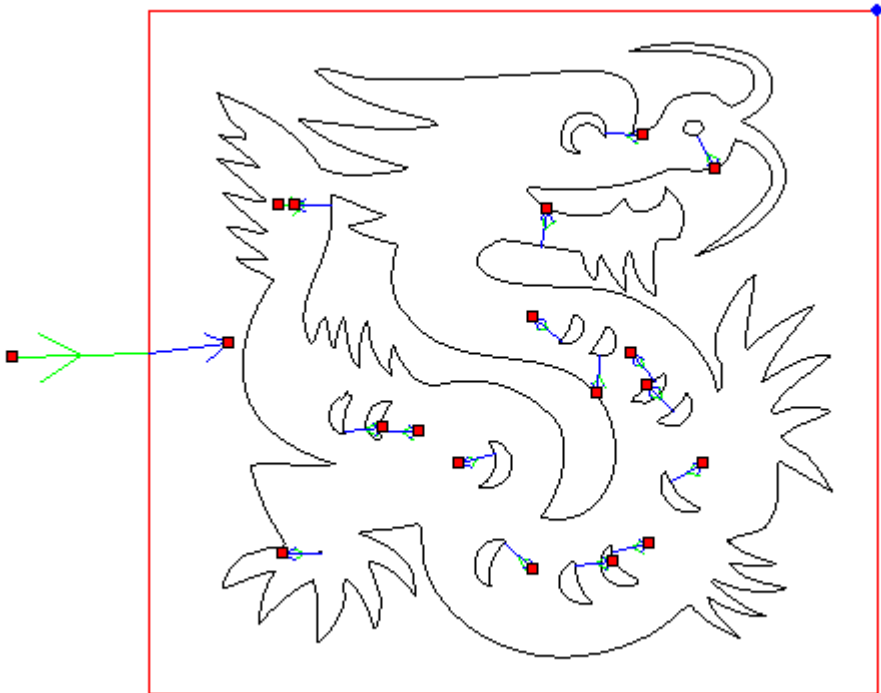
Click 【Tool】 / 【Unite Lines】 .A dialog is as follow.Then Press 【OK】



Unite Tolerance(mm):The two segments that their distance is less than their unite tolerance will be merged.

3.6.10 Edit Cutting Guide Line

Click 【Tool】 / 【Edit Cutting Guide Line】 to enter the interface as follow:

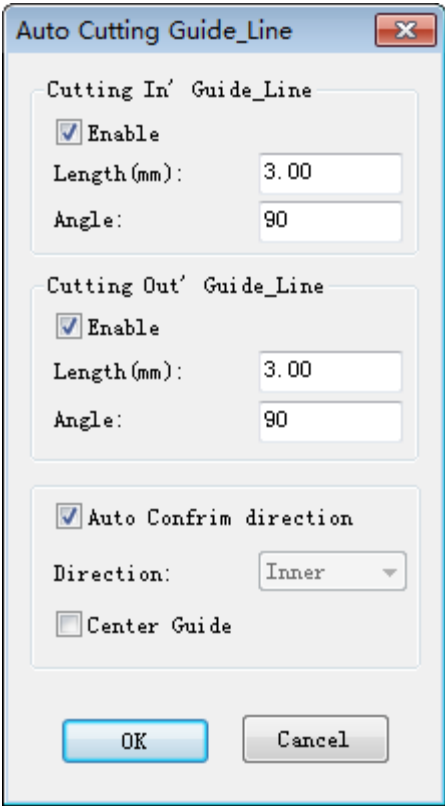


Object cutting starting point will be marked as “■”.Click object could change the start point.Cutting direction will be marked as “↖”.Arrow direction will show the cutting direction.

3.6.11 Auto Cutting Guide Line

When drawing or import graphics,it is defaulted that curve is with no cutting guide line.

Click 【Tool】 / 【Unite Lines】 .A dialog is as follow:



● Cutting In & Out Guide Line

Angle of cutting guide line and starting line.Counterclockwise with positive numbers.

● Auto Confirm direction

When it is not be chosen,you can select guide line direction by hand.When choose direction inner,lines will be guided from graphic inside.Otherwise will be from out of graphic.

● Center Guide

means cutting guide lines will be guided from center of graphic.

3.6.12 Image Invert

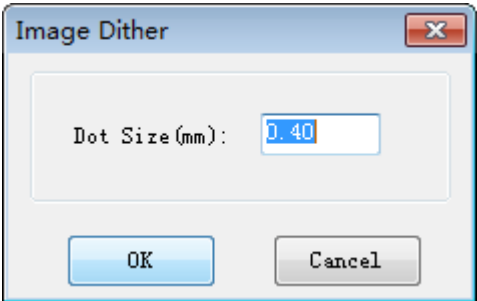
Select edit tool .Then select file which need to do image invert.And Click 【Tool】 / 【Image Invert】

or click object operation bar .



3.6.13 Image Dither

Select edit tool bar .Then select the bitmap object to be treated hanging.And click **【Tool】 /【Image Dither】** in list or click object operation bar .A dialog as follow:



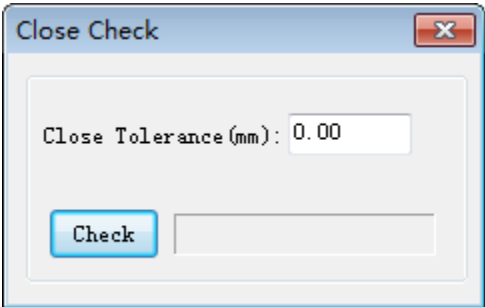
3.6.15 Create Image Outline

Select edit tool bar  and select the file graphic which need to create image outline.Then click **【Tool】 /【Create Image Outline】** as follow:



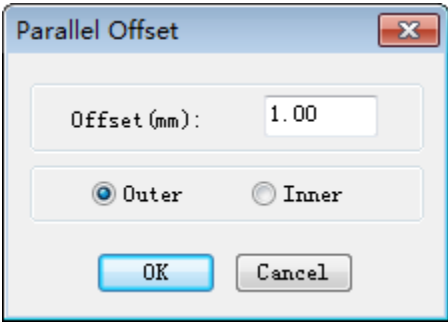
3.6.16 Close Check

Select edit tool bar .Then select vector object which need to do close check.And click **【Tool】 /【Close Check】** in list as follow:

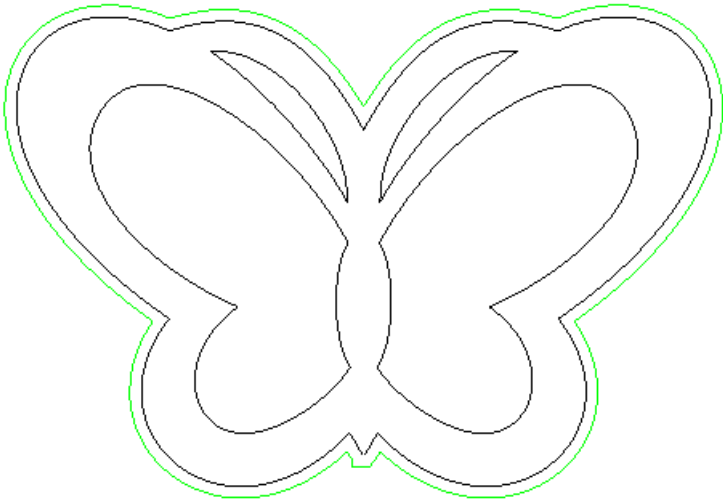


3.6.17 Parallel Offset

Parallel offset is a external expansion or internal contract.Select graphic and click 【Tool】 / 【Parallel Offset】 or click object operation bad .A dialog as follow:

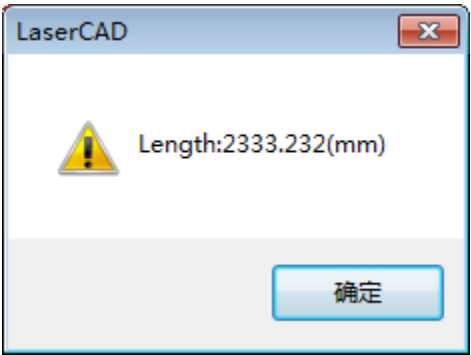


Select necessary parameter and click 【OK】 to create a parallel line.Also it will be automatically created as a new layer.As follow:



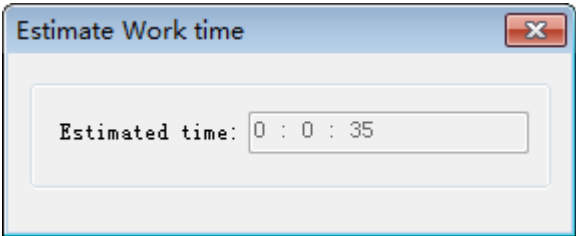
3.6.18 Measure Length

Select edit tool bar .Then select relative file.And click 【Tool】 / 【Measure Length】 .As follow.



3.6.19 Estimate Work Time

elect edit tool bar .Then select relative file.And click 【Tool】 /【Estimate Work Time】or click system tool bar  to budget the working time of processing.As follow:



3.6.20 Simulate

elect edit tool bar .Then select relative file.And click 【Tool】 / 【Simulate 】 or click system tool bar to Analog output machining process.As follow:

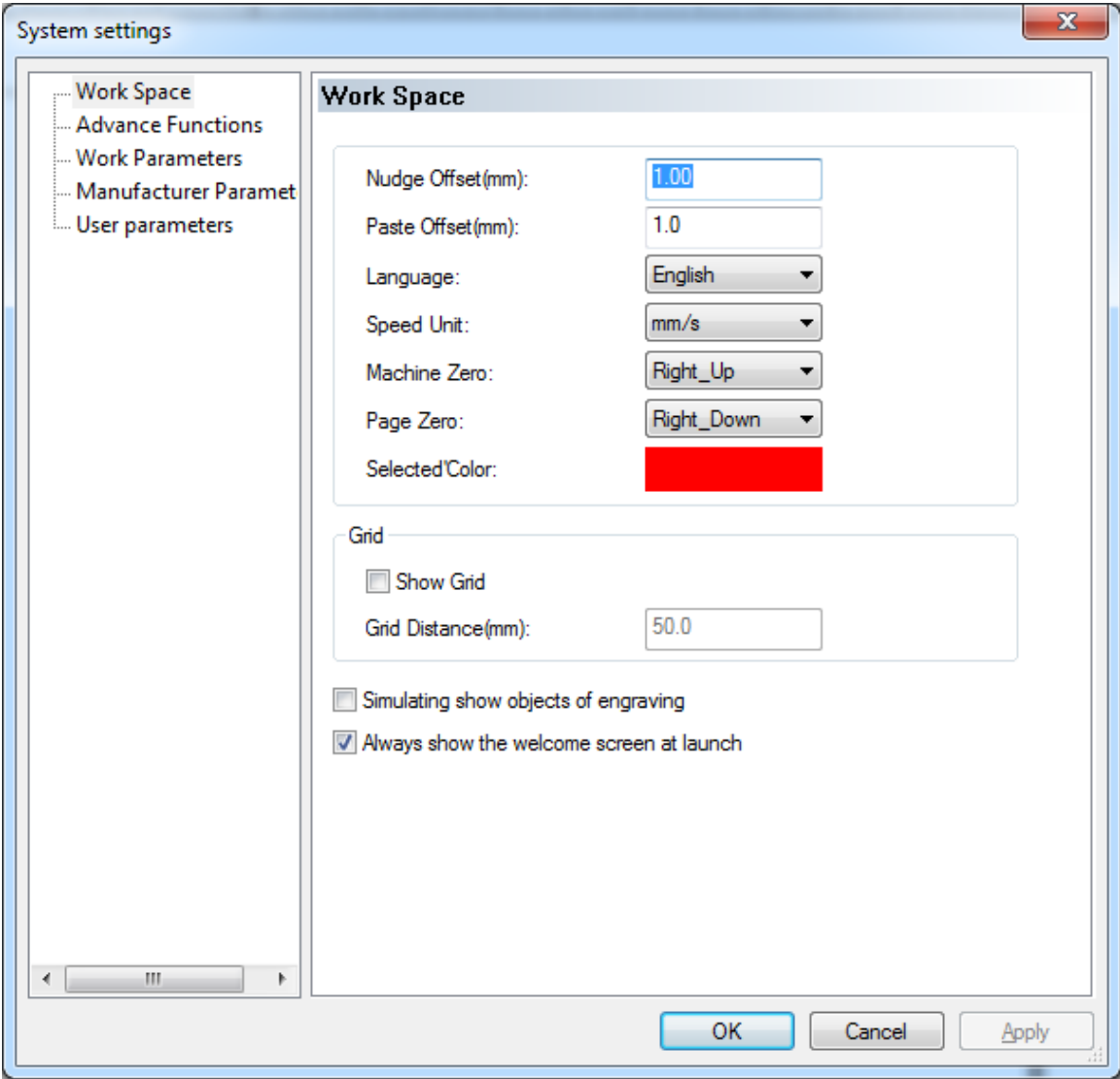


3.7 Options

3.7.1 System Options

Click 【Options】/【System Options】 or click system tool bar  to enter the system parameters setting interface.

3.7.1.1 Work Space



● **Nudge Offset(mm)**

The single movement distance of pressing keyboard “←”, “→”, “↑”, “↓”to move the selected file.

● **Paste Offset(mm)**

the offset distance of pasting a copy of selected object to current view.

● **Language**

the language used in the type of software

● **Speed Unit**

the unit type used for all items in software related to speed.

● **Machine Zero**

The current machine zero point(Or limit switch position.)this parameters should be the same as actual machine zero point.Otherwise processed file may be left-right or up-down reversed.

● **Page Zero**

Zero point in software graphic.Or when mouse move to graphic right down corner,state bar presents X=0,Y=0.

● **Selected' Color**

Outline color of the selected object.

● **Show Grid**

Graphic will be showed with grid model.

● **Simulating show objects of engraving**

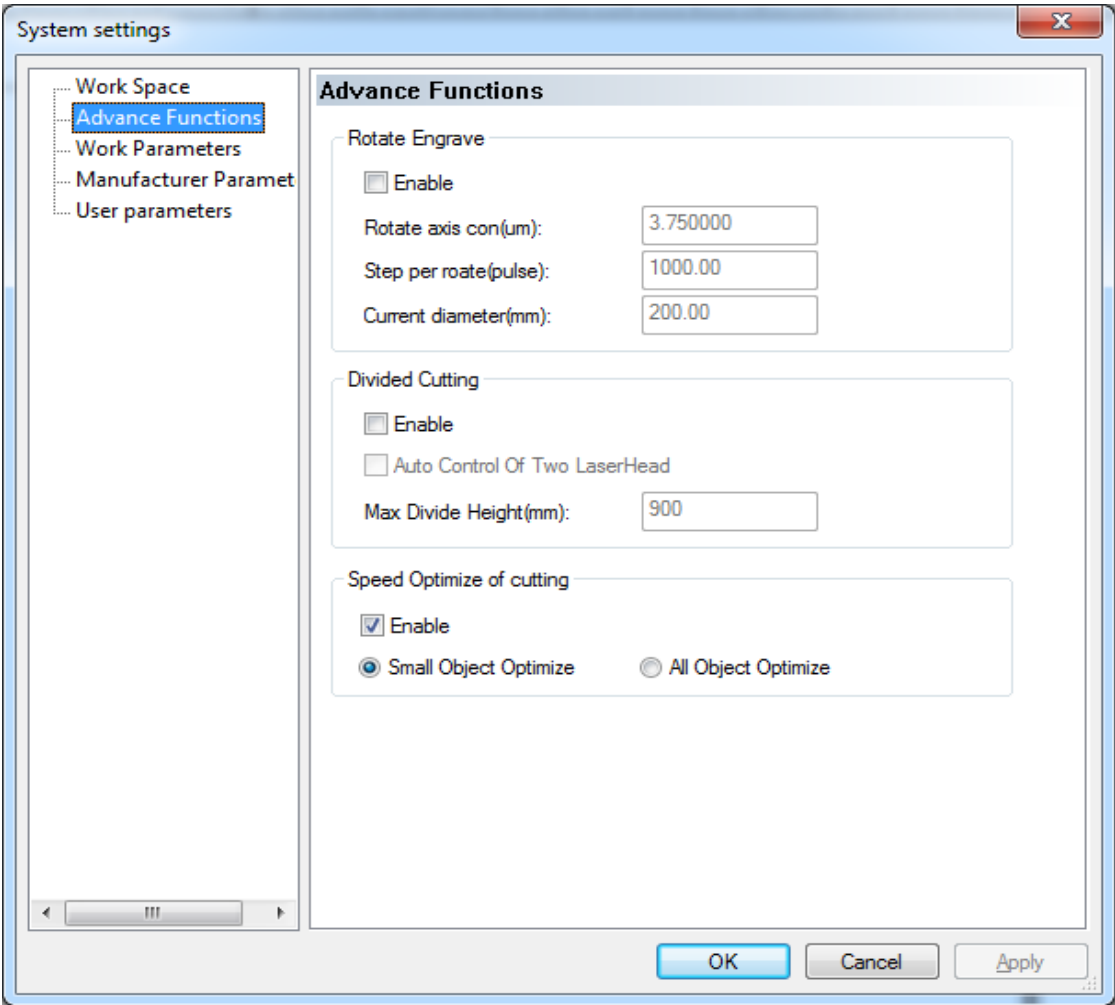
Simulating shows layer with stuffed engraving way.

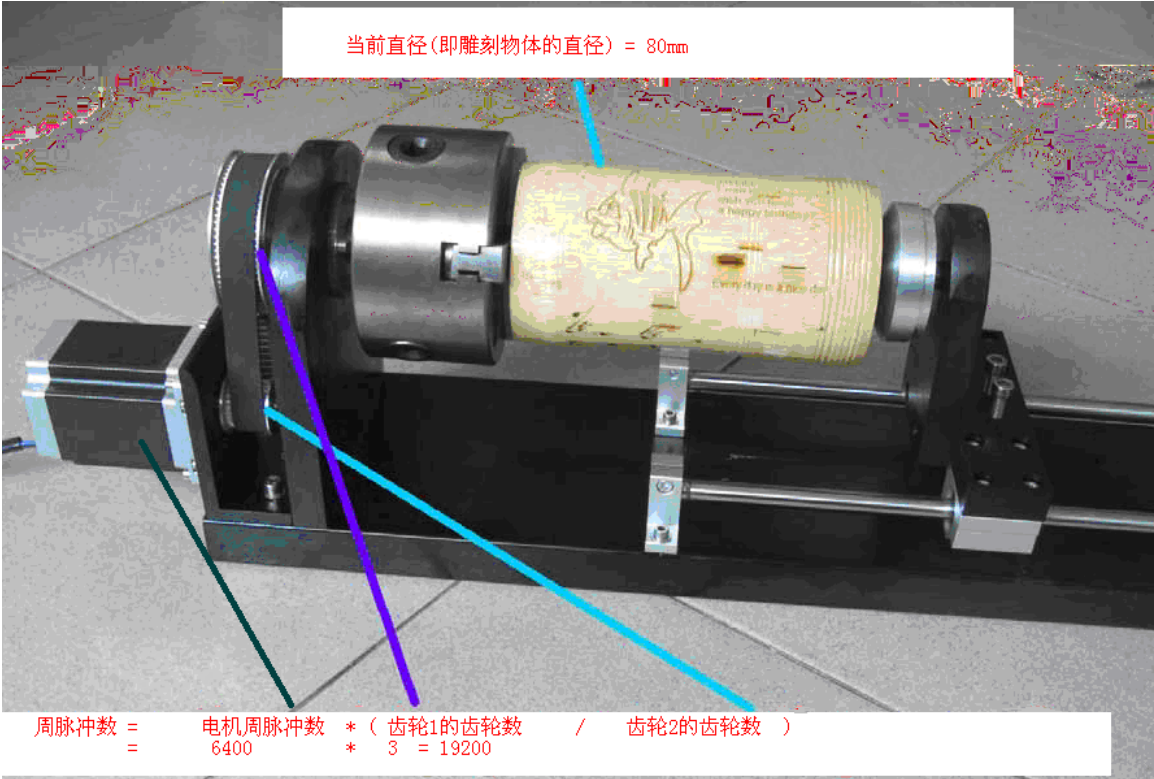
※When the amount of data in graphic sculpture is large,it will lead a slower speed of software display.Regularly not recommend this option.

● **Always show the welcome screen at launch**

When it is selected,there would always be a software defaulted welcome interface after starting.

3.7.1.2 Advance Functions:





● **Rotate Engraving(Only for AWC608,AWC608C System)**

Enable:tick it and will exchange the normal output engraving parameters into rotary engraving parameters and achieve rotary engraving craft.

● **Rotate axis con(um)**

when use X axis as rotate axis ,engraving way must be 【X_Swing】 or 【X_Unilateral】 And the 【Rotate axis con(um)】 is X axis pulse equivalent parameters.

● **Rotate axis con(um)**

when use Y axis as rotate axis ,engraving way must be 【Y_Swing】 or 【Y_Unilateral】 .And the 【Rotate axis con(um)】 is Y axis pulse equivalent parameters.

● **Step per rotate(pulse)**

The number of pulses which motor driver need to output to make the rotary table rotate one circle.

● **Current diameter(mm)**

diameter of engraved object.

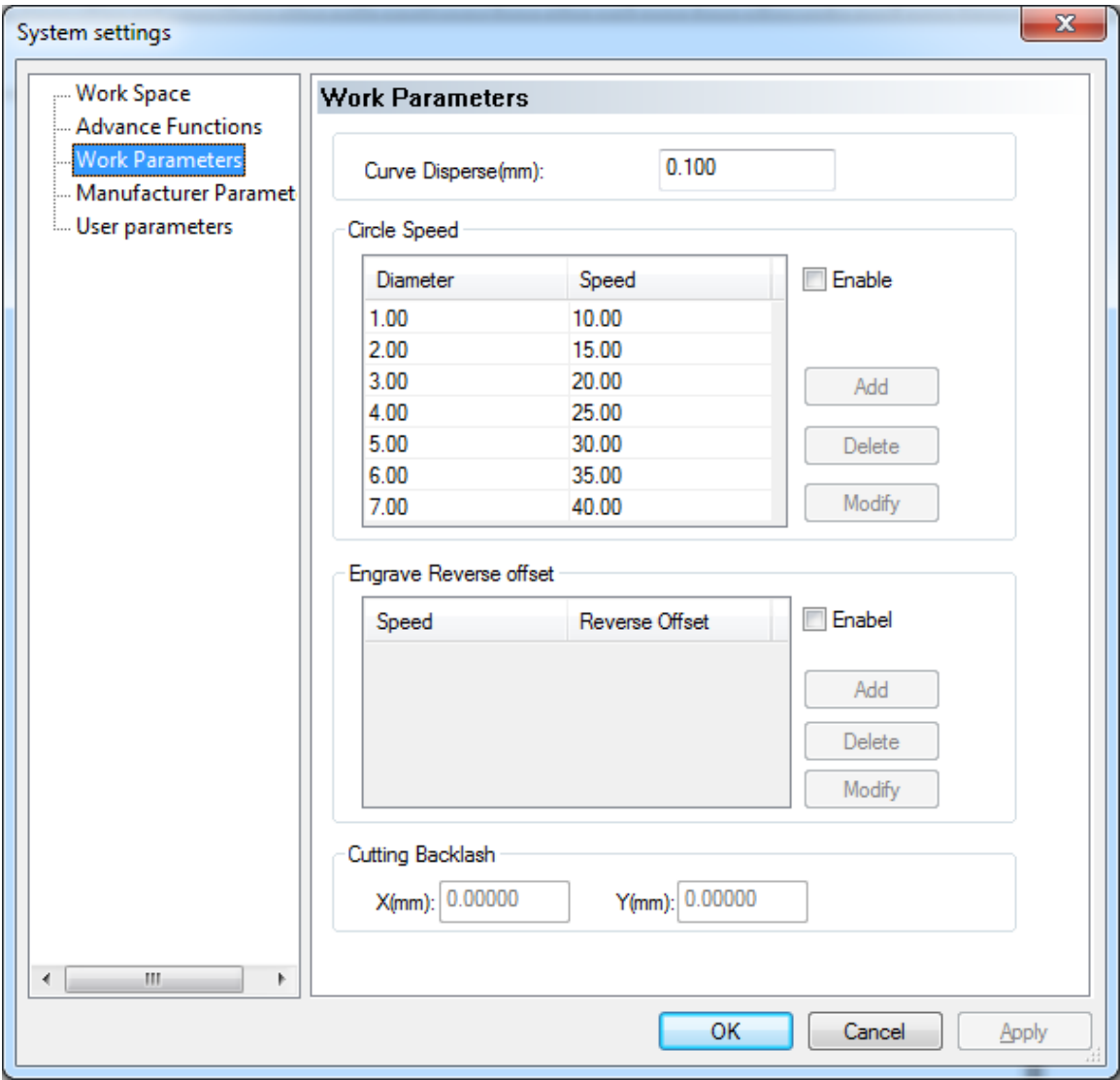
● **Divided Cutting**

Normally keep default parameters.

● **Speed Optimize of cutting**

Normally keep default parameters.

3.7.1.3 Work Parameters



● **Curve Disperse(mm)**

Parameters of curve smooth.The smaller it is ,the higher graphic precision is.But also the slower computing speed is.And it effects processing speed.Normally for materials like acrylic,you can choose a smaller number.Otherwise please use default 0.10.

● **Circle Speed**

system Automatically determine if the processed circle is limited on cutting speed.And then process it by relative diameter date with different speed.Under right parameters setting,the cutting effect of circle will be great improved.To Click **【Add】** , **【Delete】** , **【Modify】** and set the parameters.

● **Engrave reserve offset**

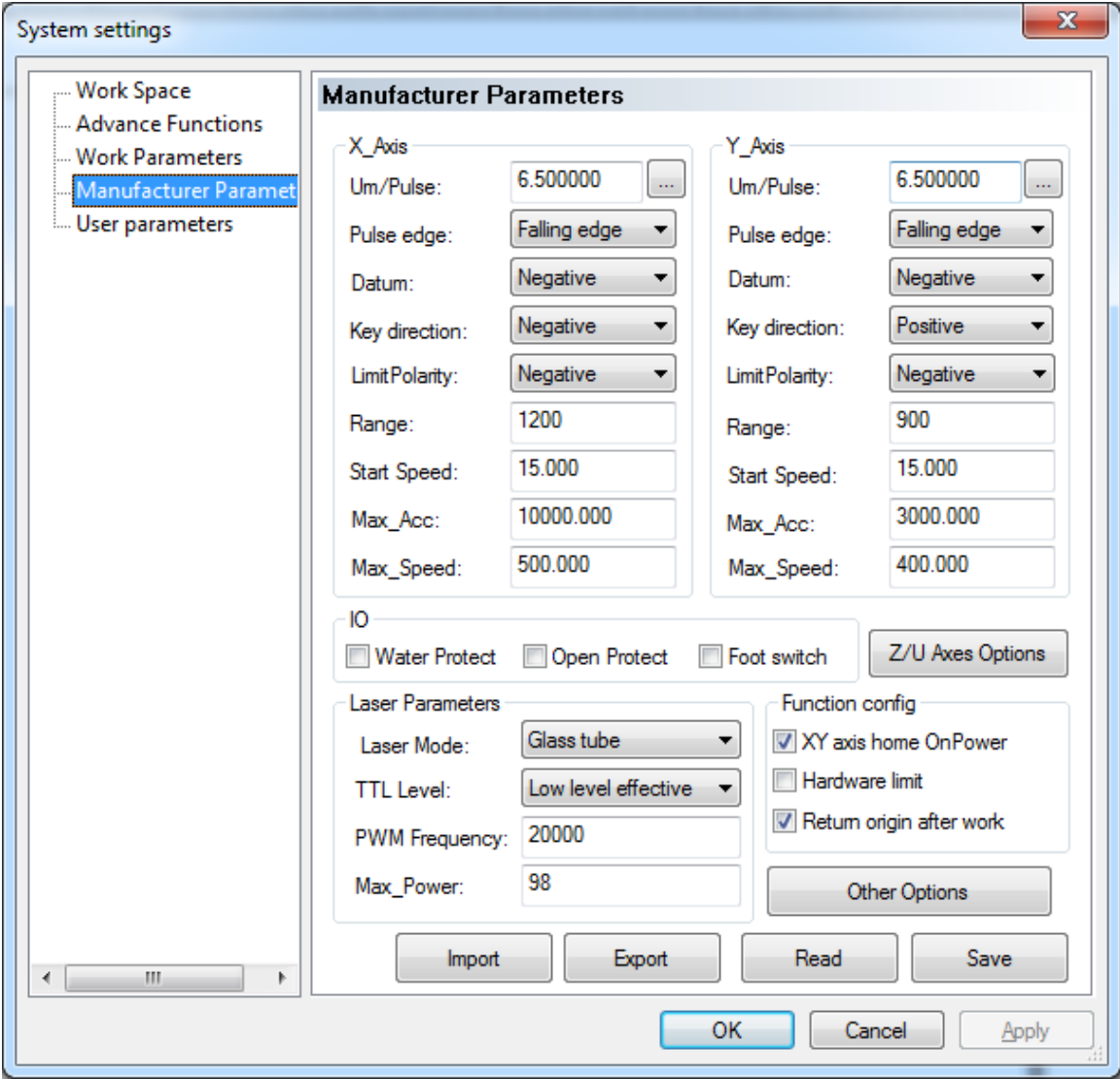
During the double-way engraving graphics,due to mechanical backlash,it may lead to a uneven edge graphics after scanned.So we use engraving reserve offset to fix it.Special speed relate to special engraving reserve offset.Normally speaking,the more speed with the higher engraving reserve offset.Also this parameters could be positive or negative.

When speed is 200mm/s,reserve offset is 0.3mm;When speed is less than 200mm/s,the relationship between speed and reserve offset is proportional.So when speed is 100mm/s ,reserve offset is $0.30 \times (100/200) = 0.15\text{mm}$

When speed is 300mm/s,reserve offset is 0.50mm;When speed is within 200~300mm/s,the relationship between speed and reserve offset is proportional.So when speed is 250mm/s ,reserve offset is $0.30 + (300 - 250) / (300 - 200) \times (0.5 - 0.3) = 0.40\text{mm}$

When speed is more than 300mm/s,reserve offset is the same as when speed is 300mm/s(or 0.5mm)

3.7.1.4 Manufacturer Parameters



● X,Y axes parameters

X,Y,Z,U axes parameters(Z axis is for up down axis,and U axis is for auto feeding axis).

Click 【Z/U Axes Options】 you can set up parameters of Z and U axis.

● Um Pulse(um)

The absolute distance value (unit: um) that a signal sent by motor relate to motion axis movement.The processed graphic size with error Um pulse setting will not the same as expected.

● Pulse Edgethe

trigger edge of motor driver make motor spin.It will lead a cutting dislocation if with wrong parameter setting.

● Datum

Axis movement direction during reset.When this datum is not the same as axis limit switch,please rewrite this parameters.

● Key direction

direction of lcd panel button movement.When it is not the same as the actual direction,please rewrite this parameter.

● Range

Working area of machine.Or related axis max working distance.

● Start Speed

speed of motion axis from still state to starting state.The more numbers ,the higher the starting

speed.Also with more machine stopping shake.Please adjust it with machine property.Classical setting ranges in 5~20mm/s.

- **Max_Acc**

acceleration of motion axis doing adding or reducing speed.If with too high Acc,it will cause motor loosing step or shaking.If with too low Acc,it may cause a low working speed and slow down whole program.For a axis with big inertia,like beams corresponding to the Y-axis,a classical setting parameters range from 800 to 3000mm/s². For a axis with small inertia,like the X-axis,a classical setting parameters range from 10000 to 20000mm/s².

- **Max_Speed**

The max speed motion axis could be up to which decided by motor driving ability and inertia.When doing engraving task,the engraving speed could not beyond the max speed of relative axis.When doing cutting task,the max cutting speed could not beyond the max speed of X and Y axes.Controller will protect speed within the max speed limitation if met any over-high speed requirement.

I/O Switches

- **Water Protect**

Controller board water protection interface is Laser 1-Protect and Laser- Protect. Enable **【Water Protect】** and system will real-time monitor the two water protection signal.When one of them presents in a high level state,the processing task will be paused and laser will be turned off.And “Water protection error”will be shown in lcd display.

- **Open Protect**

Controller board open protection interface is IN1. Enable **【Open Protect】** system will real-time monitor the signal.When it changes into low level,the processing task will be paused.When it is in a high level,the paused task will be continued.

- **Foot Switch**

Controller board foot switch interface is IN2.Enable **【Foot Switch】** system will real-time monitor the signal.When signal exchange from high level to low level,the states will be switches(from pause to work or from work to pause).

- **Laser Mode**

select this parameters as out-connected laser source type.Normally mainly three types are China glass laser tube,RF tube(pre-ignition pulse)and RF tube(non-ignition pulse)

- **TTL Level**

select this parameters as out-connected laser power supply.Laser switch signal are Laser1-TTL and Laser2-TTL.When choose **【Low level effect】** and start optic,system will output two road signal with low level and when stop optic,system will output two road signal with high level.

When choose**【High level effect】**and start optic,system will output two road signal with high level and when stop optic,system will output two road signal with low level.

- **PWM Frequency**

pulse frequency of control signal of out-connected laser source.Normally ranges from 20000 to 80000.If with too small parameters,it will lead a possible output imbalance during working and come out a “black point”.

- **Max Power**

peak power percent of laser source.During processing,working power cannot beyond this parameters.

ZU Axes Options

● XY axis home OnPower

Enable ,when machine is started,X axis and Y axis will do reset motion at the same time.

● Z axis home OnPower

Enable ,when machine is started,Z axis will do reset motion at the same time.(normally not enable).

● U axis home OnPower

Enable ,when machine is started,U axis will do reset motion at the same time.(normally not enable).

● U axis for feeding

Enable U axis auto feeding function.If without it ,all feeding crafts in software will be invalid.(normally enable).

Other Options

Manufacturer Parameters Import and Export

Manufacturer Parameters Import can use files which has been set up.Click 【Import】 to finish it.Parameters files suffxx is cf5.

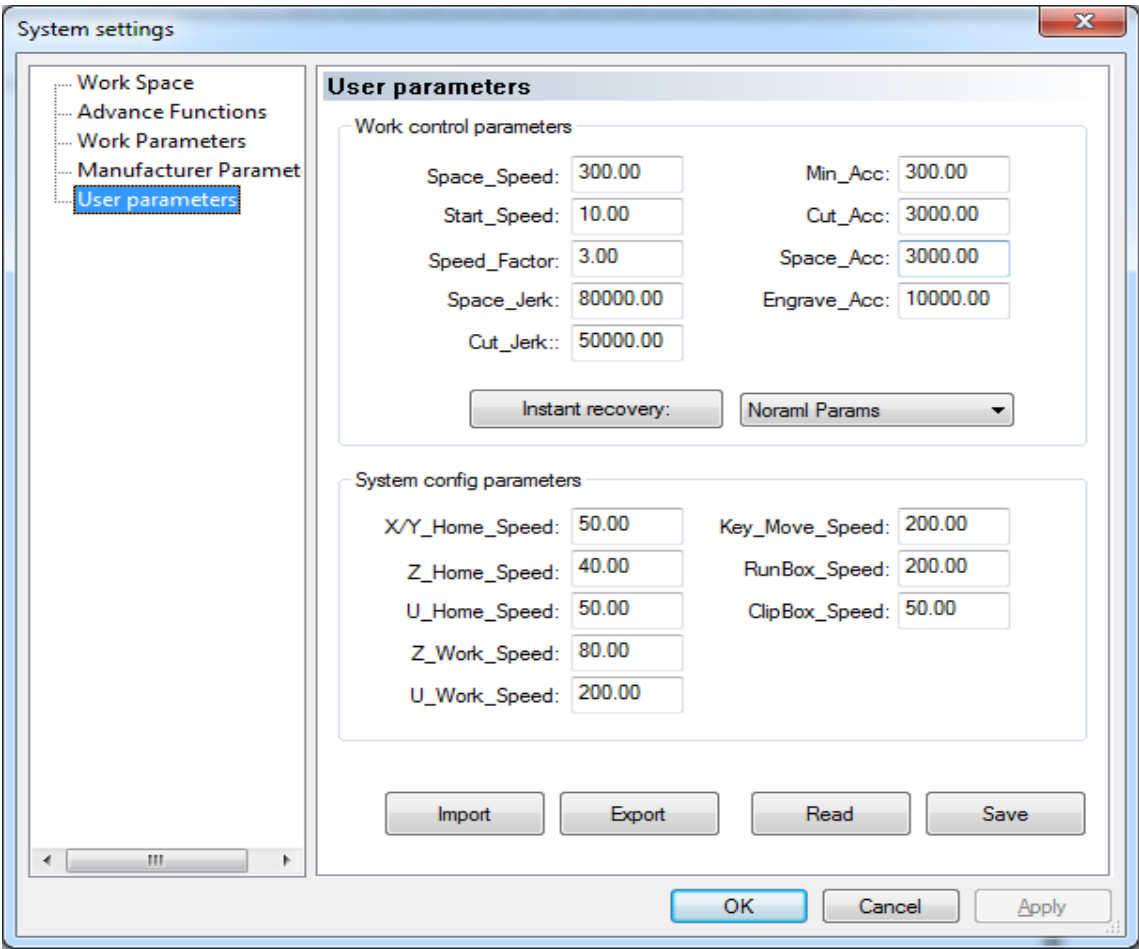
Manufacturer Parameters Export can create current copy files as backup.Click 【Export】 to finish it.And exported manufacturer parameters file could change current main board manufacturer parameters with U disk interface.

Manufacturer Parameters Read and Save

Manufacturer Parameters Read,or read parameters that had been saved into controller board into software interface.Click 【Read】 to finish it.Parameters files suffxx is cf5.

Manufacturer Parameters save.Click 【Read】 and 【Save】 ,Manufacturer Parameters will be read and saved into software.

3.7.1.5 User Parameters



Work Control Parameters

- **Space_Speed**

laser head motion speed when laser not output during working process.This parameter is limited by 【Max_Speed】 in manufacturer parameters.

- **Start_Speed**

laser head motion speed from running to still during working process.This parameter is limited by 【Start_Speed】 in manufacturer parameters.

- **Speed_Factor**

rounding speed item during working process.The bigger it is ,the faster working speed is.Also the more shake is .It ranges between 0 to 5.Default 2.5.

- **Space_Jerk**

The changing speed of space acceleration during working process.The bigger it is,the faster space speed is.Also the more shake is.It is normally set as 10000 to 150000.

- **Cut_Jerk**

The changing speed of cutting acceleration during working process.The bigger it is,the faster space speed is.Also the more shake is.It is normally set as 10000 to 150000.

- **Min_Acc**

mini acceleration of axis motion during working process.

- **Cut_Acc**

max acceleration of motion laser head when laser output during working process.Normally set below 4000.

- **Space_Acc**

max acceleration of motion laser head when laser NOT output during working process.Normally set below 4000.

- **Engrave_Acc**

max acceleration of motion laser head when engraving.Normally set higher than 8000.It with too small parameter,it will lead a long distance between starting speed increase to engraving speed.And cause engraving oversize to fail.

- **Instant recovery**

one press button to set user parameters.As the difference of materials and working effects recommend,you can choose “Slower Params”, “Normal Params”, “Faster Params” and “Fastest Params”.

System Config Parameters

- **X/Y_Home_Speed**

machine speed reset to origin point.Normally ranges between 40 to 80.If too big ,it will lead a overload impact and probably damage limit switch.

- **Z_Home_Speed**

Z axis(up down axis) reset to origin point.

- **U_Home_Speed**

U axis(feeding axis) reset to origin point.

- **Z_Work_Speed**

Z axis motion speed during working process.

- **U_Work_Speed**

U axis motion speed during working process.

- **Key_Move_Speed**

axis movement speed when pressing keys on LCD panel.

- **RunBox_Speed**

laser head motion speed along graphic outline box.

- **ClipBox_Speed:**

Cutting speed on graphics outline box.

- **User parameters import and export**

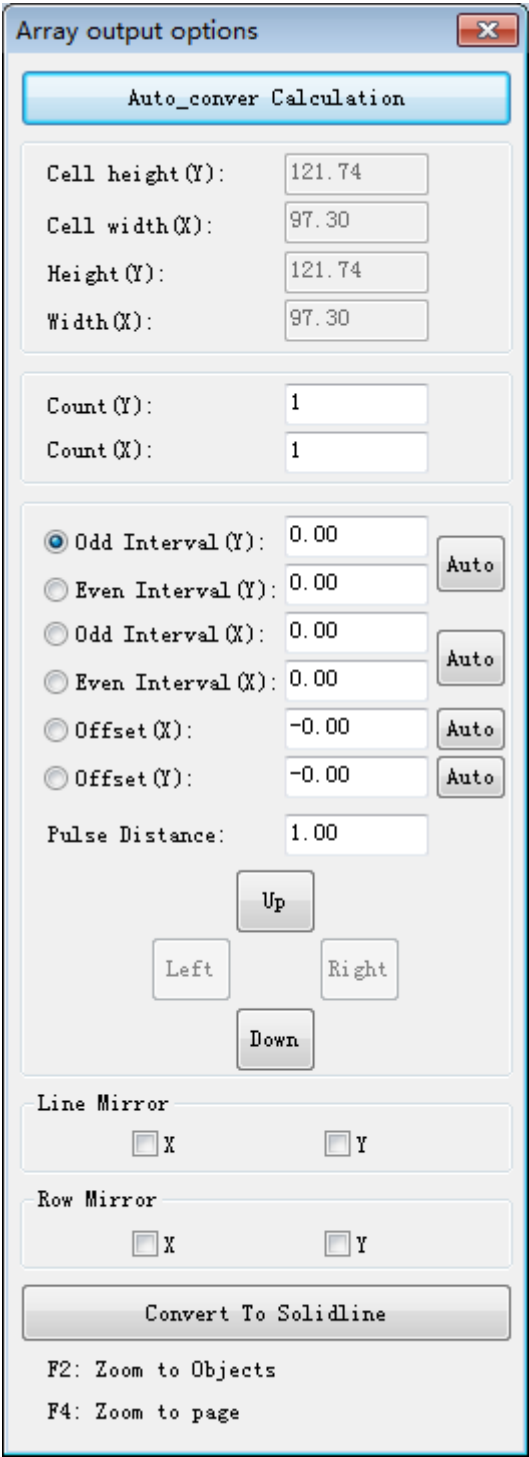
User parameters import could be used for all adjusted user parameters files. Click **【Import】** to finish it ; User parameters export can create current copy files as backup. Click **【Export】** to finish it. And exported user parameters file could change current main board manufacturer parameters with U disk interface.

- **User parameters read and save**

User Parameters read, or read parameters saved in controller main board to software interface. Click **【 Read】** to finish it. And click **【Save】**, user Parameters will be saved into software.

3.7.2 Array output options

Graphics needed to do array process will be dealt with array parameters setting. It saves humanity working time and materials. Click **【Option】** / **【Array output options】** to enter it as follow:

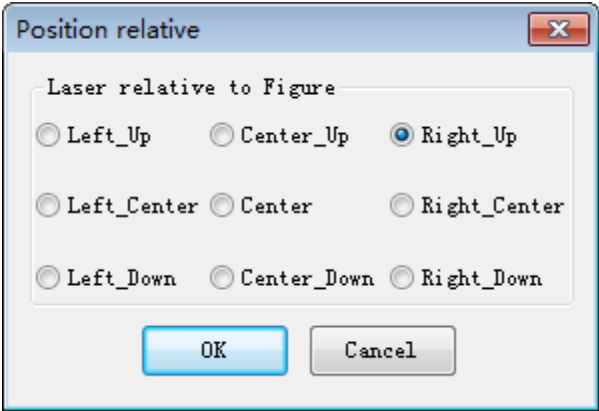


Click **【Auto_conver Calculation】** software will do automatic array as the working area and graphic size with the most economical way of materials and make graphics filled in whole working size.

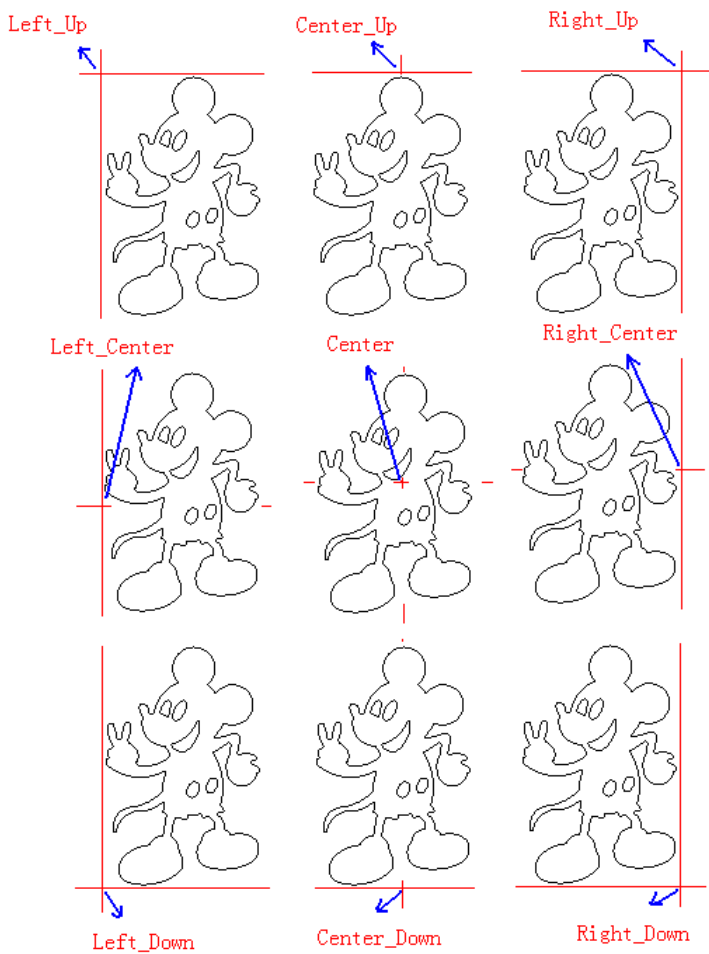
3.7.3 Position relative

【Position relative】 means a relative position relationship between laser head and processed graphics.

Click **【Options】** / **【 Position relative 】** or click system tool bar .A dialog as follow then click **【OK】** to finish it.

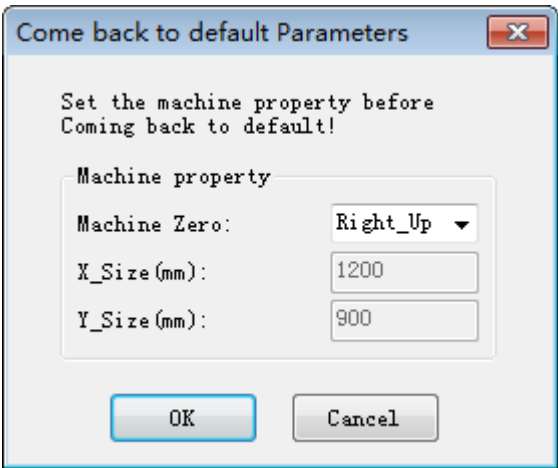


Graphic relative position as follow:



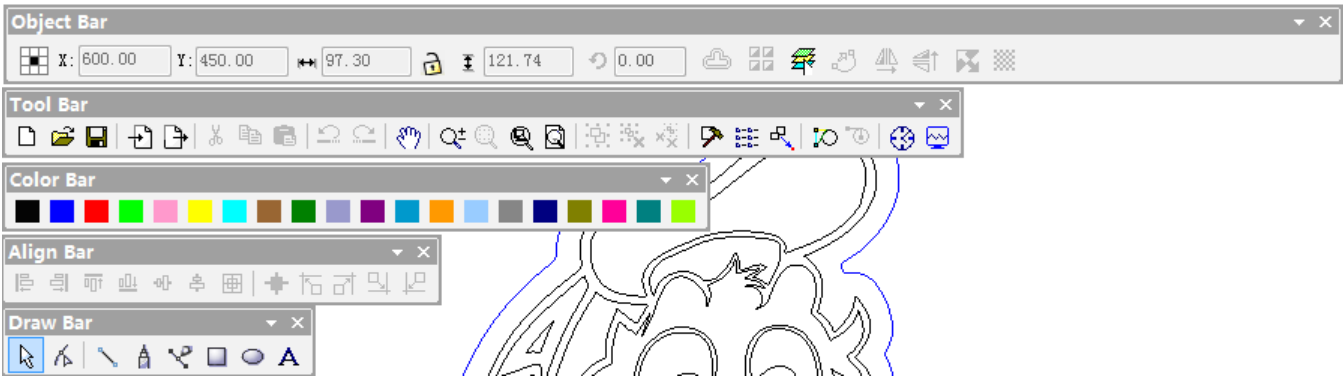
3.7.4 Default Parameters

Back to default software parameters. When it is selected, reset machine property parameters will be required.



3.8 View

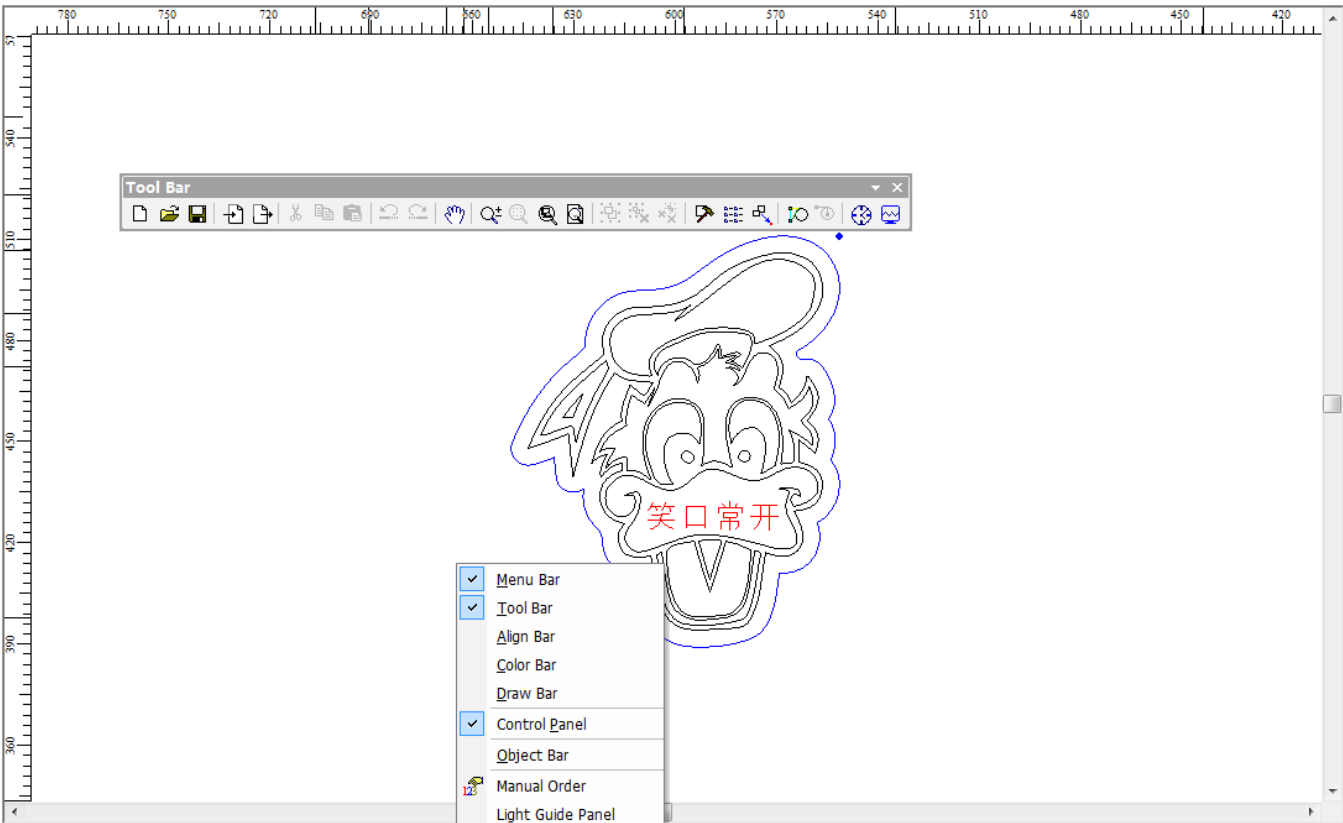
View list is used to tune out or hide the toolbar



3.8.1 How to tune out the hidden tool bar?

When menu bar is not hidden,you can choose relative tool bar in 【View】 list to tune them out.

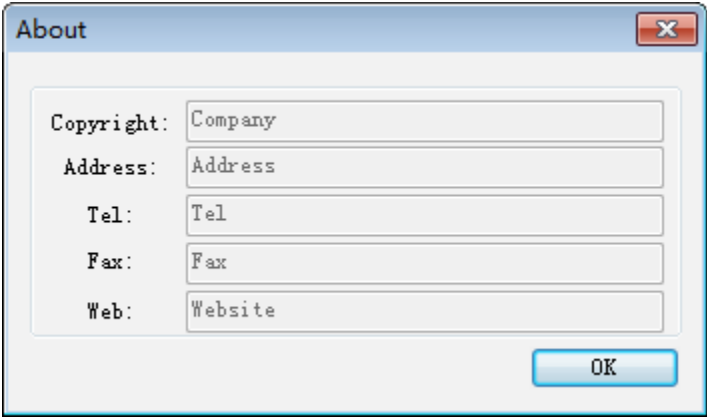
When menu bar is hidden,click mouse right button in space area of state bar and select relative tool bar to finish it.Press down tool bar title and not loose.Then drag it to software top to fix toolbar.As follow:



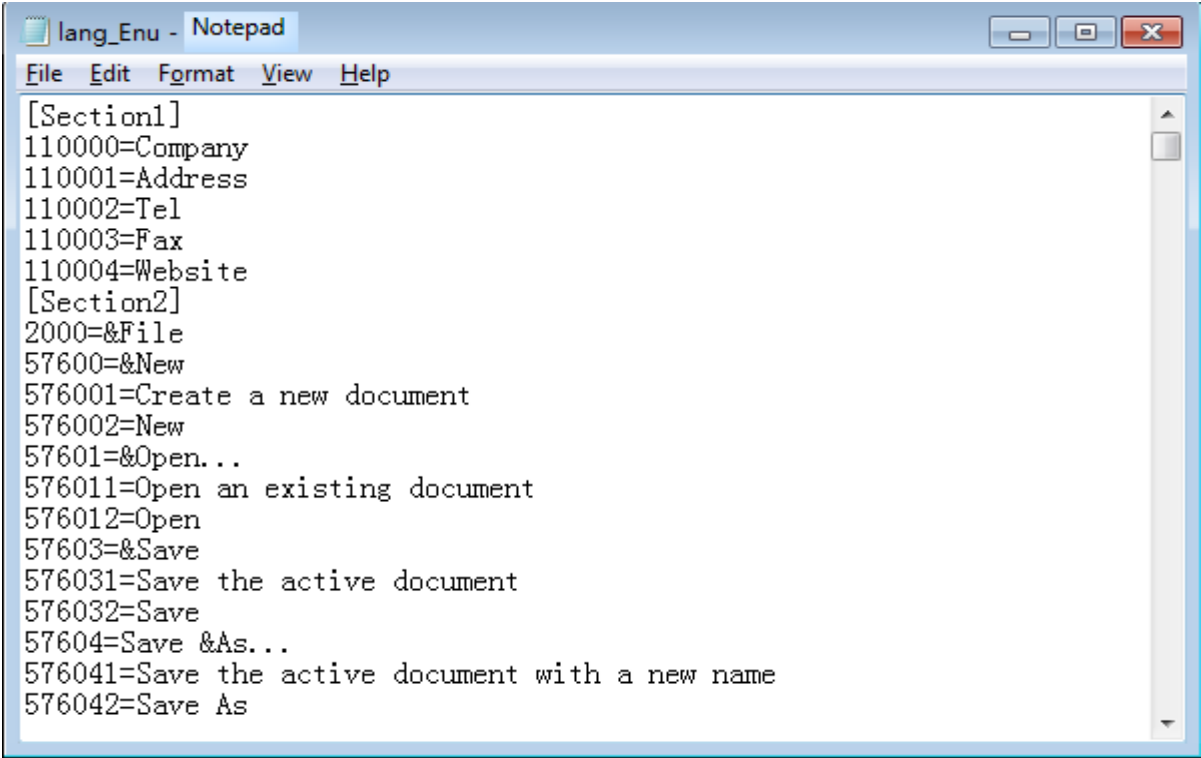
3.9 Help

3.9.1 Information change and customerized

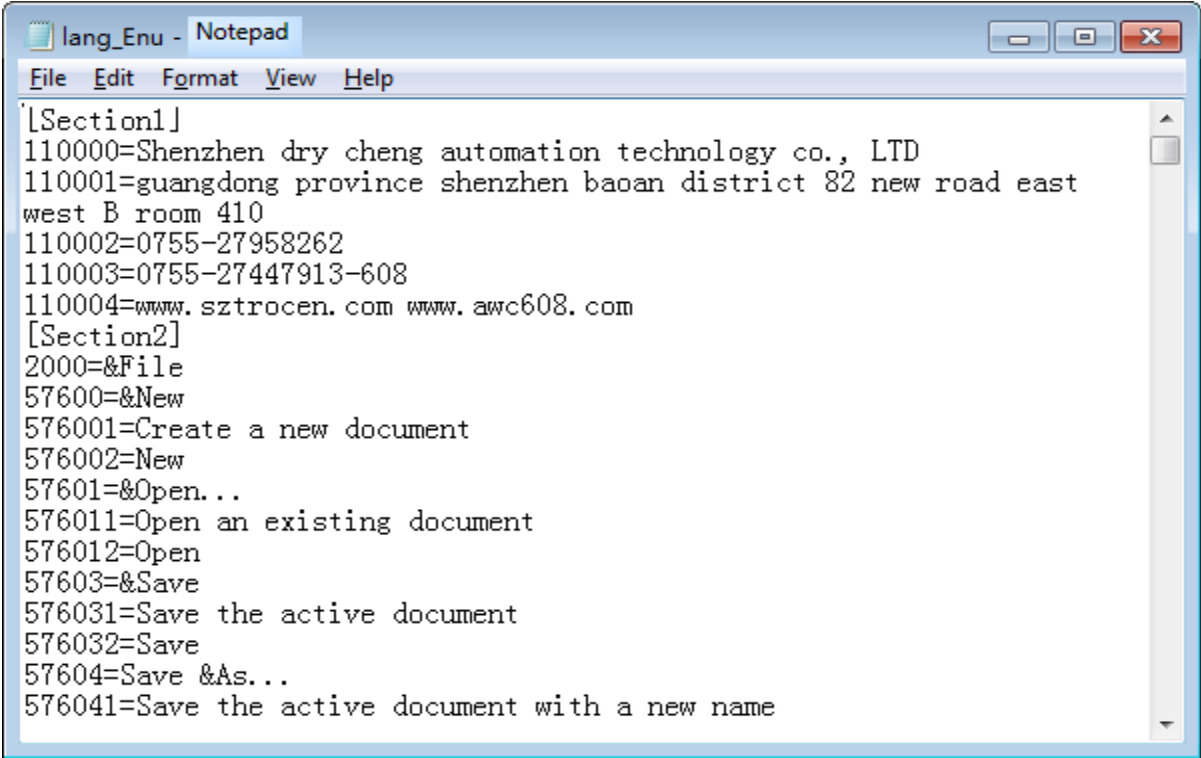
Users could do Customerized modifications on information setting of software.Default setting on information as follow:



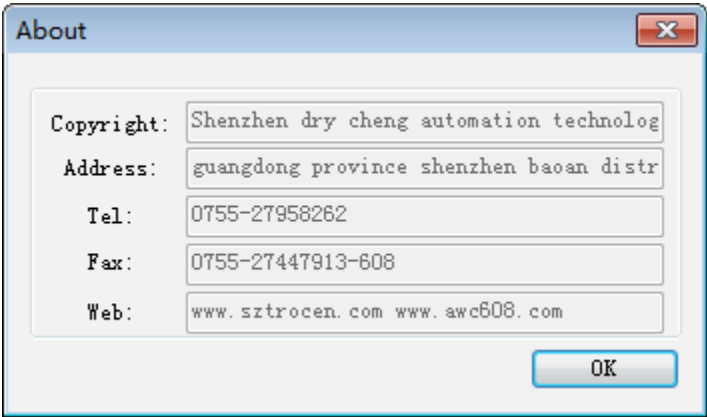
After the software installation package unzipped ,enter software installation categories.Then open AWCLanguage file and double click lang_chs file as follow:



Exchange the first four options with relative information as follow:



The modified effect as follow:



3.9.2 Software Icon exchange.

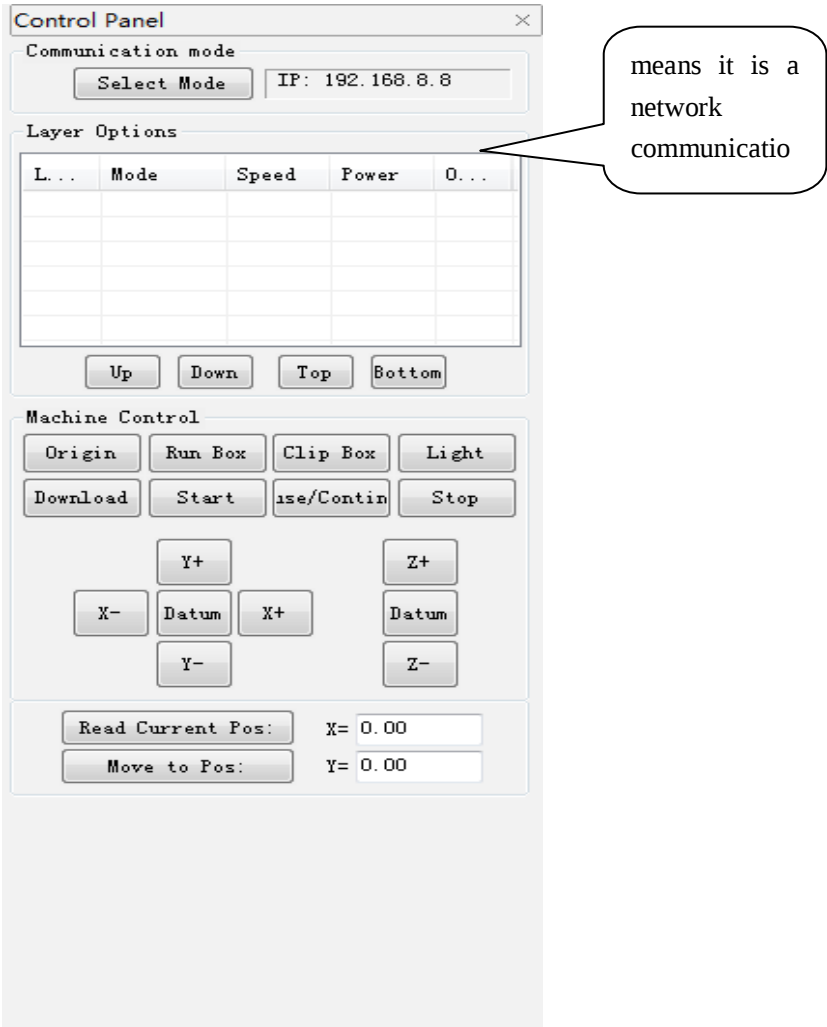
Icon for the software vendors can be replaced.After decompression software installation package unzipped,enter software installation categories and open AWCRes file.Rename your new icon as title.Copy and replace the old icon with the same name.Icon size is 32*32 and format is ico.

4. Control Panel

Computer can do communication with awc series controller main board with Usb and Net work two modes and do operation on laser machine.

4.1 USB mode

Select communication mode in control panel.



Click 【USB Mode】

Select Mode

USB Mode

Add

Delete

Modify

	DeviceName	COM
☐	MachName	3
☐	MachName	13
☒	MachName	21

Network Mode

Add

Delete

Modify

	DeviceName	IP
☒	MachName	192.168.8.8

Double click ☒ MachName 3

USB Com

DeviceName: MachName

USB COM: 21

FindCom

OK

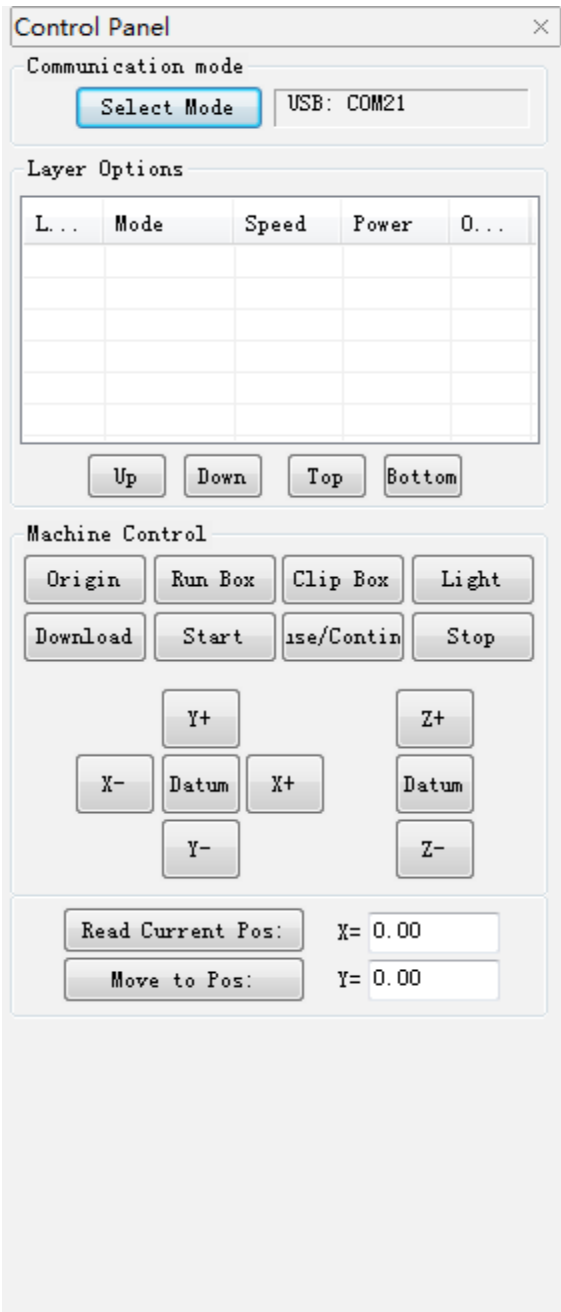
Cancel

Device name could be rewrote as you wish.Input device name and click find com.After it succeeded you can press OK and finish it.

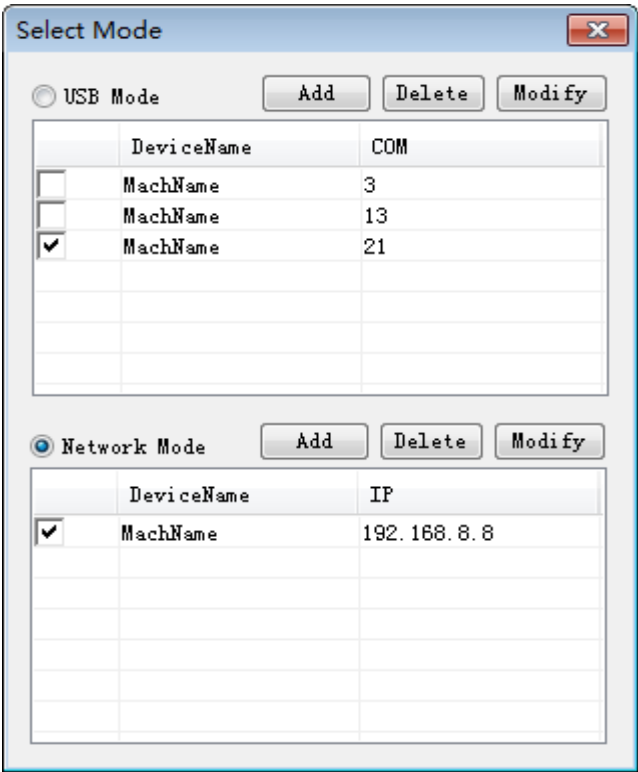
4.2 Select Network Mode

4.2.1 Connect with network directly to main board.

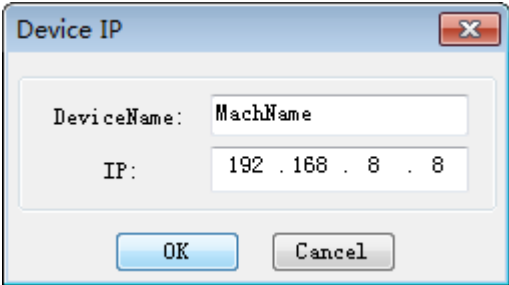
Select communication mode in control panel.



Click Network Mode.



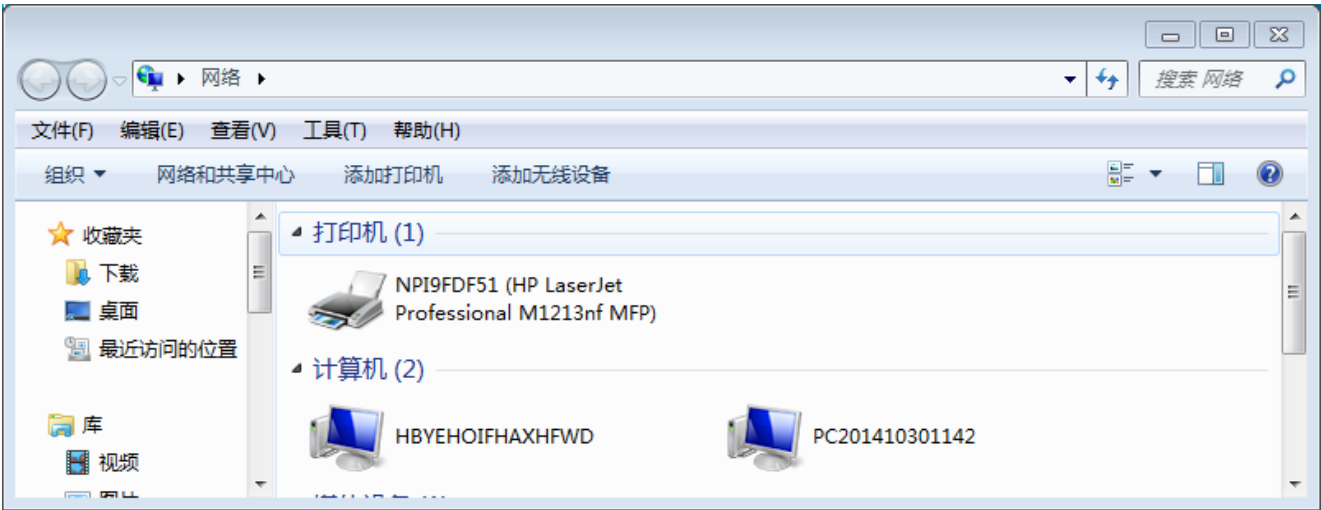
Double click ☒ MachName 192.168.8.8



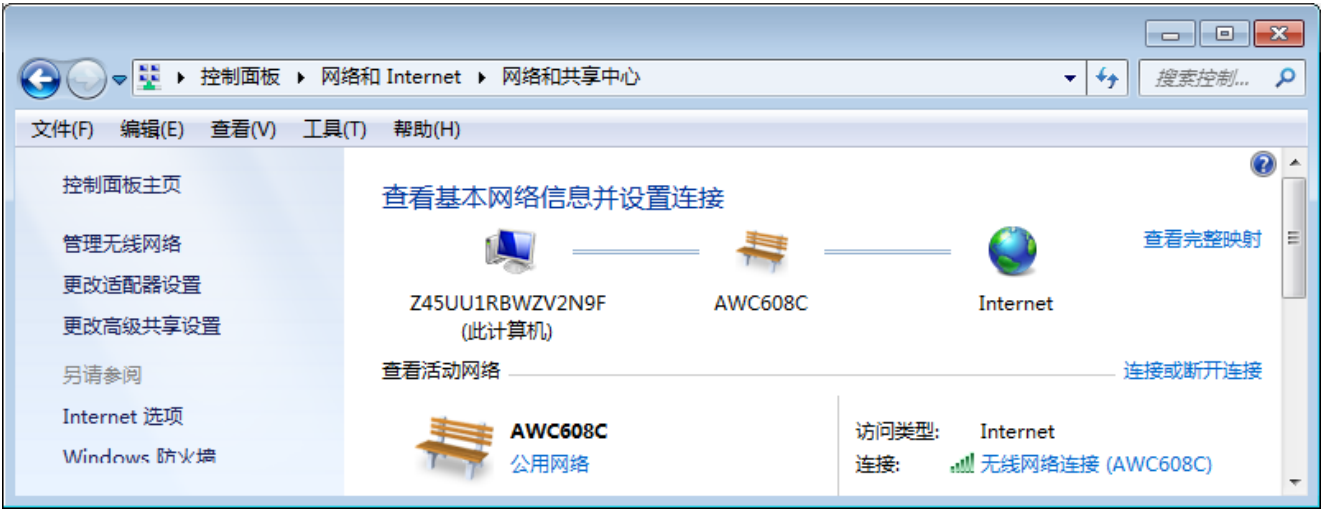
Device name could be rewrote as you wish.Input ip address in controller main board panel and press OK to finish it.

Windows 7 System for example

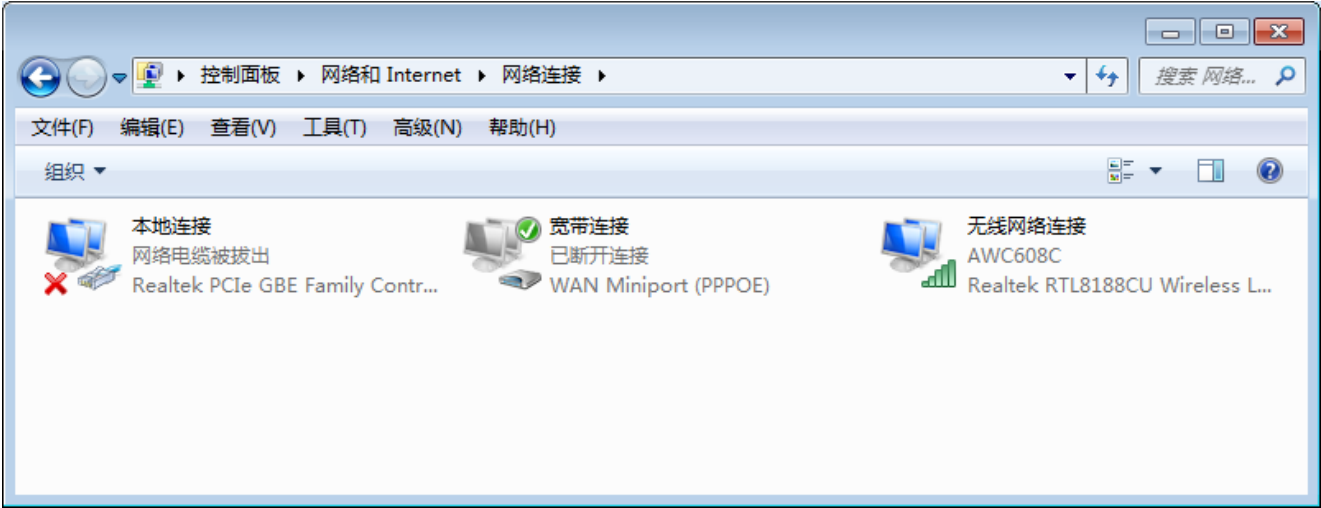
Double click Internet to open it.



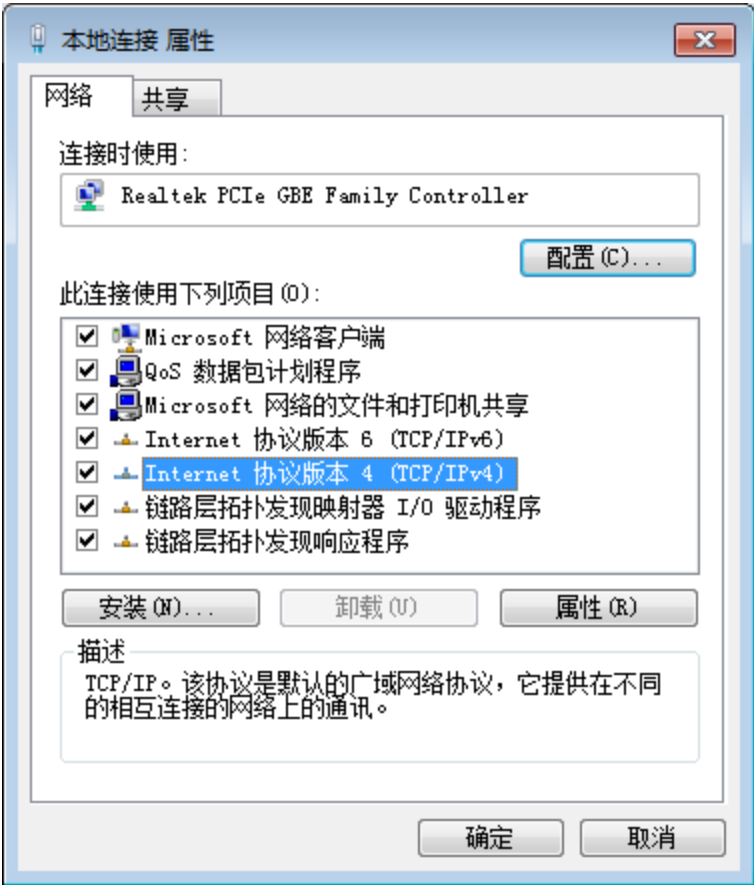
Click Network and Sharing Center



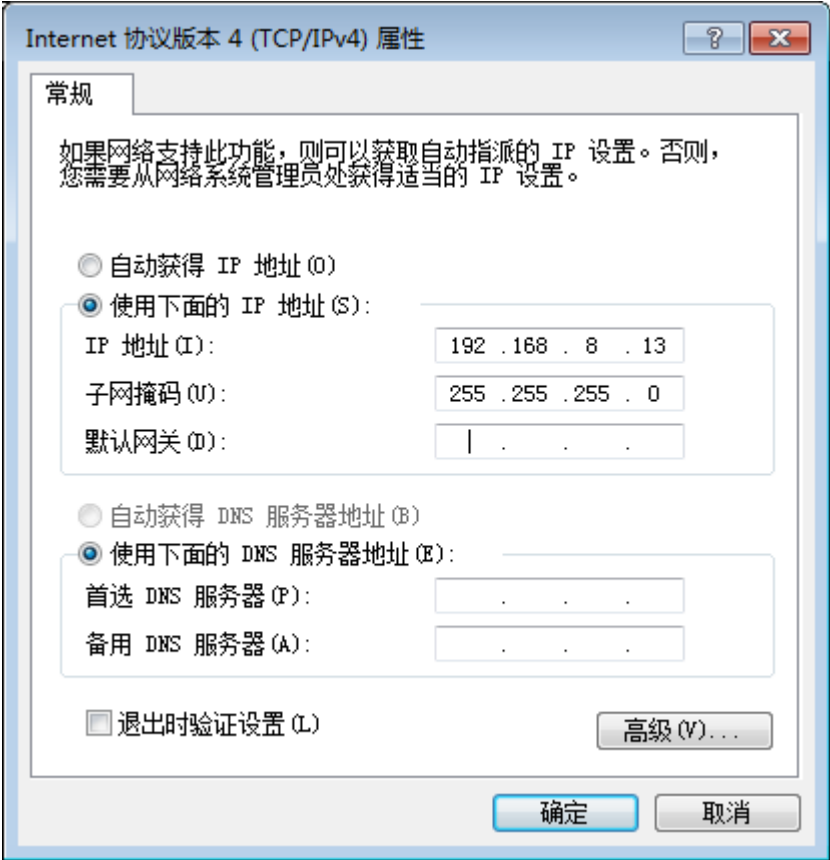
Click to change adapter settings



Double local area connection icon



Double click Internet Protocol Version 4(TCP/TPv4)



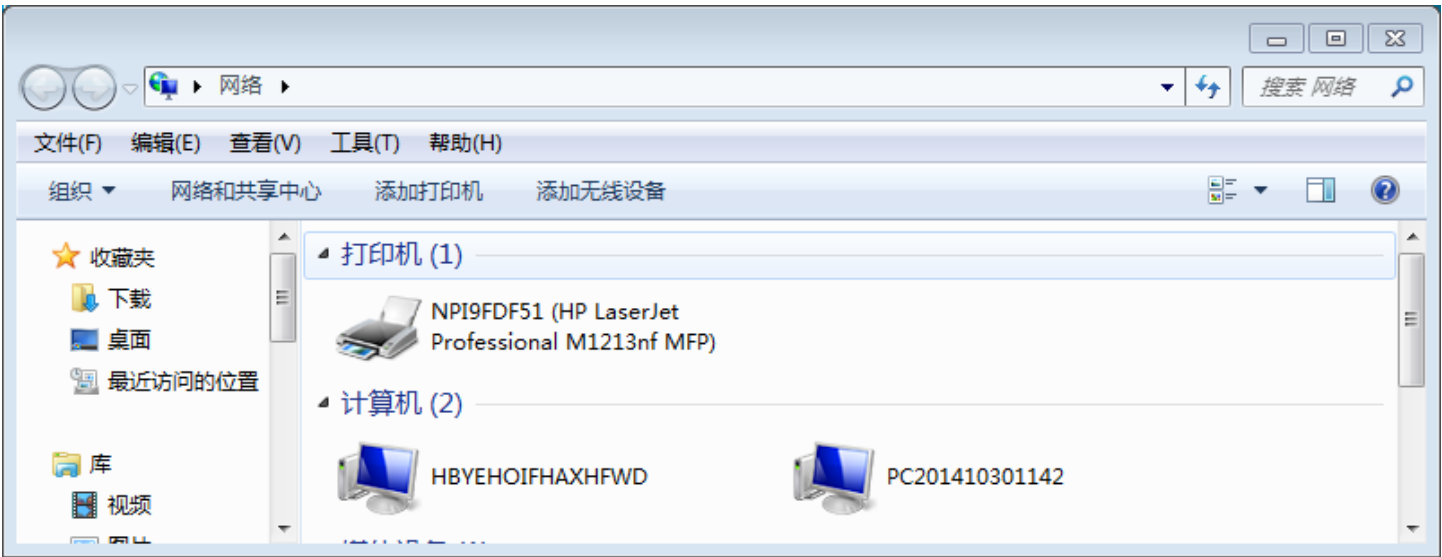
Select the following ip address.The Former three ip address must be the same as what in controller main board.The end one ip could select any one number between 0-255 except main board ip address.Then Click 【 OK 】 to finish it.

4.2.2 Connection through the router to main board.

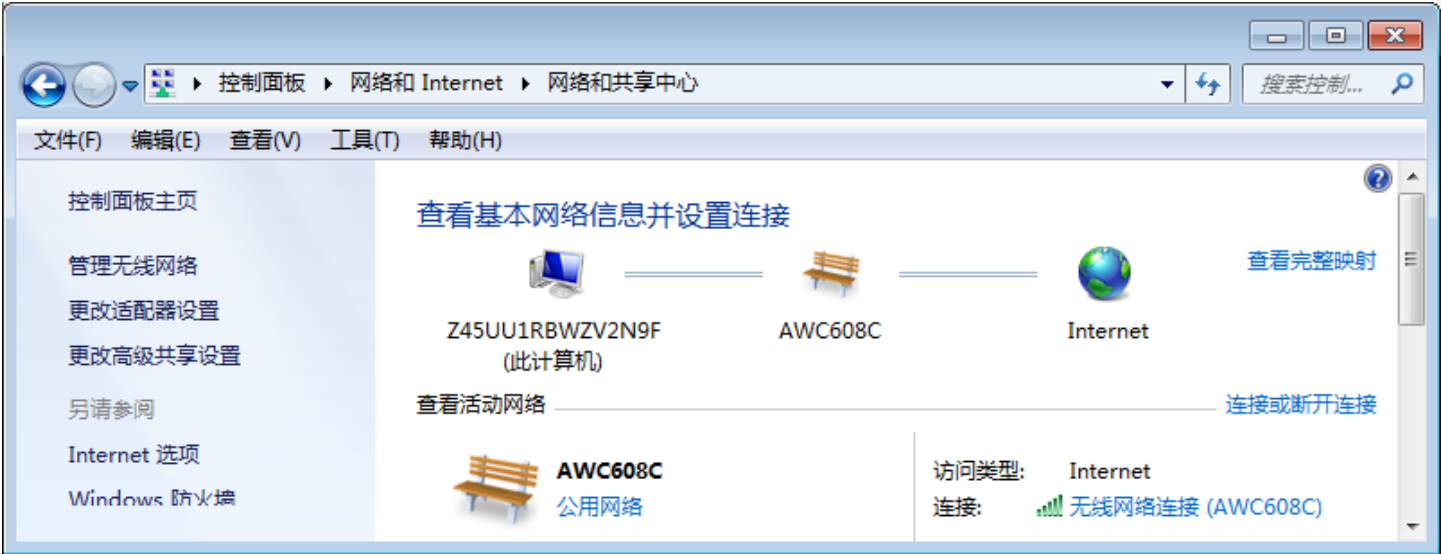
Computer setting the same as former.Ip address set as obtain ip address automatically.The Former three ip address must be the same as what in controller main board.The end one ip could select any one number between 0-255 except main board ip address.

Windows 7 System for example

Double click network to open it.



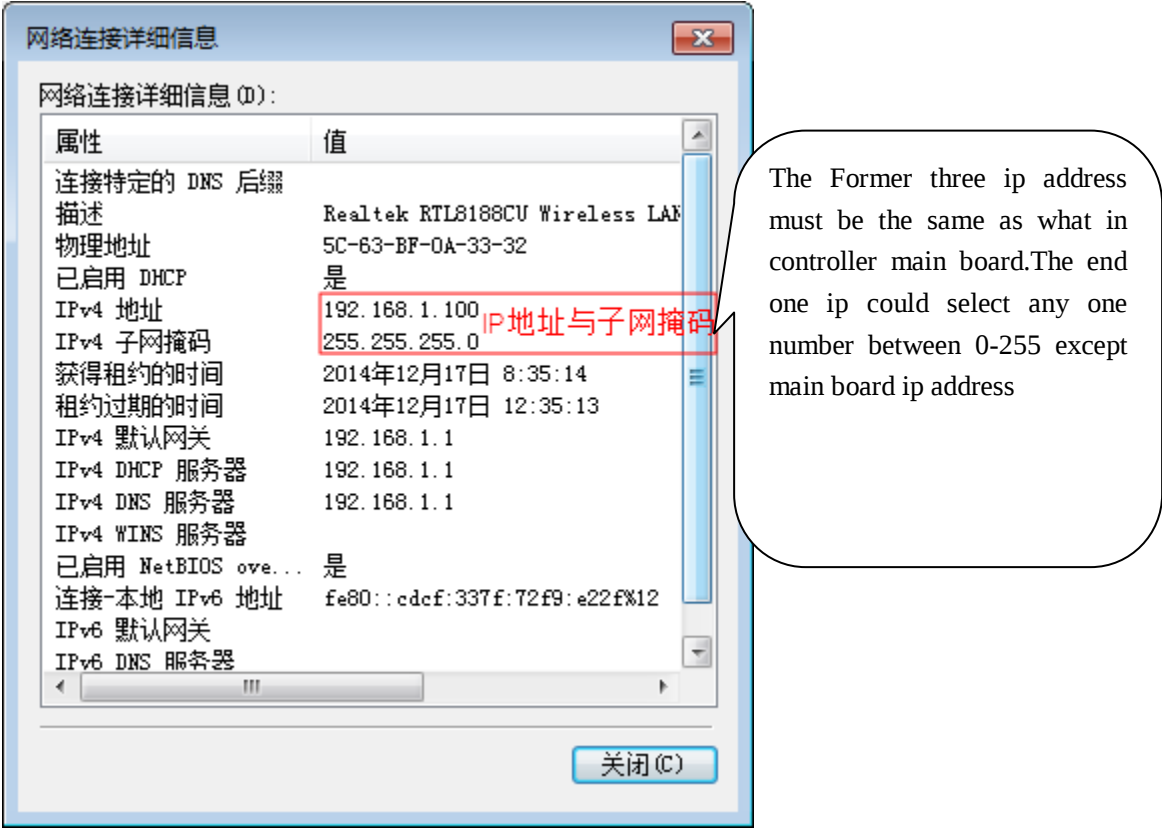
Click Network and Sharing Center



Click wireless router network connection



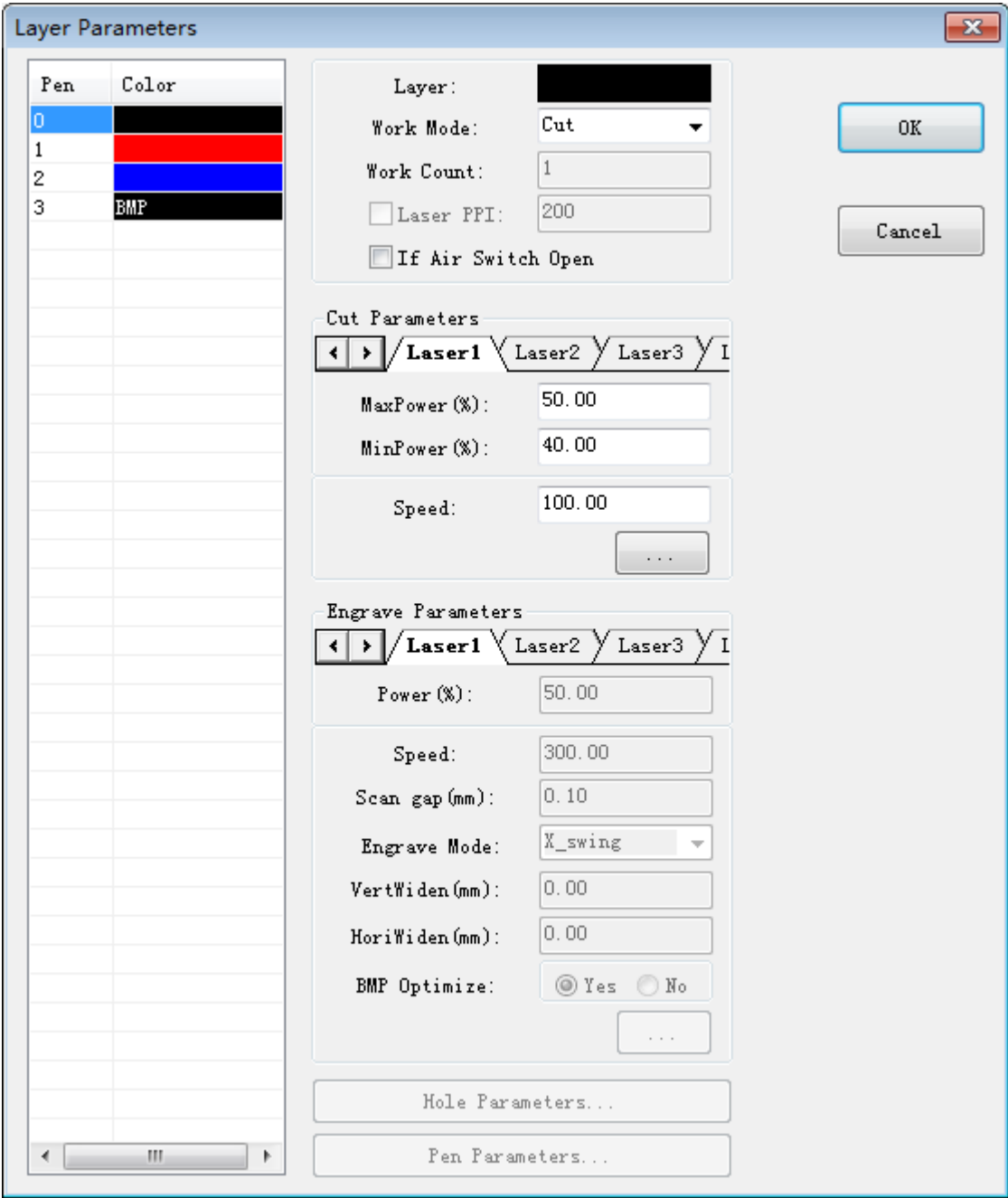
Click Details



4.3 Setting layer parameters.

Layer parameters

Click “Output” bar,could select if this layer will be used for processing.☒ means yes.☐ means no.Double click any row of parameters list(such as 激光切割 150.00 85.00 ☒).A dialog as follow:



● Layer

means the current layer which need to change parameters.could click layer bar in the left side to exchange them.

● Work Mode

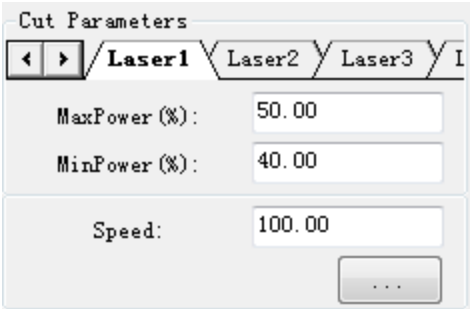
Includes “Cut”, “Engrave”, “Cut after engrave”, “Hole”, “Pen Run”. If current file format is BMP or bitmap layer,then it shows only “Engrave”(As bitmap layer is only used for laser engraving).

● If Air Switch Open

blowing air when cutting this layer.

● Cut Parameters

Select “Cut”or “Cut after engrave” in 【Work Mode】 ,cut parameters would be enable.As follow:



- **Speed**

working speed of laser head during cutting.

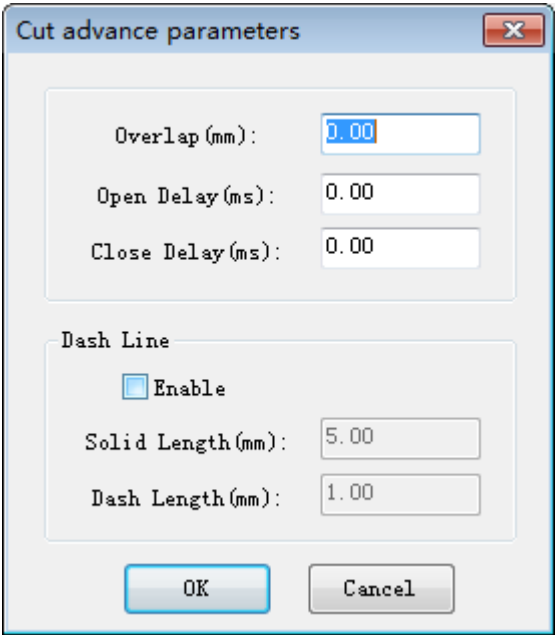
- **Max Power(%)**

Machine working power (unit is percent).Related to awc controller panel Laser 1 power.

- **MiniPower(%)**

In variable motion,the power in the lowest speed.Related to awc controller panel Laser 1 power.

setting cut advance parameters ,click  and a dialog as follow:



- **Overlap(mm)**

as the mechanical deviation,it may lead a closed graph cannot be cut down result.This parameters can help to solve this problem.However it should not be adjust too much.Suggest improve your mechanical parts precision to fix it.

- **Open Delay(ms)**

set open delay time before laser output.

- **Close Delay(ms)**

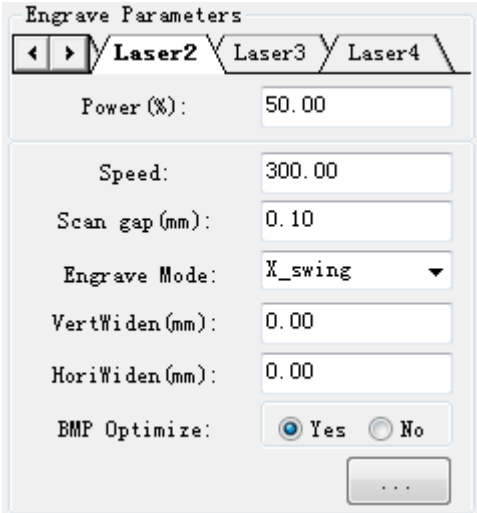
set close delay time after laser shut down.

- **Dash Line**

cutting graphic with a dash line way.Enable it and you can set the dash line length and single solid length.

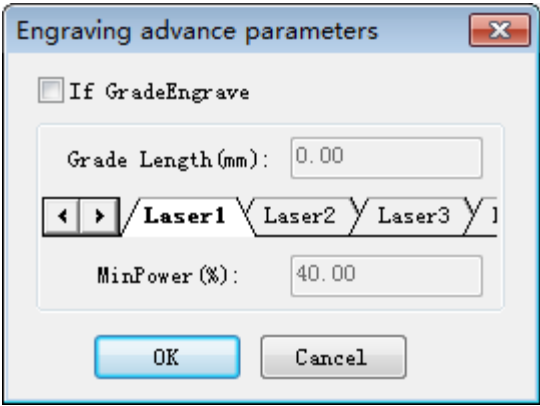
- **Engrave Parameters**

Select “Engrave” or “Cut after engrave” in **【Work Mode】**.And engrave parameters will be enable as follow:



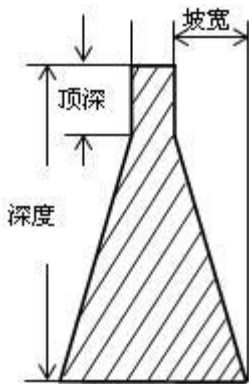
- **Speed**
scanning speed when engraving.
- **Power(%)**
adjustable laser power of processing the layer (unit is percent).
- **Scan gap(mm)**
gap distance of each scanning line
- **Engrave Mode**
includes X_swing,X_unilaserism,Y_swing,Y_unilaserism
- **X_Swing**
laser head do BACK AND FORTH repeat laser scanning graphics in LEVEL direction.
- **X_unilaserism**
laser head do back and forth repeat laser scanning graphics in level direction BUT LASER OUTPUT ONLY TOWARDS TO ONE DIRECTION.For example,when laser head do output scanning from right,it won't do optic output when towards to left.
- **Y_Swing**
laser head do BACK AND FORTH repeat laser scanning graphics in VERTICAL direction.
- **X_unilaserism**
laser head do back and forth repeat laser scanning graphics in vertical direction BUT LASER OUTPUT ONLY TOWARDS TO ONE DIRECTION.For example,when laser head do output scanning from top to bottom,it won't do optic output when towards from bottom to top.

Click  to enter engrave advance parameters



● If GradeEngrave

choose “Yes” and enable 【Grade Length(mm)】和【MinPower(%)】.Grade engraving schematic diagram:



● Grade Length(mm)

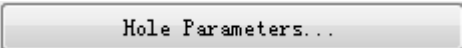
or “slope” in diagram.

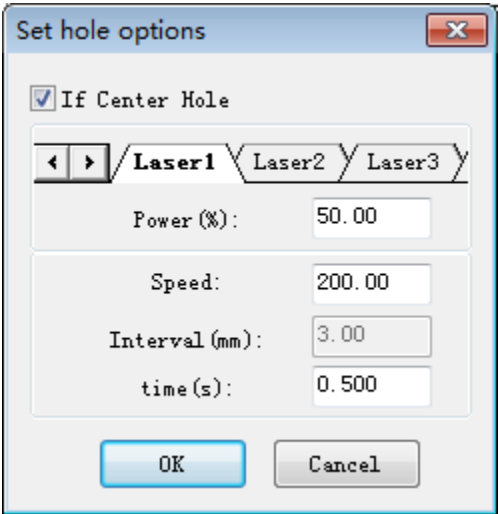
● MinPower(%)

min power of laser when doing grade engraving.This parameters decide top depth of slope. 【Power%】 decide the engraving depth.

● Hole

Select “Hole” in 【Work Mode】 and enable hole parameters.

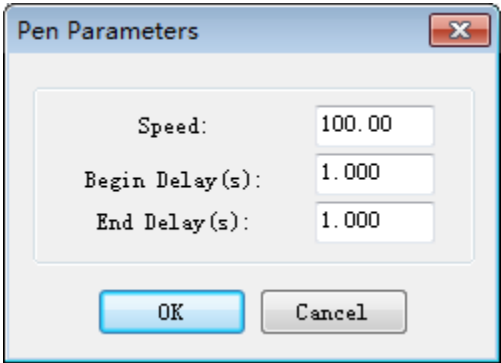
Such like .Press 【Hole Parameters】 and a dialog as follow:



● Power(%):

adjustable laser power when the layer is being processed.

- **Speed:**
laser head movement speed.
 - **Interval(mm):**
distance of each hole
 - **Time(s):**
each period laser head will stay when drilling
- Pen Parameters



- **Speed:**
movement speed of pen.

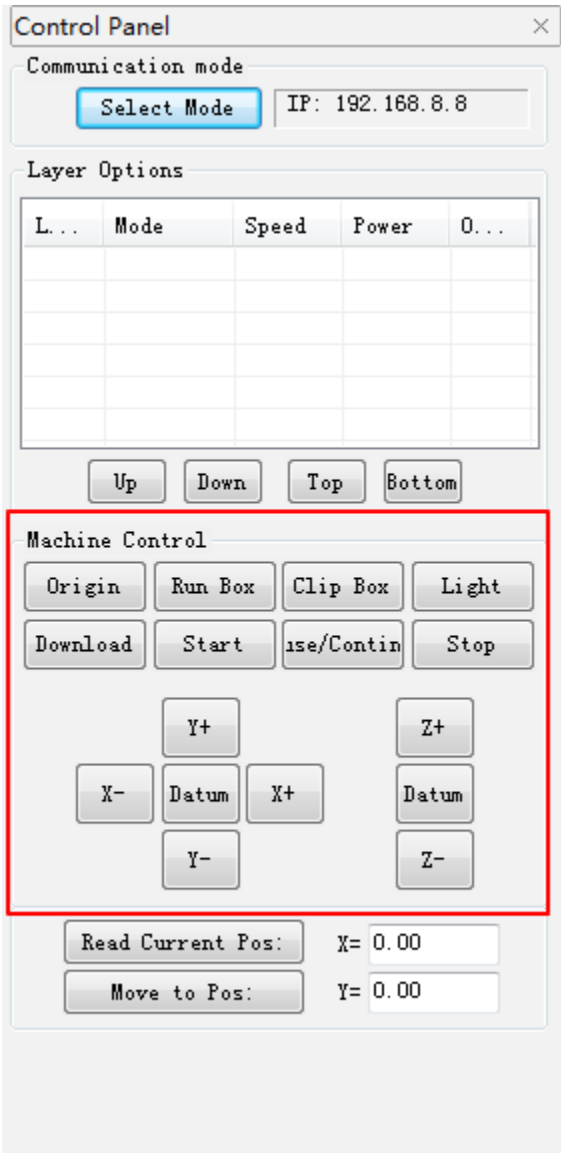
4.3.1 Adjust layers processing order

Default processing order in layer list is from top to bottom.If you need change it,just select any one layer and press Up , Down , Top , Bottom to finish it.

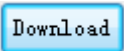
※Only select **【Order by layer】** in Route optimization parameters ,this function will work.

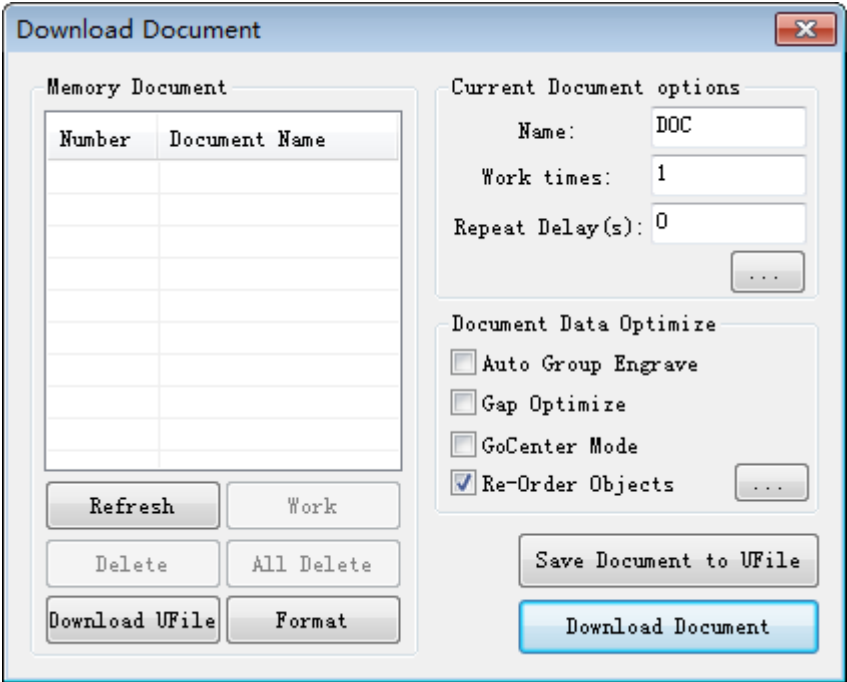
4.4 Machine Control

【 Machine Control】includes control operation on importing graphics,starting process and other simple machine stuffs.



4.5 Download graphic parameters management

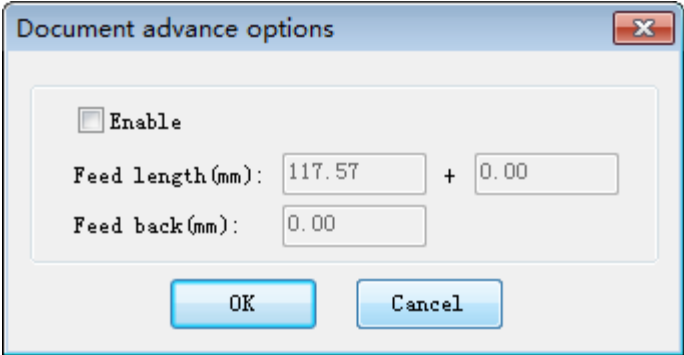
Click  button and a dialog as follow:



Current Document options

- **Name**
name of file downloaded to main board.
- **Work times**
processing time of file downloaded.After it's started ,system could do repeat processing on this file parameters.
- **Repeat Delay(s)**
delay time after one processing program is finished during repeat processing.

 : Document advance options setting.Click this button and a dialog as follow.Then click **【OK】** to finish it.



- **Feed length(mm)**
feeding distance of feed axis(or z axis) after each processing finished.
- Document Date Optimize
Auto Group Engrave
- **Gap Optimize**

When cutting complex graphics,if this option is enable,system will decide cutting direction automatically to do mechanical backlash compensation.However it will greatly add length of space running.Normally not recommend.

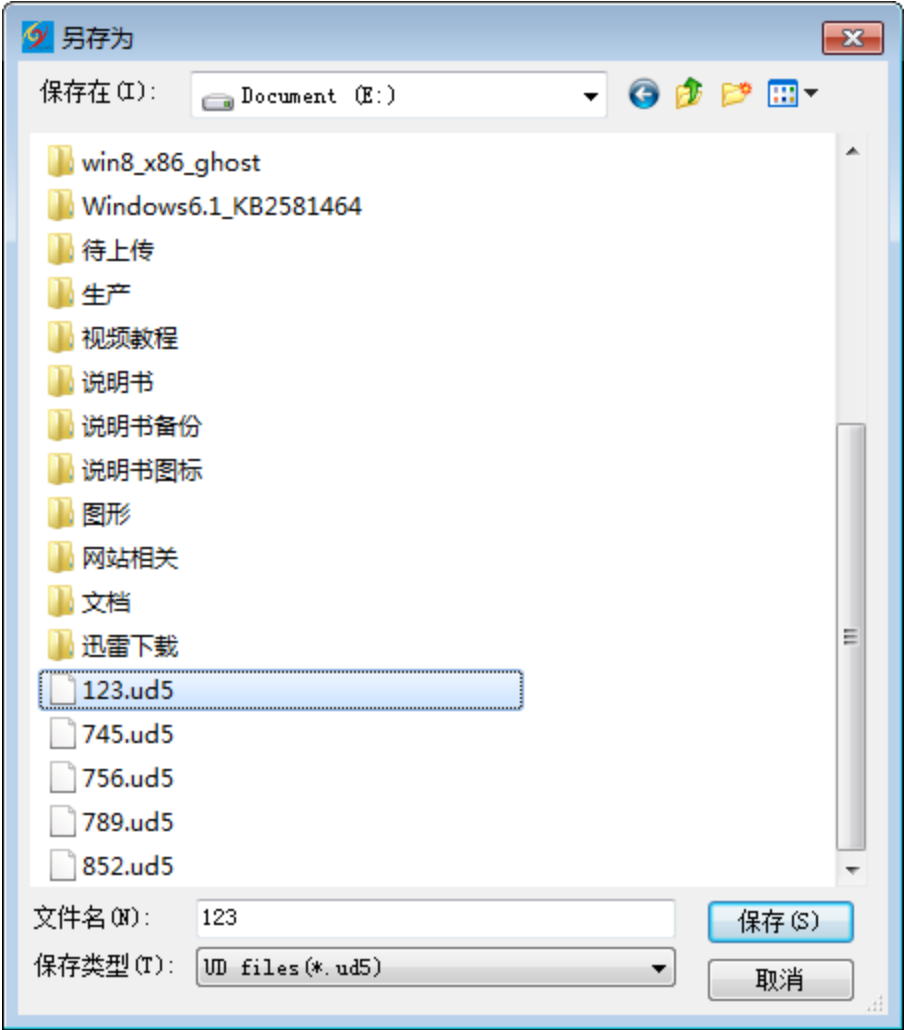
● Re-Order Objects

When it is enable,system will do a 【Route Optimize】 on file graphic parameters.

Export file parameters

Saved it as off-line file(or *.ud5 file).Then copy it with U disk to controller main board.Press

【Save document to Ufile】 and dialog as follow:



Input file name and press 【Save】 to finish it.

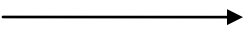
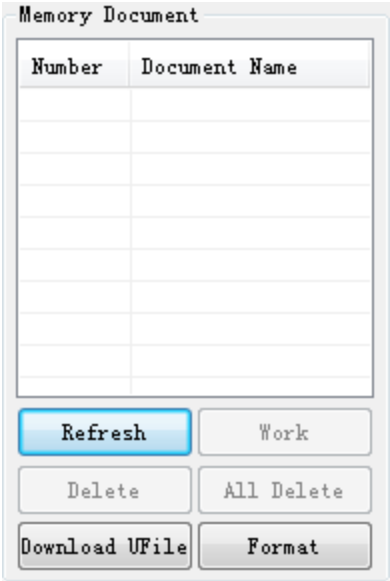
Directly download file parameters via USB or network mode to controller main board.

Device file management

Manage the files saved in main board storage.

● Refresh

or check all files saved in main board storage.Click  all files name saved here will be presented in device file list.



“2” , “1” , “003” , “abc” 。
Main board saved four files: “2”,
“1”, “003”, “abc”

● Work

select a file in files list and click  to start the processing program on it.

● Delete

select a file in files list and click  button. Then this file will be removed from main board storage.

● All Delete

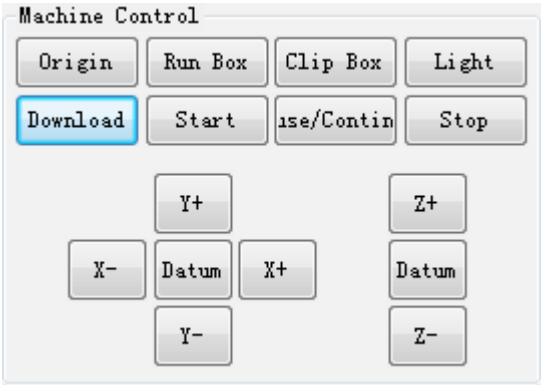
remove all files in controller main board storage.

● Format

format controller main board storage. All files saved here will be lost.

Download UFile: download Ufiles saved in computer (ud5 files) to main board. Click  and a dialog appears. Then select the Ufile or ud5 file you need to load and click **【Open】** to finish it.

4.5.1 Start processing and relative control

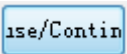


● Origin:

set laser head current position as origin point.

● Start:

start current selected file in controller main board to do process.

Click  to switch two states: pause and continue.

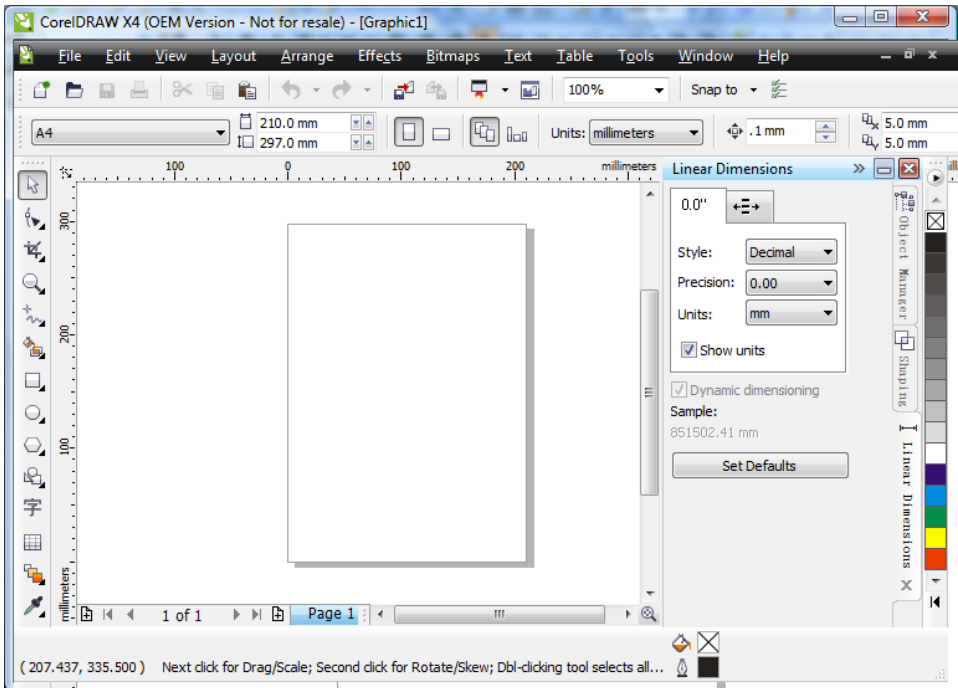
- **Stop:**
machine stop current task.
- **Run Box:**
laser head will do a space run along a relative working parameters rectangle.This craft is used for ensure the position of processed materials.
- **Clip Box:**
cutting a completed processed file off from materials.
- **Light:**
press ,laser output.And loose it,laser shut down.
- **Datum:**
click this button and laser head (or Z axis)will move to machine zero point with a low speed.Once touched machine limit switch,it will move to origin point fast.This function could reduce cumulative deviation.Recommend once before processing program started.

Move laser head(or Z axis).When press relative button,laser head (or Z axis)start to move.When loose button,laser head (or Z axis)will stop move.

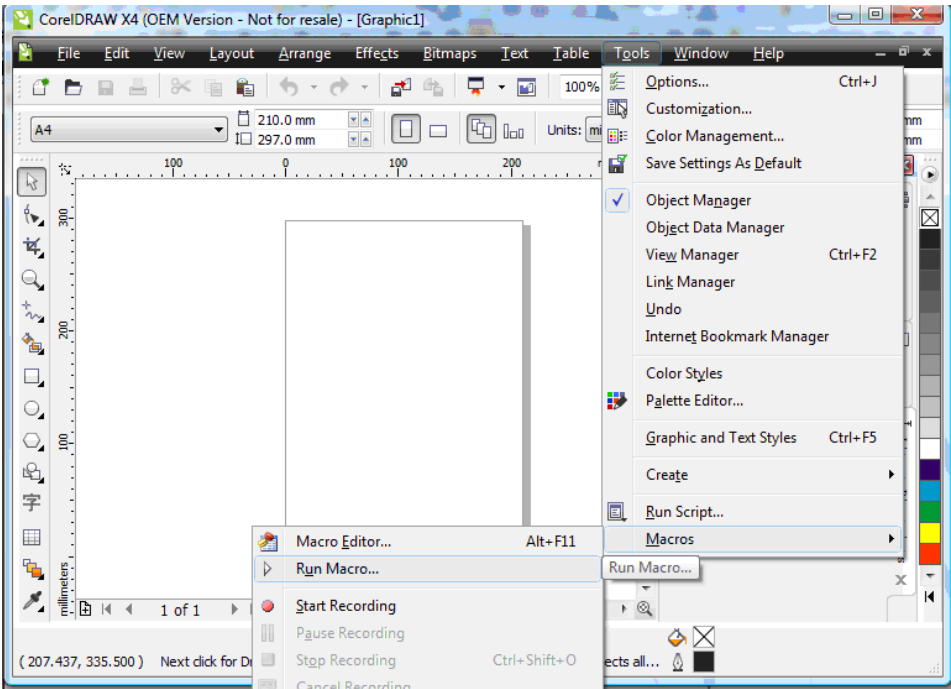
5 CorelDraw Based Software

5.1 Manual Download Tool “AWCLaserCut”

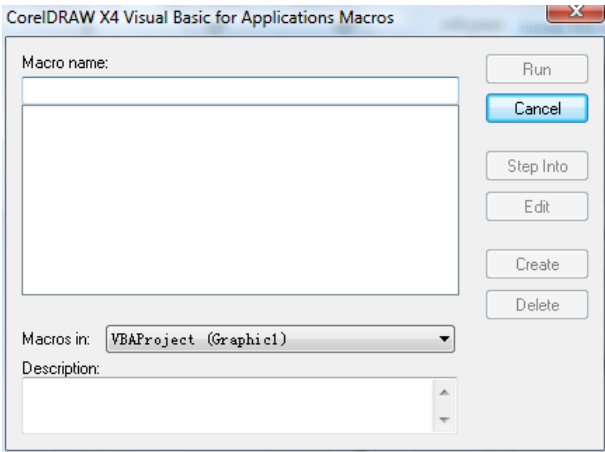
After installation of CorelDraw direct output, (refer to Chapter 2 Installation of Software) ,start CorelDraw, Main interface of CorelDraw12 shown as below:



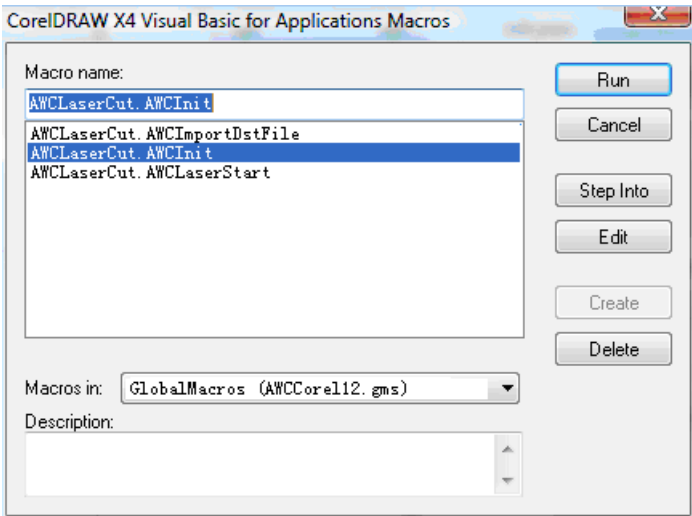
- (1) Click menu 【Tool】 / 【Macro】 / 【Run Macro】 as follows:



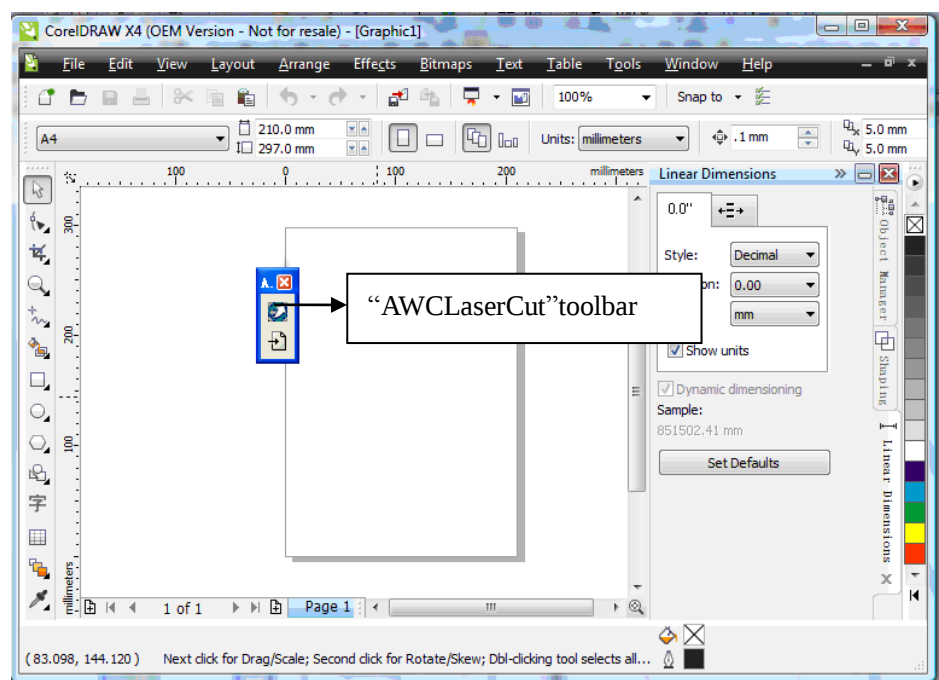
(2) Dialog displayed as follows:



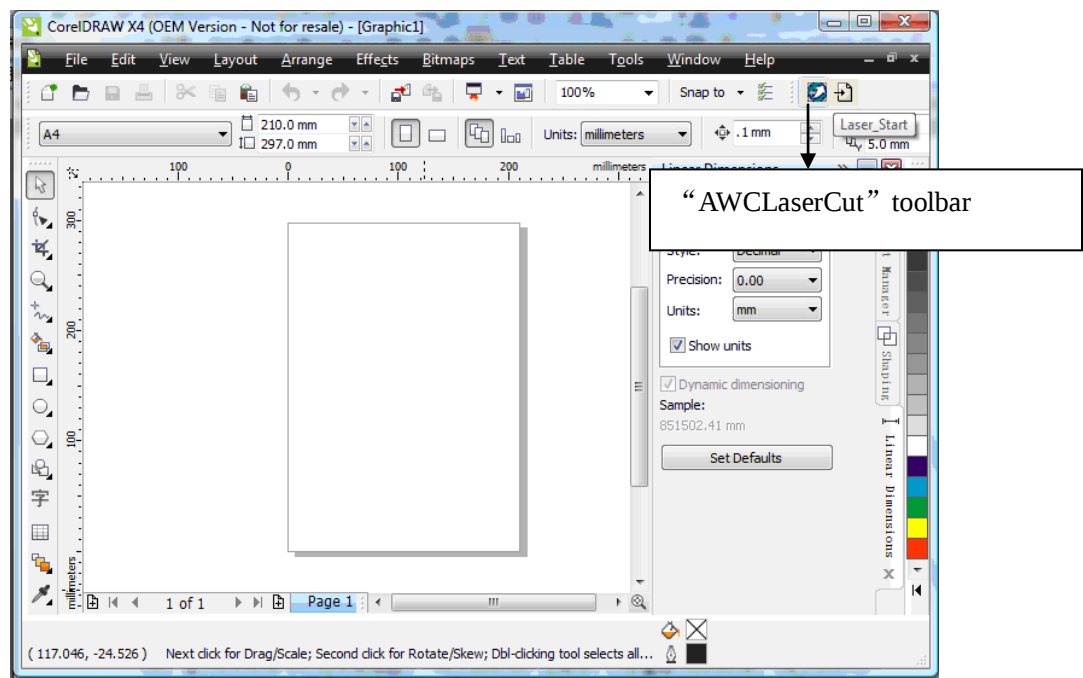
(3) At 【Mocras in】 select “AWCCorelEx.Gms” or” AWCCorel12.Gms”, then at 【Mocra name】 select “AWCLaserCut.AWCInit” as follows:



(1) Click 【Run】 , main interface of CorelDraw can add tool “AWCLaserCut” as follows:



(5) Use mouse to drag tool “AWCLaserCut” to toolbar as follows:

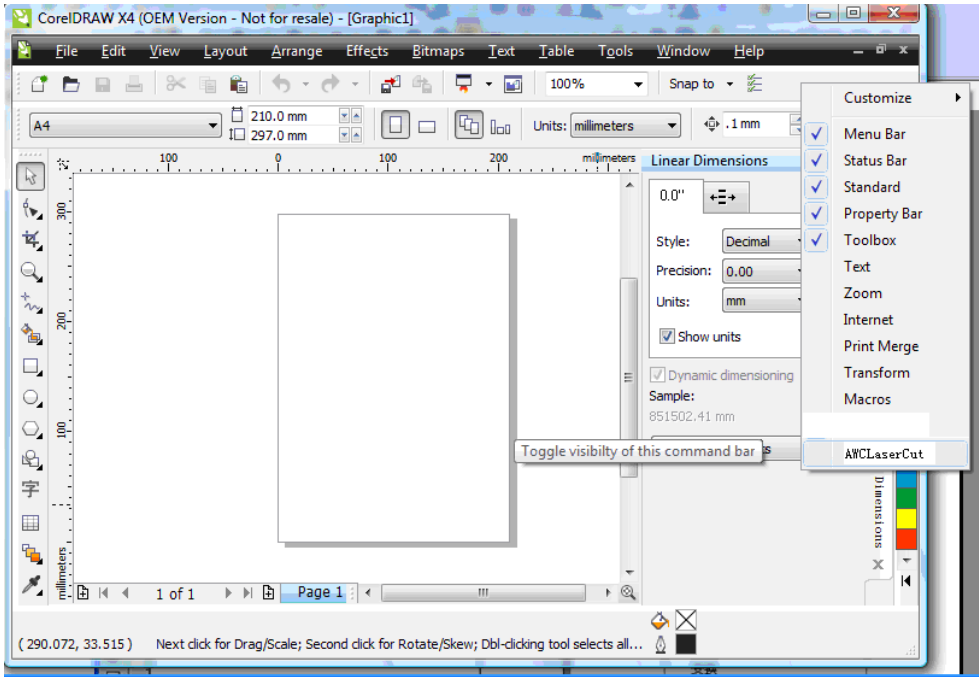


(6) After manual loading tool “AWCLaserCut”in CorelDraw, then re-start CorelDraw, “AWCLaserCut” Tool will display in toolbar.

5.2 Display hidden tool “AWCLaserCut”

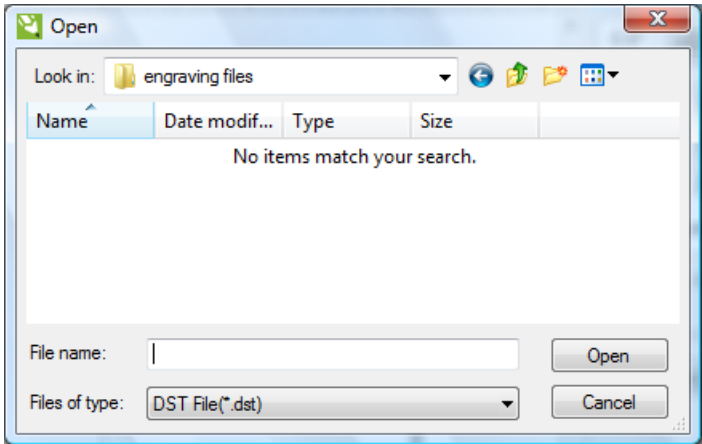
User will close tool “AWCLaserCut” carelessly during using CorelDraw, so hidden tool should be displayed, operation as follows:

Right click toolbar to display a list, then click 【AWCLaserCut】 as follows:



5.3 Import DST/DSB file

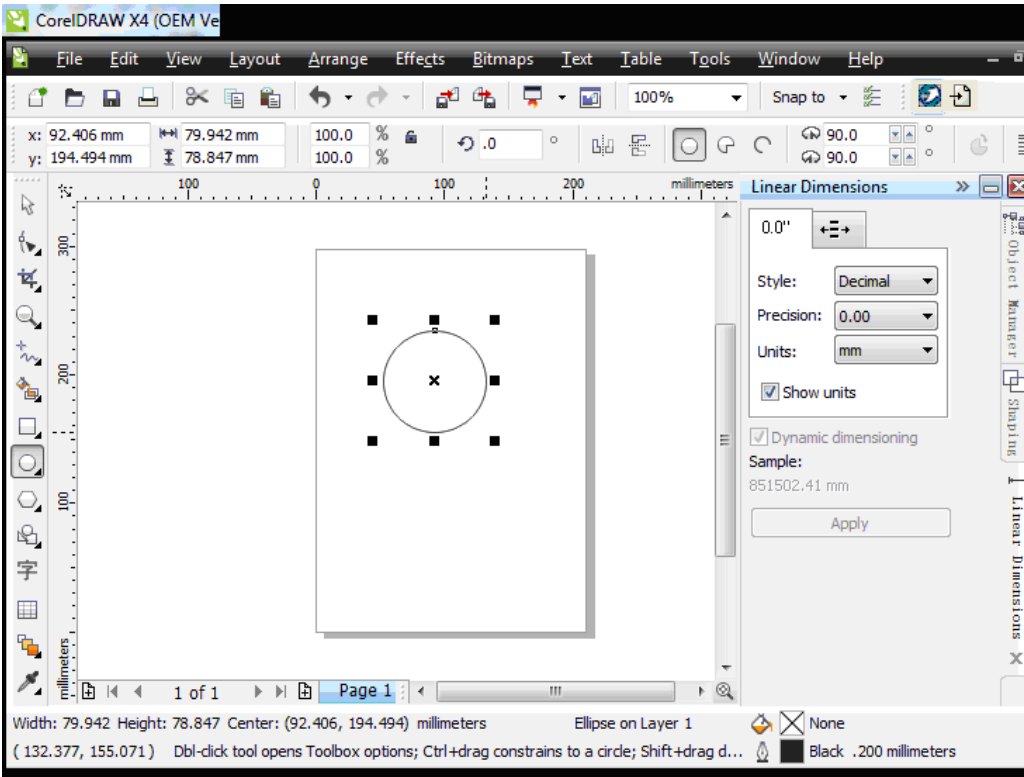
Click import button  of tool “AWCLaserCut”, dialog displayed as below:



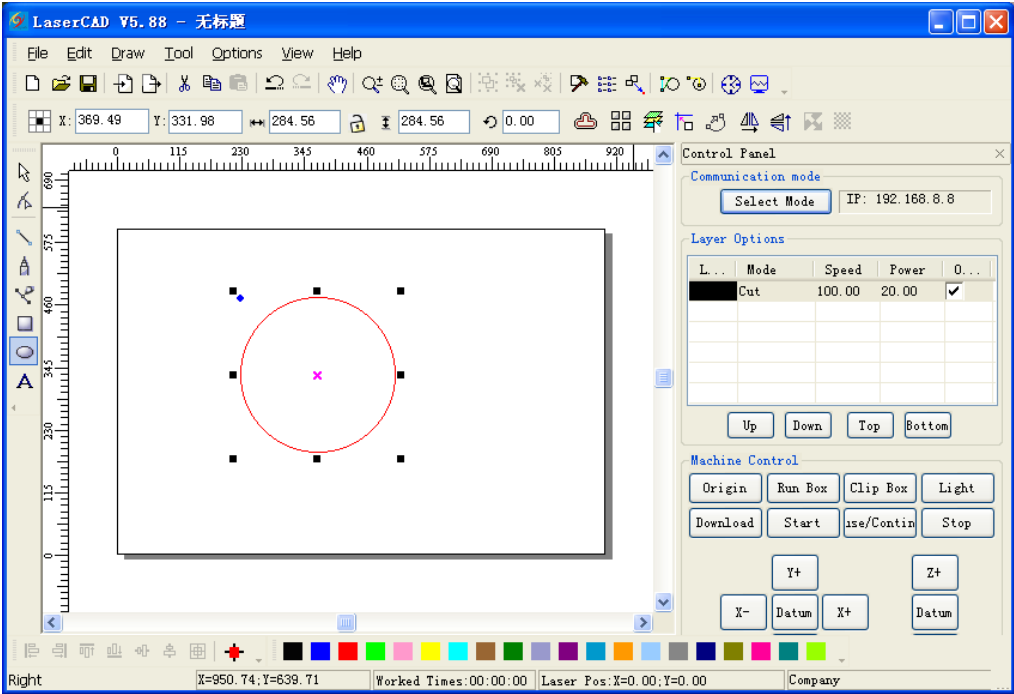
Select DST/DSB file to be imported, then click **【Open】** .

5.4 Switch CorelDraw to LaserCAD

Edit diagram in CorelDraw as follows:



Click to switch to LaserCAD directly. And edited diagram in CorelDraw will display in the view of LaserCAD as follows:



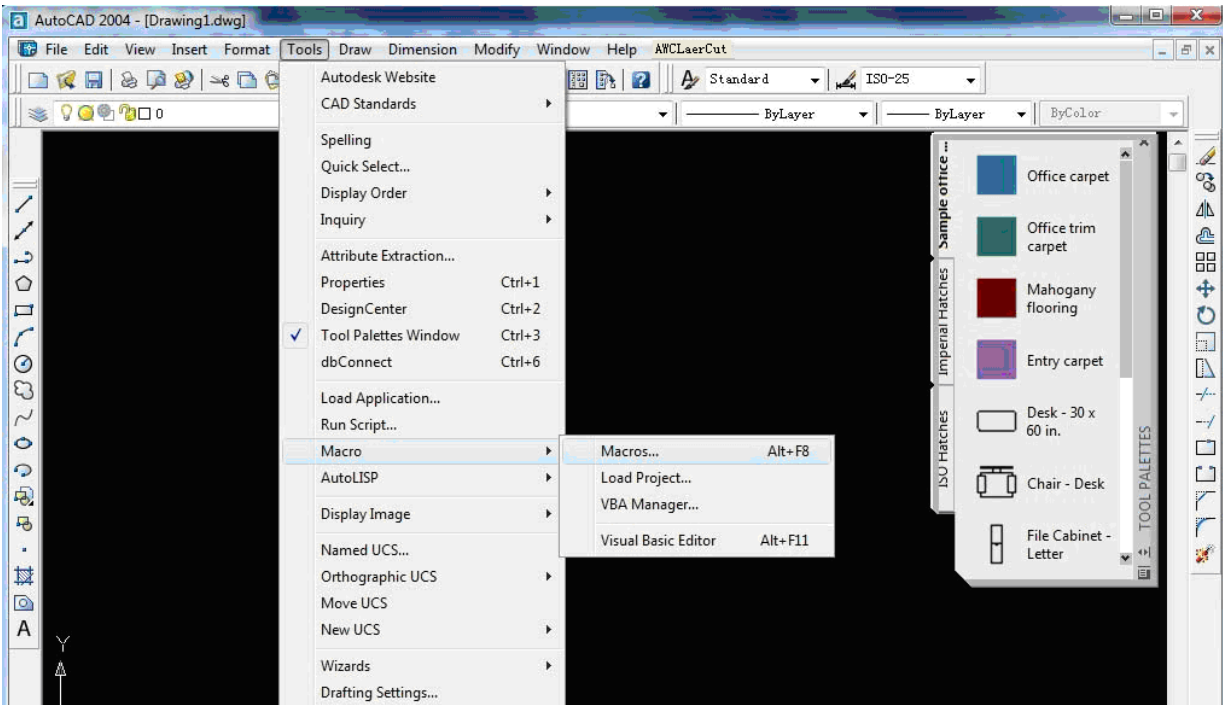
In this case, we can complete laser machining by LaserCAD.

6 AutoCAD Based Software

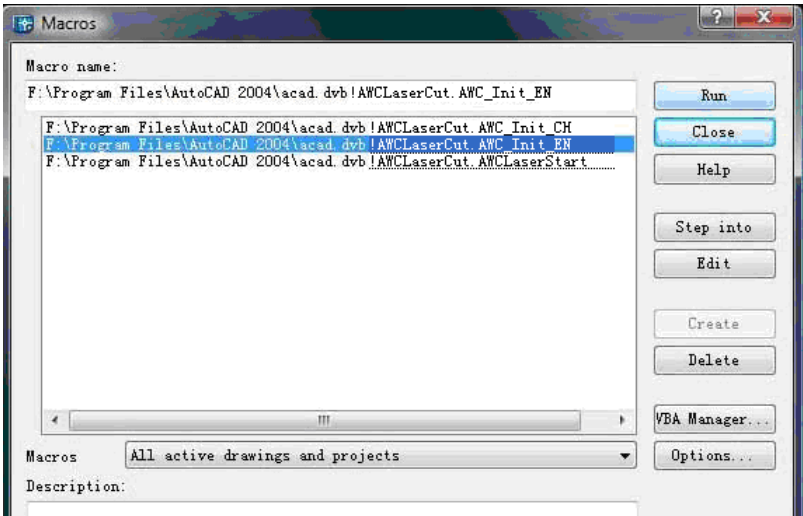
6.1 ADD AWCLaserCut toolbar.

After installation of AutoCAD direct output, (refer to: Chapter 2 Installation of Software), start AutoCAD, the main interface doesn't display menu **【Laser machining】** and tool **【Laser machining】**, at the moment, it should be downloaded manually. Operation as follows:

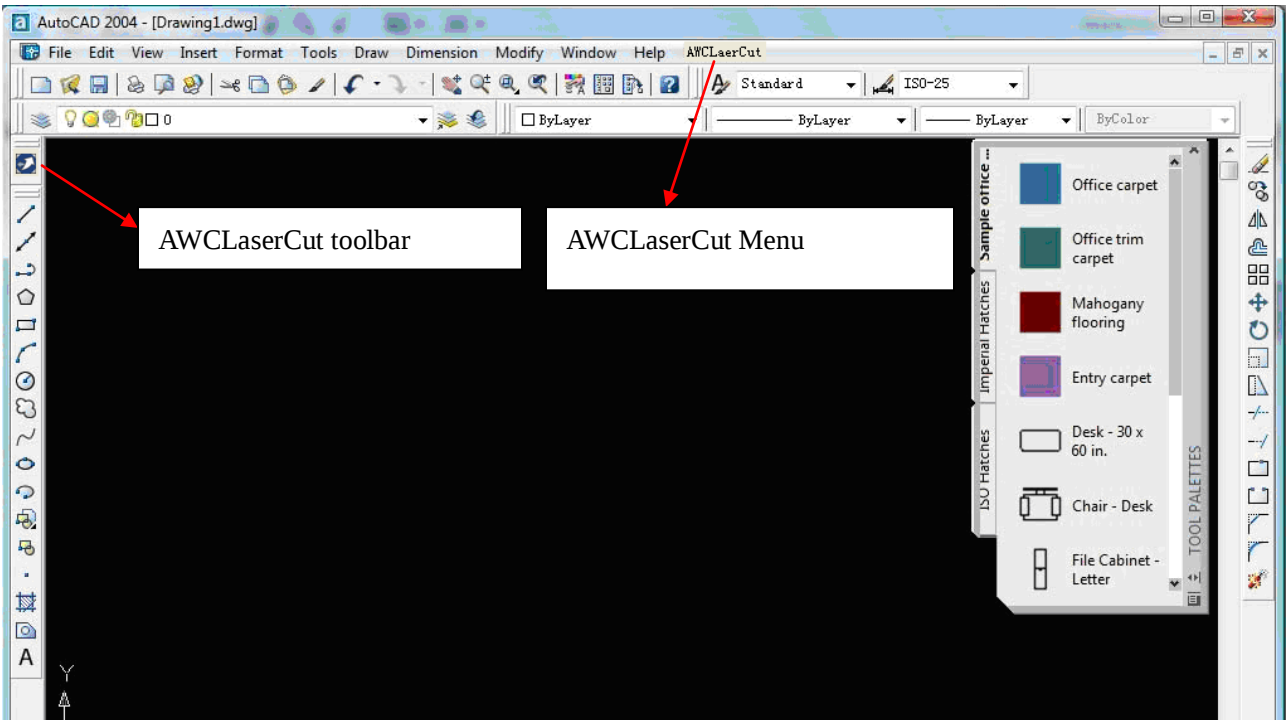
- (1) Click menu **【tools】 / 【Macro】 / 【Macro】**, shown as below:



(2) Dialog displayed as follows:



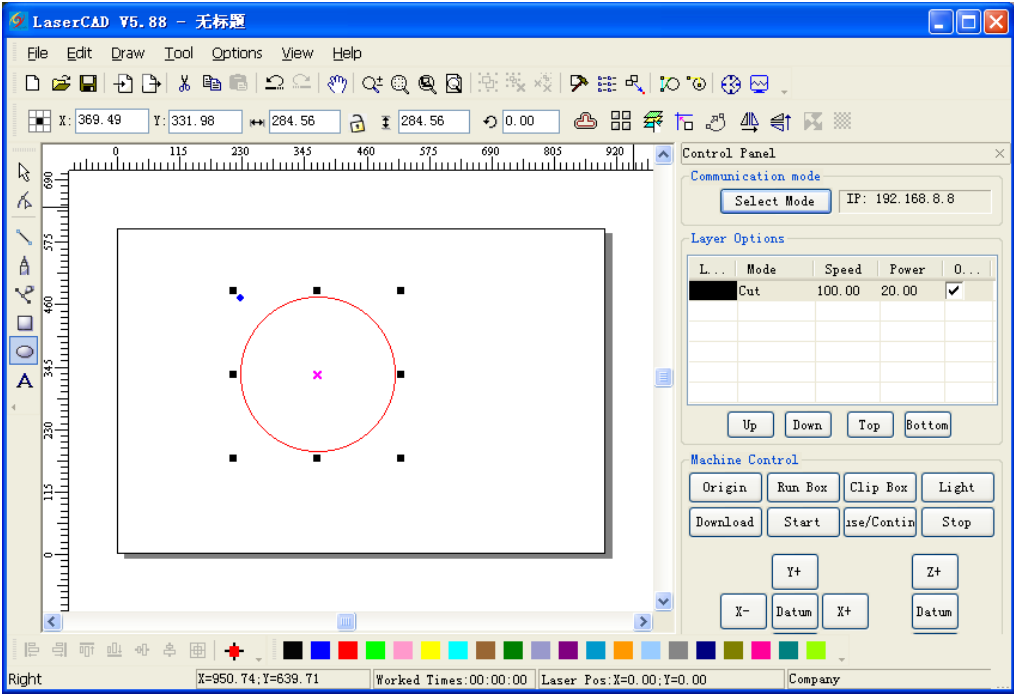
(3) In 【Macro name】 to select“...AWCLaserCut.AWC_Init_EN”, and then click 【run】 ,menu “AWCLaserCut” and tool ”AWCLaserCut”, as follows:



6.2 Switch AutoCAD to LaserCAD

Edit diagram in AutoCAD as follows:

Click menu 【AWCLaserCut】 / 【LaserCut】 ,or click  to switch to LaserCAD and edited diagram in AutoCAD will display in the view of LaserCAD as follows:



In this case, we can complete laser machining by LaserCAD.

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