

**Laser Engraving and Cutting Software**

# **Operation Instructions**

If the actual operation mode and the function settings etc. are inconsistent with the Operation Instructions caused by upgrade of software, the software shall prevail.

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# Chapter I Overview

## 1.1 Introduction to laser engraving and cutting system

The laser engraving and cutting system realizes effective control of laser NC machine tool via computer and finish processing task according to different requirements of users.

The system includes control mainboard, control panel and supporting software. The Instructions introduces how to use the software to finish laser processing task.

**(Refer to supporting Wiring Instructions for Mainboard and Operation Instructions for Control Panel for operation of mainboard wiring and control panel)**

Main features of the system version are perfect operation interface, addition of preview function of latest file based on 5.60 version and multi-window file function.

## 1.2 Type of software version

There are three versions: general version, CorelDraw direct output version and AutoCAD direct output version

## 1.3 File formats supported by the software

Vector formats: dxf, ai, plt, dst, dsb etc.

Bitmap formats: bmp, jpg, gif, png, mng etc.

## 1.4 Requirements of software for operation system environment

- It is the operation system running in WindowsXP version or above. It is suggested to use WindowsXP.
- CPU 586 or above. P<sub>4</sub> or above P<sub>4</sub> are suggested.
- It is suggested to use 1G memory or above.

## 1.5 Functional characteristics of control system

- Voltage: operation panel 5V/3A and mainboard 24V/5A
- Super large true color touch display screen with function of clear preview image and trace of graph working track.
- Friendly HM interface and simple operation for easy learning and understanding
- Independent software which can make simple graphs and words and edit and typeset the imported data
- Support multi-file management. Multiple graphic files can be opened at the same time.
- Adopt high-speed machined micro-line segment prospect S type smooth transition algorithm
- 2-grade interpolation mode and fast and stable cutting without saw tooth
- Multi-level and layered processing for graph and change of output sequence

- Many saving modes for graphs and processing parameters for convenience of repeated use
- Graphical simulation, man hour forecast and pricing function
- Multi-patch optimization function and adjustment of power and speed during graph processing
- Set starting and ending point of processing, working path and laser head docking position during finishing based on different processing demands
- Accurate double-head mutual-moving function, automatic material feeding, automatic focusing and platform lifting function
- Automatic adjustment and compensation of machine clearance and perfect image processing function
- ♦ Support many communication modes. User can choose USB communication or network communication. In USB communication mode, the port can be automatically searched without the need of manual set.
- Accurate continuous engraving function after power recovery. In case the power is in failure during processing, after power recovery, the processing work can be restarted at the power failure position to avoid waste of material.
- The system supports multi-axle control (X/Y/Z/U). Machine can realize different functions depending on different types. Rotary engraving is enabled. Z axis is for platform lifting/automatic focusing/ dual-head move and U axis is for material feeding.
- The system supports online upgrade and U-disk import and export function. It is compatible with U-disks with different brands.
- Super-large capacity: 512M memory for storage at your will.

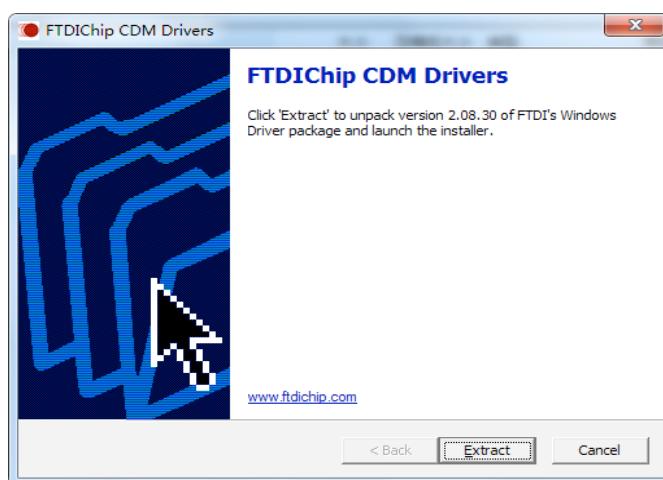
## Chapter II Installation of Software

### 2.1 Simple steps for installation of software

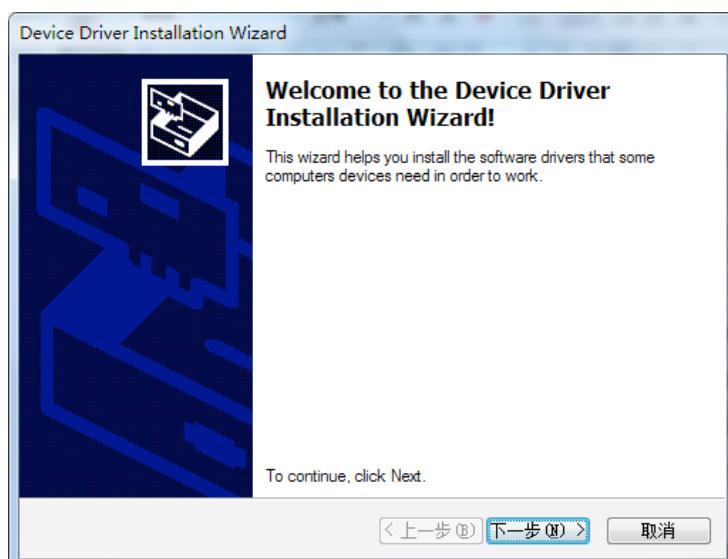
- (1) Double-click the Setup.exe in installation directory and then the following dialog will appear:



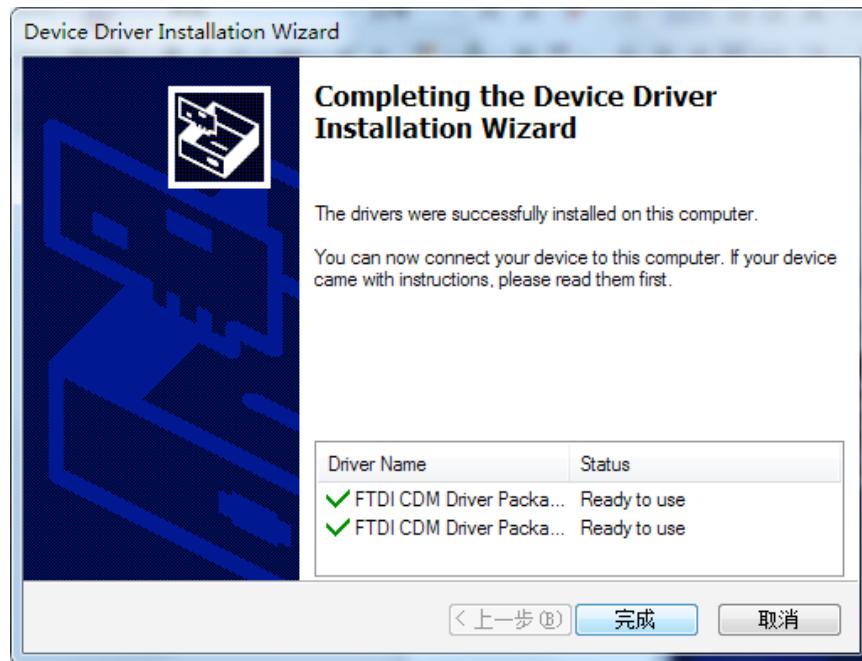
- (2) Click 【Installation of Driver】 and then the following dialog will appear:



- (3) Click 【Extract】 and then the following dialog will appear:



- (4) Click 【Next】 and then the following dialog will appear:

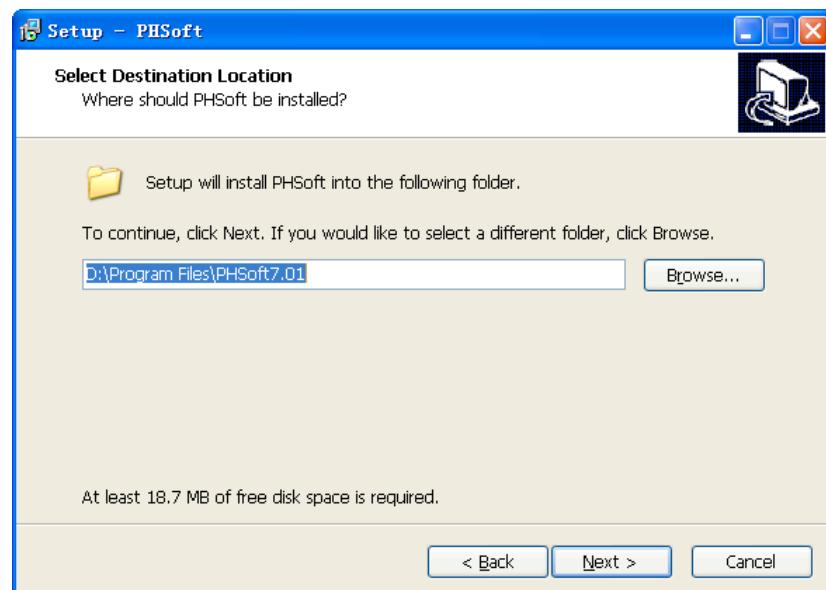


- (5) Click 【Finish】 and 【Install Main Program】 , and then the following dialog will appear:

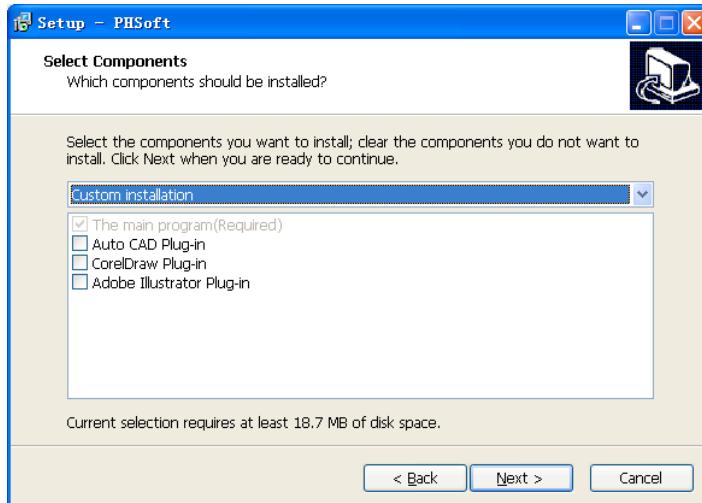


Note: the language selection herein refers to language type during installation (including Simplified Chinese and English) instead of language on software interface.

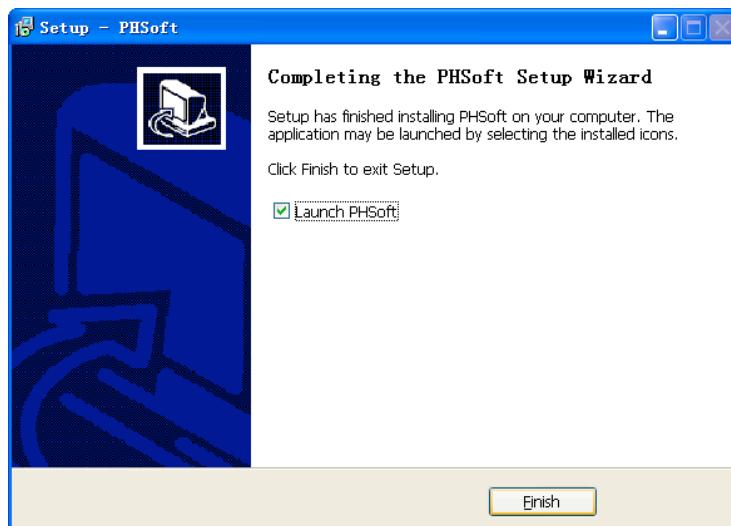
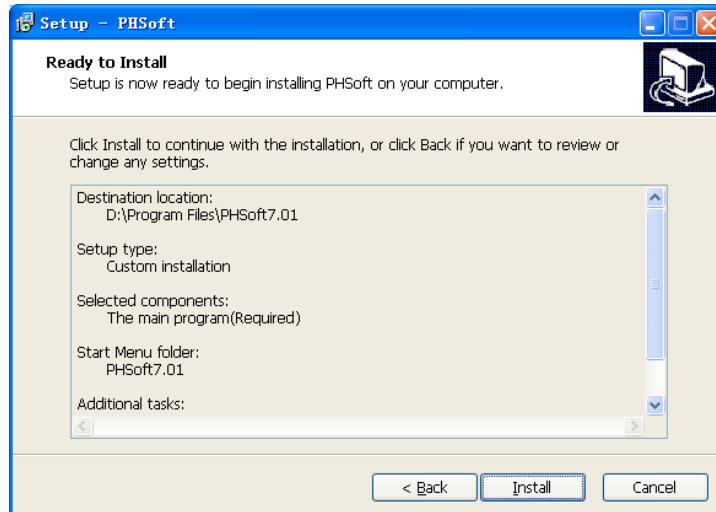
- (6) Click 【Enter】 , and then the following dialog will appear:



(7) After selecting installation path, click 【next】 , and then the following dialog will appear:



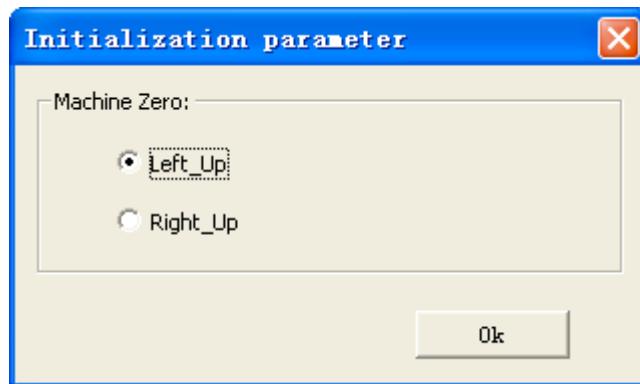
(8) After selecting a drawing software to be embedded, click 【next】 , and then the following dialog will appear:

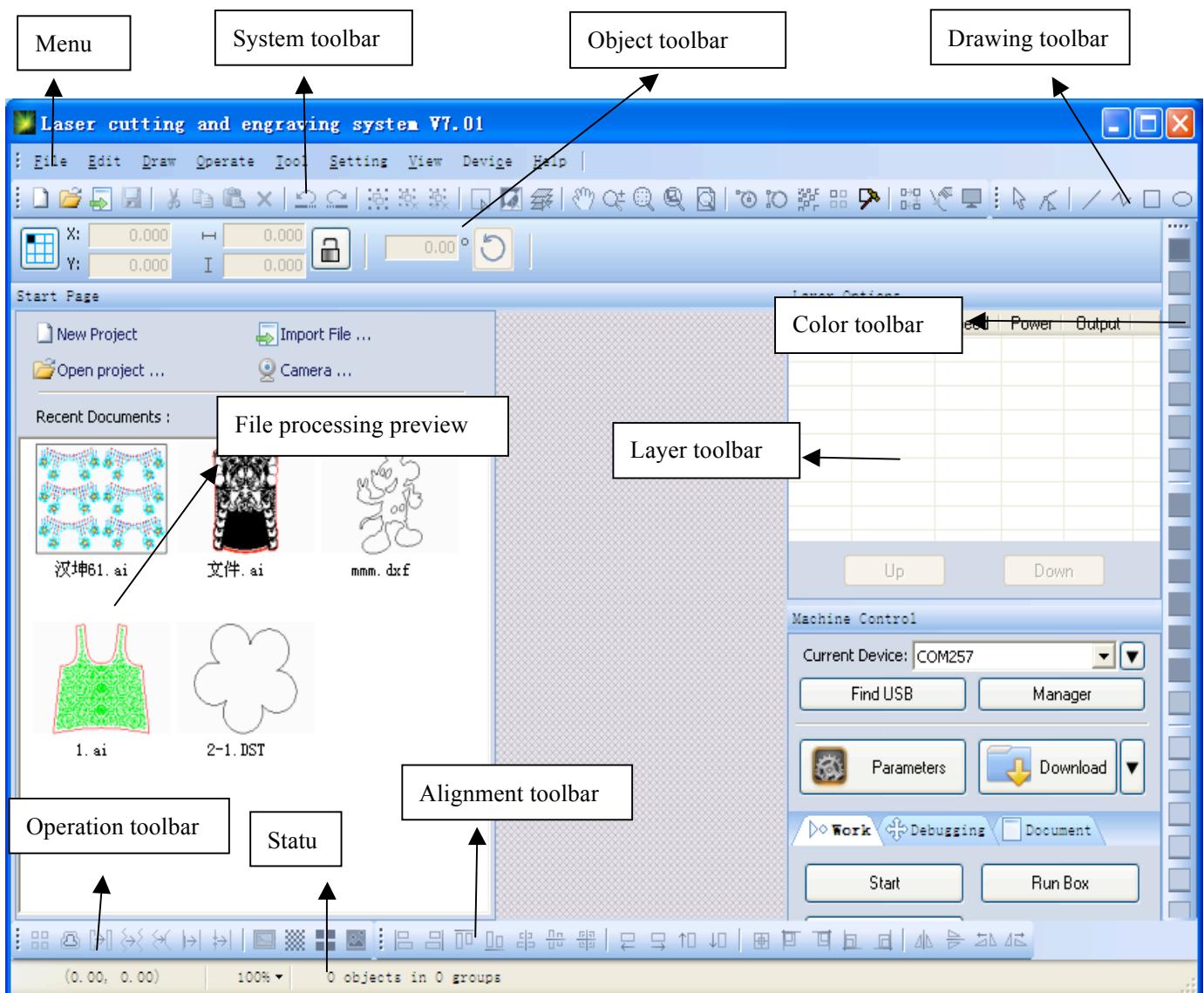


## Chapter III Basic Operation of General Software

### 3.1 Main operation interface

After starting the software, the operation interface in following figure will be displayed. Acquaintance of the operation interface is the basis of laser processing via software.





Menu bar: main functions of the software can be finished by implementation of command options in menu bar. Implementation of menu command is the most basic operation mode. The menu bar includes file, edit, draw, operation, tools, settings, view, device and help.

System toolbar: in which, there are many commonly used function options in form of command button. Most of those function options are selected from menu.

Object toolbar: provide relevant properties during selecting object and using tool. Set of relevant properties in property bar can control relevant change of object.

Edit toolbar: in left position of working area in default. In which, there are commonly used edit tools for more flexible and convenient operation.

Alignment toolbar: align many objects for perfection of typesetting of page.

Layer toolbar: change color of selected object. One color is one layer.

Control panel: finish many laser processing tasks, including set of communication port, set of layer parameter and load of image etc.

Recent file: recently opened image.

### 3.2 File:

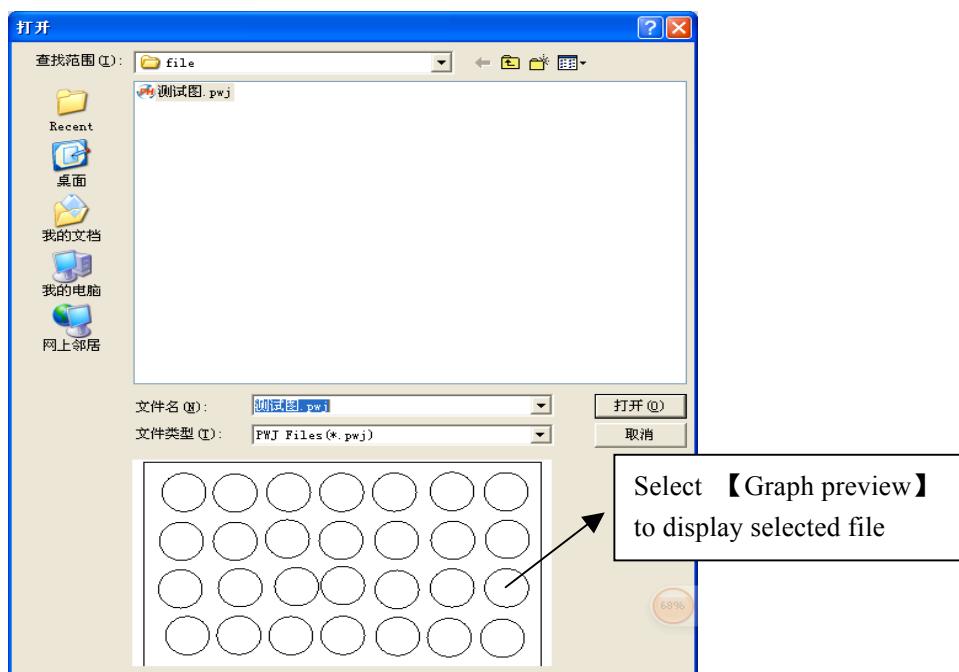
(The software uses pwj file which saves information of graph, layer processing parameters and processing sequence of graphic elements. Therefore, the imported graphic data will be saved as pwj file for convenience of output processing of the graph).

#### 3.2.1 Create

Click 【File】/【Create】 in menu bar or click create icon  in system toolbar to create new processing file.

#### 3.2.2 Open

(1) Click 【Open】 in 【File】 in menu bar or click open icon  in system toolbar, and then the following dialog will appear:

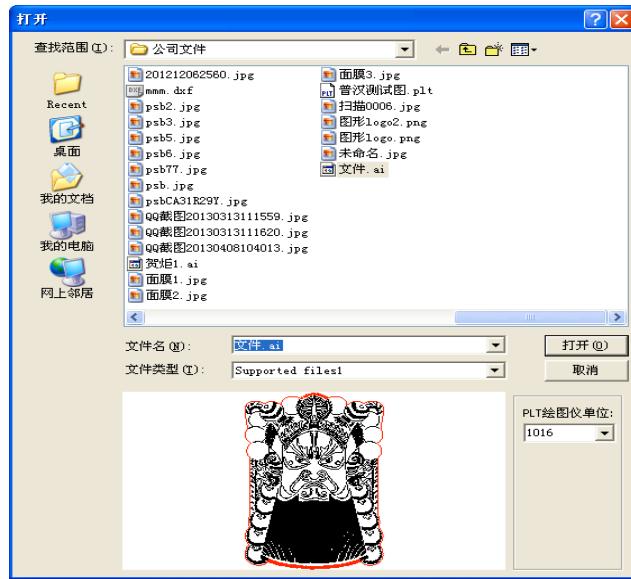


(2) Select a file to be opened (for example: test graph pwj) and then click 【Open】. The software supports multi-file edit, i.e. open many files at the same time.

#### 3.2.3 Import

Graph files imported: dxf, ai, plt, dst, and other formats;

Click 【Import】 in 【File】 in menu bar (Ctrl+I) or click import icon  in system toolbar. The following dialog will be displayed. Select corresponding file, and then click 【open】.

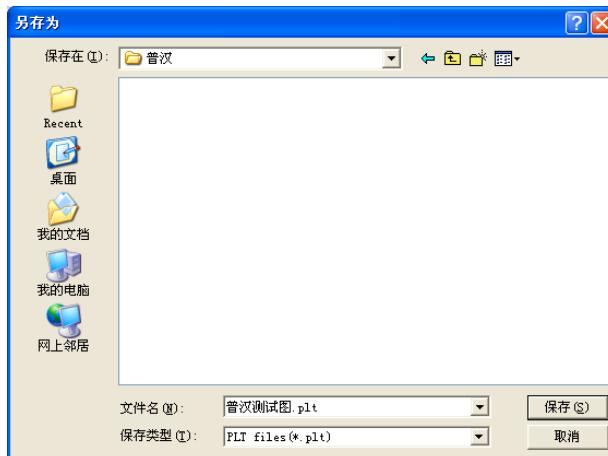


【PLT graph plotter unit】 refers to length of unit data in plt file. If the value is different, dimension of the imported graphs are also different.

### 3.2.4 Export

Because the software supports pwj file, other graphs shall be imported for making or editing. The export function enables finished graph file applicable to other software. Format of exported file is plt.

Click 【Export】 in 【File】 in menu bar (Ctrl+E). The following export dialog will be displayed. Enter file name and then click 【save】.



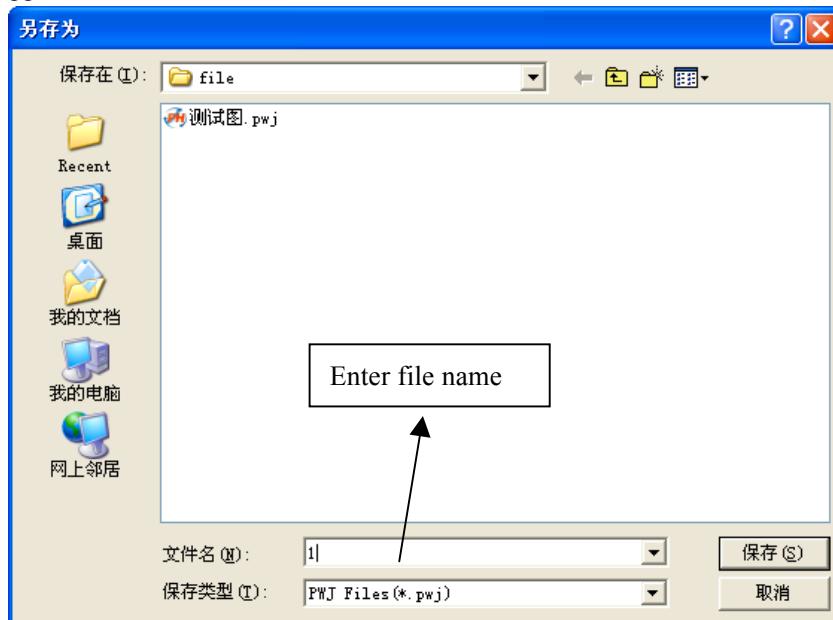
### 3.2.5 Save

After creating graph, click 【Save】 in 【File】 in menu bar or click save button on the software. Enter name

to be saved, select saving directory and then click save.

### 3.2.6 Save as

(1) Click 【Save as】 in 【File】 in menu bar or click save icon  in system toolbar, and then the following dialog will appear:



(2) Enter file name in file name edit box and then click 【Save】.

### 3.2.7 Close

Close current file.

### 3.2.8 Exit

Close all programs.

### 3.2.9 Recent file

Graph file which is recently opened.

### 3.2.10 Empty recent file

Empty the recently opened graph files.

### 3.3 Edit:

#### 3.3.1 Undo

Click undo icon  in system toolbar to return to previous edit state.

#### 3.3.2 Redo

Click redo icon  in system toolbar to return to state before undo.

#### 3.3.3 Cut

Select graph to be cut and then click 【Edit】 / 【Cut】 or press shortcut key Ctrl+X.

#### 3.3.4 Copy

Select graph to be copied and then click 【Edit】 / 【Copy】 or press shortcut key Ctrl+C.

#### 3.3.5 Paste

Select the cut graph and then click 【Edit】 / 【Paste】 or press shortcut key Ctrl+V.

#### 3.3.6 Delete

Select the graph to be deleted and then click 【Edit】 / 【Delete】 or press shortcut key Delete.

#### 3.3.7 Select all

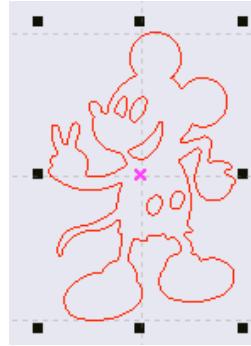
**During graph drawing and editing, the first thing is to select object. If the object is selected, “×” mark will appear in center of the object and 8 control points will appear around the object. The color of contour is the same color with selected object.**

Click 【Select】 in 【Draw】 in menu bar or click  in edit toolbar to change to “selection” state. Under such state, object can be selected. The following content is five methods of object selection:

Click 【Select all】 in 【Edit】 in menu bar (shortcut key Ctrl+A) to select all objects.

Click to select one object.

Click the object to be selected. The object will be selected, as shown in following figure.



Frame selection of object

Press the mouse and drag. All objects in contact with the frame will be selected.

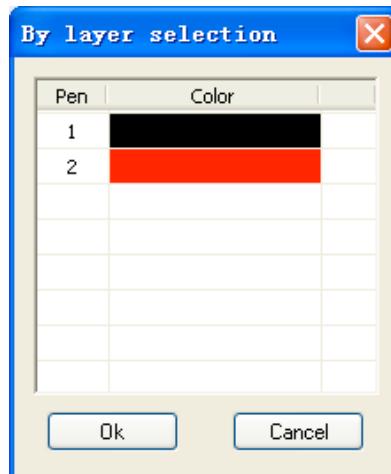
Increase selected objects/decrease selected objects

Increase: firstly, select the first object; secondly, press and hold Shift key; then, click (or select by frame) other objects to be selected. In such way, many graph objects will be selected.

Decrease: press Shift key, and click (or select by frame) selected graph object. In such way, such clicked (or selected) object will be deleted from the scope.

Select object based on layer color

Click  in system operation bar, and then the following dialog will appear:



Select the color of object which is to be selected, and click **【Enter】**. All objects in the same color layer will be selected.

### 3.3.8 Select inversely

Click **【Select inversely】** in **【Edit】** in menu bar (shortcut key **Ctrl+Shift+i**) to select all other objects other than selected objects.

### 3.3.9 Combine

Combine many graphs into one.

### 3.3.10 Cancel combination

Disassemble many combined graphs which are currently selected.

### 3.3.11 Cancel all combinations

Disassemble all combined graphs which are selected.

## 3.4 Draw:

### 3.4.1 Select

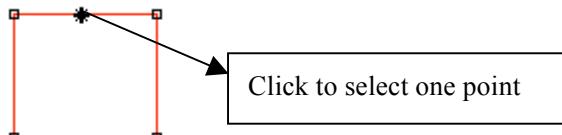
Select graph to be edited. Click 【Draw】 / 【Select】 in menu bar or click  in drawing toolbar to select graph or some part of the graph. Selected part of the graph can be moved, deleted or changed in layer etc.

### 3.4.2 Node edit

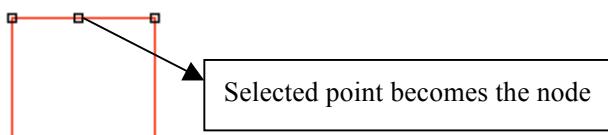
Click 【Node edit】 in 【Draw】 in menu bar or click  in edit toolbar. At this time, tool  (add node)  (delete node)  (connect node) will appear in the right position of object toolbar.

Add node

Select one point on the selected object, as shown in following figure:

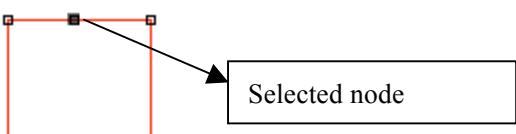


Click  in object toolbar. The selected point will become the node of object, as shown in following figure:

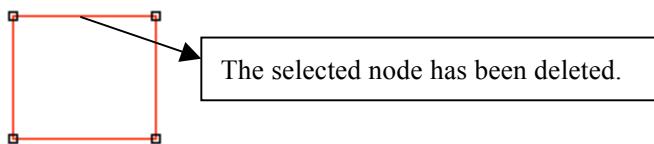


Delete node

Select one point on the selected object, as shown in following figure:



Click  in object toolbar. The selected node will be deleted, as shown in following figure:



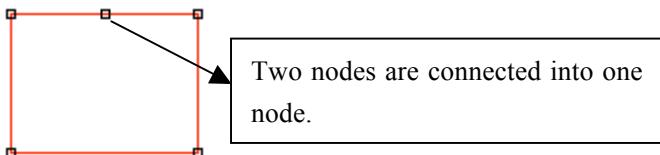
#### ◆ Connect node

Use mouse to select one node and press Shift, as shown in following figure:



Click  in object toolbar to connect these two nodes:

As shown in following figure:



### 3.4.3 Straight line

#### Draw straight line

Click 【Straight line】 in 【Draw】 in menu bar or click  in edit toolbar. Drag the mouse on the screen to draw any straight line. Drag the mouse during pressing “Ctrl” key to draw horizontal straight line.

### 3.4.4 Broken line

#### Draw multi-point line

Click 【Broke line】 in 【Draw】 in menu bar or click  in edit toolbar. Drag the mouse on the screen and click mouse to draw any straight line.

### 3.4.5 Rectangle

#### Draw rectangle

Click 【Rectangle】 in 【Draw】 in menu bar or click  in edit toolbar. Drag the mouse on the screen to draw any rectangle with different sizes. Press “Ctrl” key and drag mouse to draw square.

### 3.4.6 Ellipse

#### □Draw ellipse

Click 【Ellipse】 in 【Draw】 in menu bar or click  in edit toolbar. Drag the mouse on the screen to draw any ellipse with different sizes. Press “Ctrl” key and drag mouse to draw circle.

### 3.4.7 Bezier curve

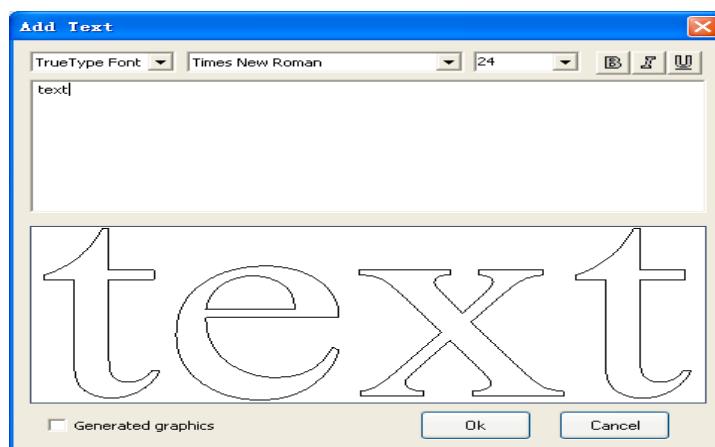
#### □Draw Bezier curve

Click 【Bezier curve】 in 【Draw】 in menu bar or click  in edit toolbar. Drag the mouse on the screen and click mouse to draw Bezier curve.

### 3.4.8 Text

#### □Edit text

Click 【Text】 in 【Draw】 in menu bar or click  in edit toolbar. Carry out double-click of left button of mouse on the screen. The following dialog will appear.

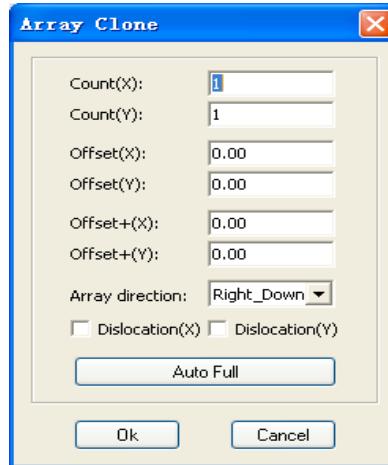


Select font, enter or select font size and enter text. Click 【Enter】.

## 3.5 Operation:

### 3.5.1 Array copy

Select  in edit toolbar to select object to be carried out with array copy. Click  in operation toolbar, and then the following dialog will appear:



Enter:

【X quantity】 【X clearance】 【X distance incremental times】

【Y quantity】 【Y clearance】 【Y distance incremental times】

Select 【Array direction】 and click Enter.

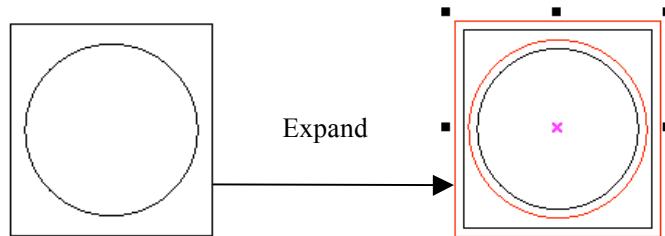
In which, **X and Y distance incremental times**: after 【Array copy】 , distance between graphs will be increased by times.

### 3.5.2 Contract and expand

Select in draw toolbar and then select object to be selected. Click 【Operation】 / 【Contract and expand】 in menu bar or click in object toolbar. The following dialog will appear:



Select expand or contract type, enter corresponding 【Distance】 , select whether in original graph, and then click 【Enter】 , as shown in figure.

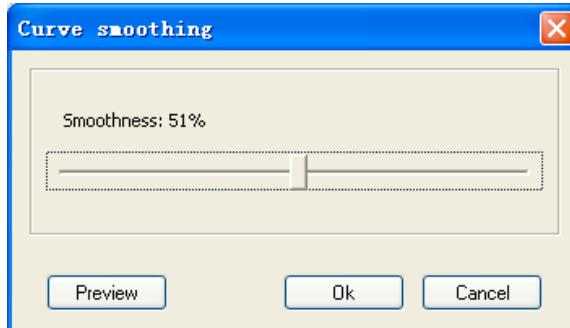


### 3.5.3 Curve smooth

【Curve smooth】 tool is used for smoothly processing all objects in current file (**the smoother the graph is, the smoother the movement during laser cutting is**).

Click 【Operation】 / 【Curve smooth】 in menu bar or click icon  in operation toolbar. After the dialog appears, click 【Enter】.

As shown in following figure:



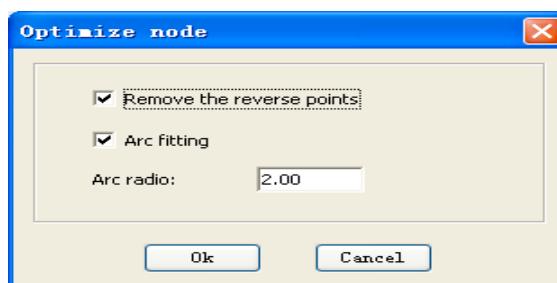
【Smoothness】 shows that the larger the smooth degree is, the smoother the graph is and the more distortion the graph has.

### 3.5.4 Node optimization

【Node optimization】 tool is used for processing graphs except for Bezier curve.

Click 【Operation】 / 【Node optimization】 in menu bar or click the icon  in operation toolbar. After the dialog appears, click 【Enter】.

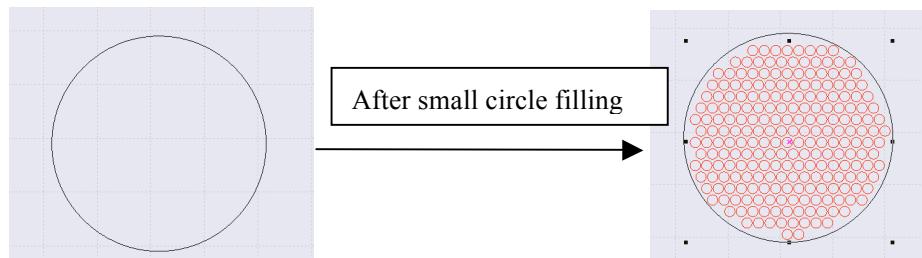
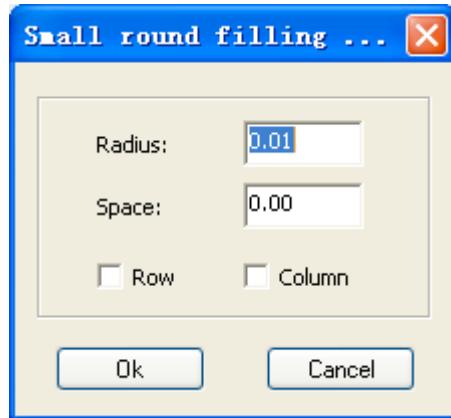
As shown in following figure:



【Node optimization】 shows that the larger the optimization degree, the smoother the graph is and the more distortion the graph has.

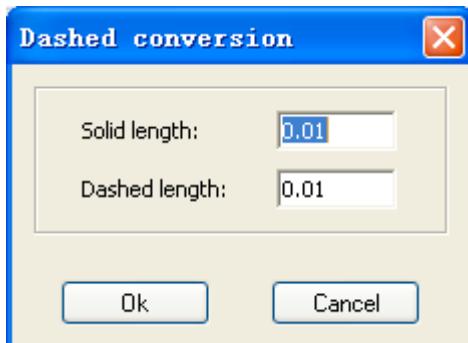
### 3.5.5 Small circle fill

Select graph to be filled and click 【Operation】 / 【Small circle fill】 . Enter filling parameter of small circle and then click Enter.

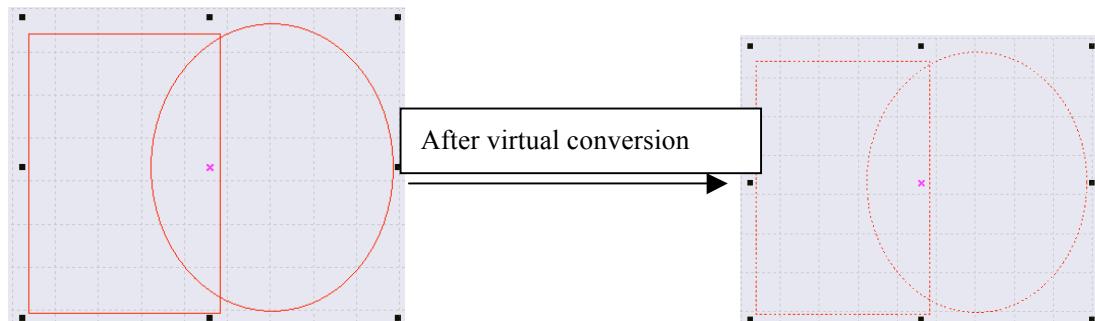


### 3.5.6 Dotted line conversion

Select graph, click 【Operation】 / 【Dotted line conversion】 , as shown in following figure:



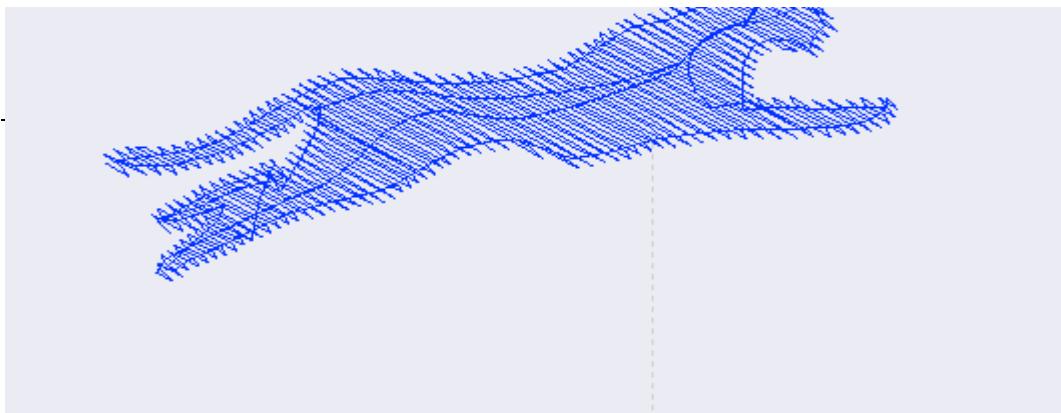
Enter required data based on demand, as shown in following figure:



### 3.5.7 Approximate circle conversion

Convert the approximate circle into circle for smoother cutting.

### 3.5.8 DST contour line



### 3.5.7 Rotate 90° left

Select graph to be rotated and then click .

### 3.5.8 Rotate 90° right

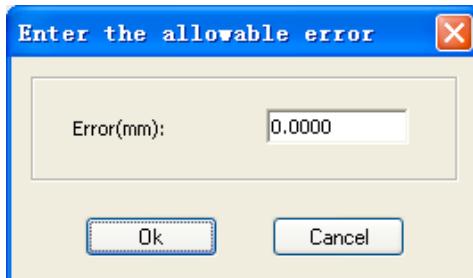
Select graph to be rotated and then click .

### 3.5.9 Horizontal flip (X-axis mirror image)

### 3.5.10 Vertical flip (Y-axis mirror image)

### 3.5.11 Delete overlapping line

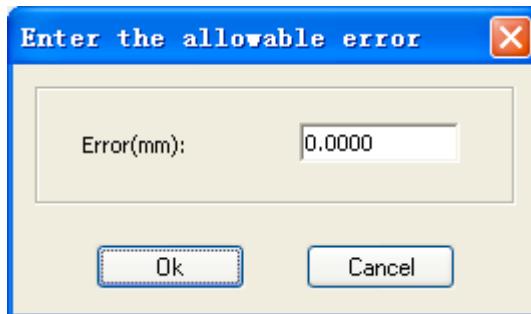
Click 【Delete overlapping line】 function in 【Operation】 in menu bar, and then the following dialog will appear.



If there are two straight lines in high coincidence degree, the overlapping line can be deleted. If all overlapping lines within certain error range will be deleted, start 【Delete overlapping line】 function and set 【Overlapping error】 in mm. In general, the overlapping error is not large to avoid miss-deletion.

### 3.5.12 Combine connected line

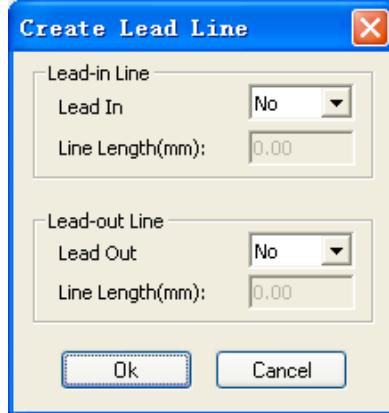
The tool can combine many connected line segments into one. Import processing graph, and click 【Operation】/【Combine connected line】. After the following figure appears, enter permissible error and then click 【Enter】.



### 3.5.13 Lead line

The lead-in and lead-out wire can be generated (the function of lead line is to lead the starting and ending of knife to make the product cutting better).

Select in edit toolbar and then select bitmap object to be processed. Click in system toolbar. The following dialog will appear:



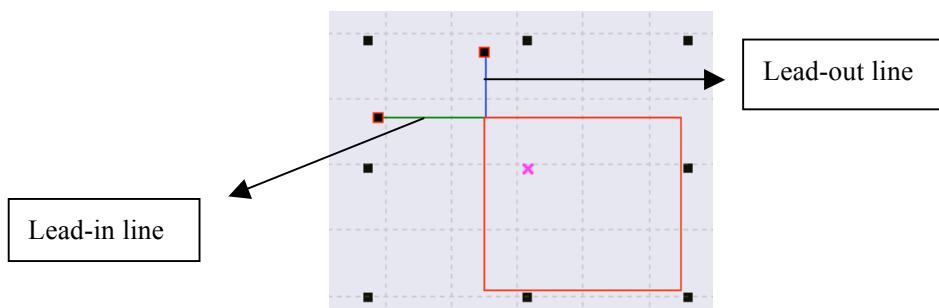
【Lead-in line】 : lead in from starting point of cutting and lead a line segment in (straight line). Length of lead-in line segment is (length of lead-in line).

【Lead-out line】 : lead out from ending point of cutting and lead a line segment out (straight line). Length of lead-out line segment is (length of lead-out line).

Note: in order to distinguish lead-in and lead-out line, try not to set them in same length.

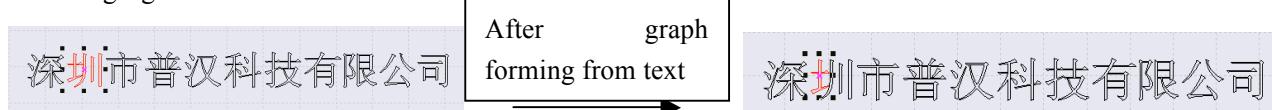
### 3.5.14 Edit lead line

Edit lead-in and lead-out line and click in system toolbar. If two red dots “■” appear in lead-in and lead-out line, the graph can be dragged at random, as shown in following figure.



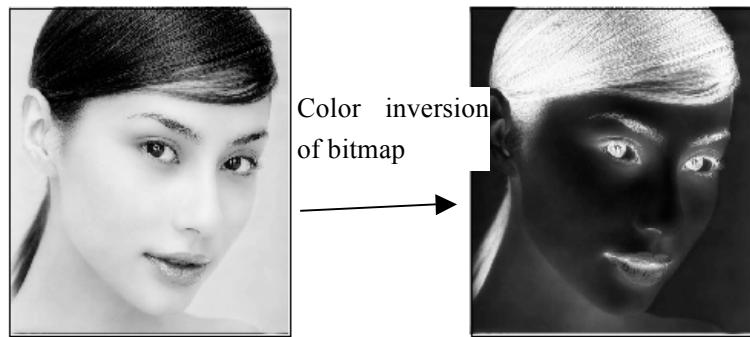
### 3.5.15 Text into graph

Select the words to be changed into graph and click 【Operation】 / 【Text into graph】 in menu bar, as shown in following figure:



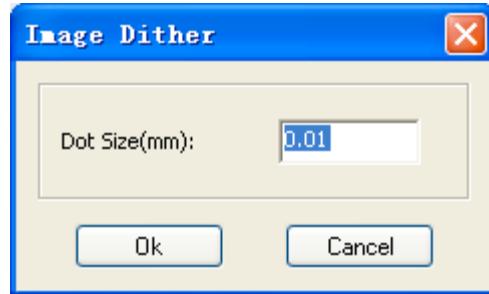
### 3.5.16 Image color inversion

Select in edit toolbar and select bitmap object for color inversion processing. Click 【Operation】 / 【Image process】 / 【color inversion】 in menu bar.

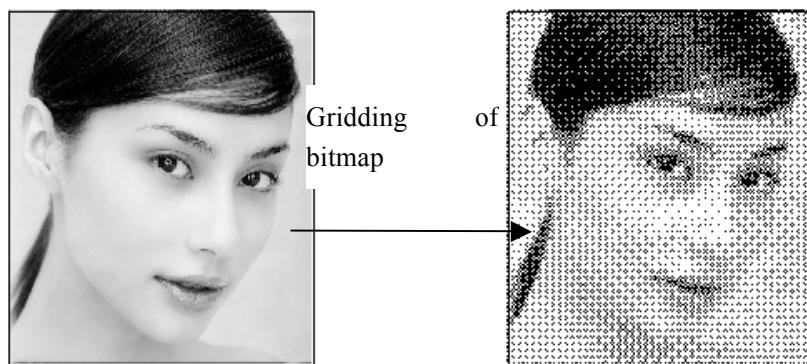


### 3.5.17 Image gridding

Select in edit toolbar and select bitmap object for screen gridding processing. Click 【Operation】/【Bitmap screen gridding】 in menu bar or click in object toolbar. The following dialog will appear:

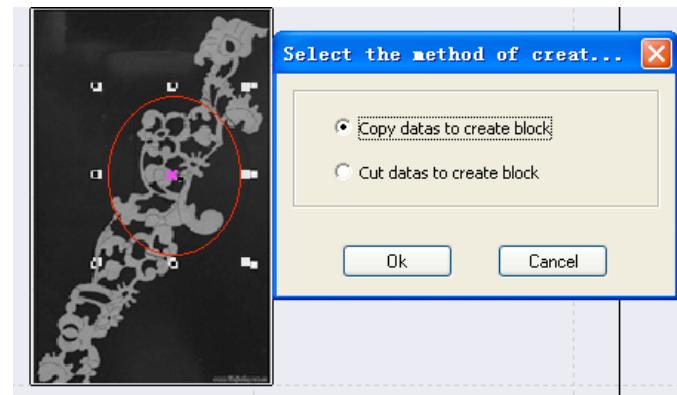


Enter in 【Mesh point size】 and click 【Enter】.

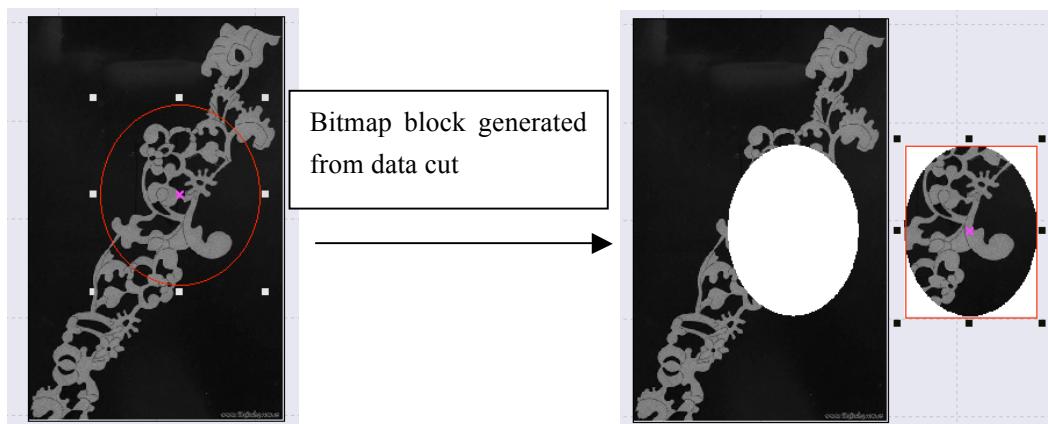
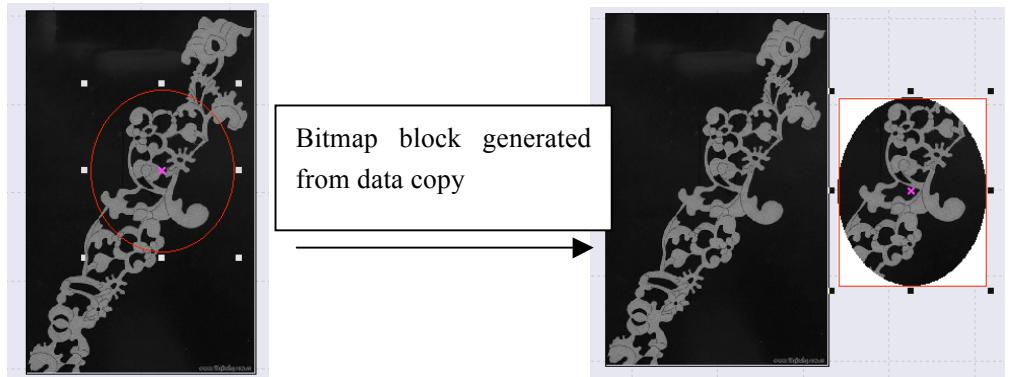


### 3.5.18 Create image block

After importing image, select graph to be drawn in draw toolbar. Click 【Operation】/【Create image block】 in menu bar, as shown in following figure:

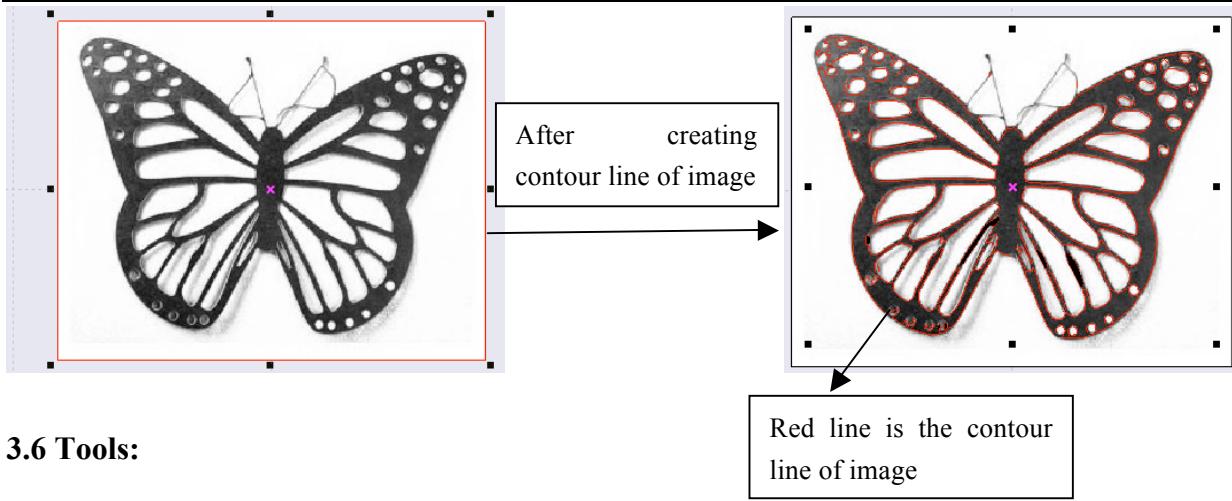


Select copy or cut based on your own choice and then Click Enter, as shown in following figure:

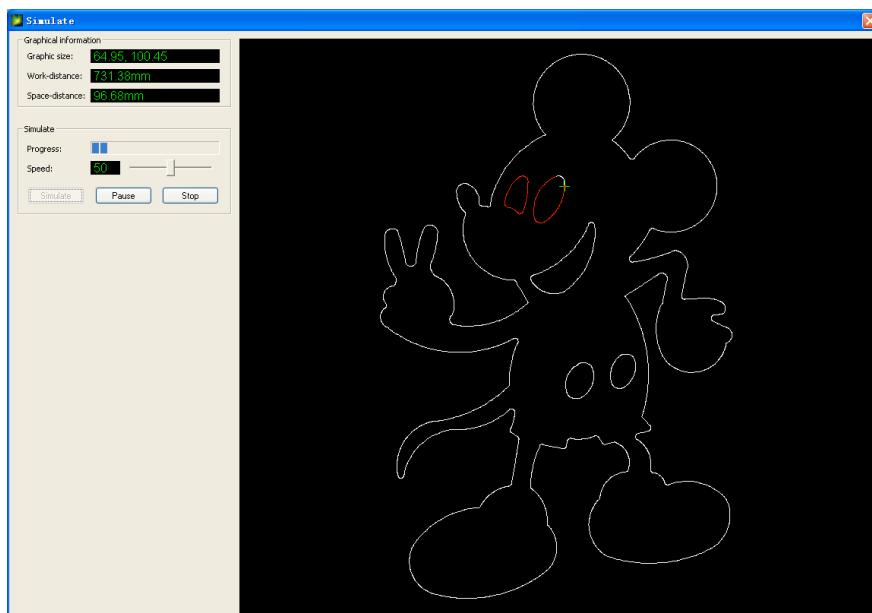


### 3.5.19 Create contour line of image

Select image to be engraved and click 【Operation】/【Create contour line of image】 in menu bar or click icon in operation toolbar, as shown in following figure:



Click in system toolbar. Following graph is loaded in emulation way.

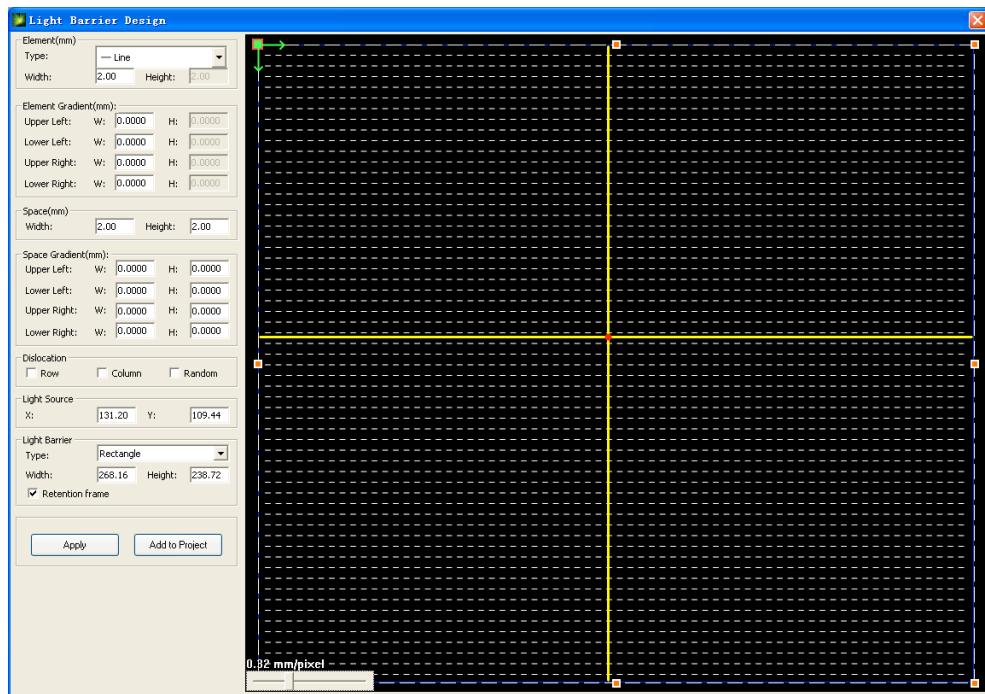


Emulation load refers to simulated processing operation for graph to be processed. Through emulation load, simulated data in actual processing can be obtained, such as ideal processing time, actual output processing path and processing distance. Meanwhile, during emulation load, processing path, graph parameter, parameter set etc. can be adjusted to increase processing efficiency in times.

### 3.6.2 Light guide plate

The tool is specially designed for light guide plate users.

Click **【Tools】 / 【Light guide plate】** in menu bar or click in system toolbar, and then the following dialog will appear:



Light guide plate is designed as follows:

**【Mesh point】**: There are 14 mesh point types, such as straight line, ellipse, triangle, rectangle and semiellipse etc. Set height and width of mesh point, i.e. size of mesh point.

**【Mesh point gradient】**: Size of mesh point increases by times based on required direction. As to upper left, take intersection point of light source as the center and expand to upper left direction (W refers to left and H refers to upper). Set of lower left, upper right and lower right is same with that of upper left.

**【Distance】**: Distance between two mesh points. Width (distance between left and right mesh points) and height (distance between upper and lower mesh points) can be set.

**【Distance gradient】**: Distance between mesh points increases by times based on required direction. As to upper left, take intersection point of light source as the center and expand to upper left direction (W refers to left and H refers to upper). Set of lower left, upper right and lower right is same with that of upper left.

**【Dislocation】**: Use two modes to make the mesh points in dislocation, i.e. row dislocation and column dislocation.

**【Light source】**: Set position of light source and expand from intersection point of X and Y axis. Manual input and selection of the option are available. As to X axis, there is left, middle or right position for selection. As to Y axis, there is upper, middle or lower position for selection.

**【Light barrier】**: Refer to outer contour for light barrier. Rectangle, ellipse or any closed graph can be selected. Besides, the size also can be set.

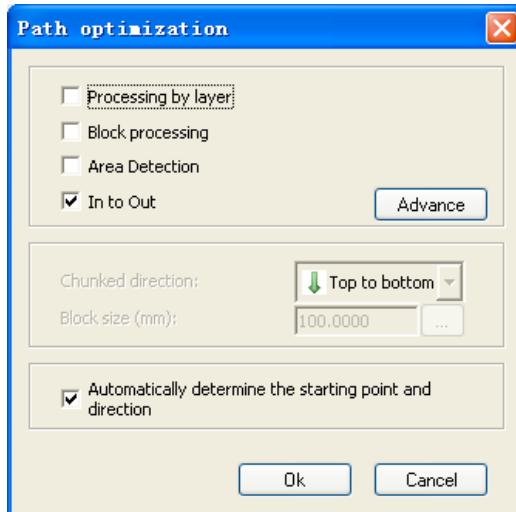
After finishing above steps, click **【Apply】** to check whether it can meet design requirements. If the design is finished, click **【Add to engineering】** button. Then, the system will be automatically added to software view.

**Grid line:** Size of grid displayed on the screen.

### 3.6.3 Path optimization

The tool is used for automatically arranging sequence of all objects in current file. **After optimized sequencing, during output processing, the movement path is the shortest in ideal way.**

□Select imported processing graph and click **【Path optimization】** in **【Tools】** in menu bar, as shown in following figure:



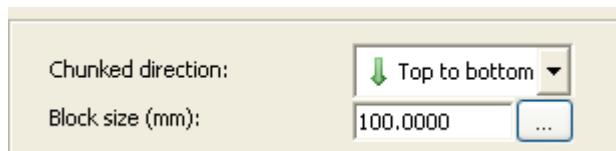
(Graphic elements are orderly sequenced. During laser cutting, the movement path will be in order. )

•Select 【Processing by layer】, and then graphic elements with same color will be continuously arranged (**in laser cutting, process all graphs with the same color, and then, process all graphs with other color.**)

•Select 【internal first and external second】. Graphs in internal part (included) will be processed earlier than graphs in external part (include) (**during laser cutting, the internal graphs will be processed firstly and then the external graphs).**

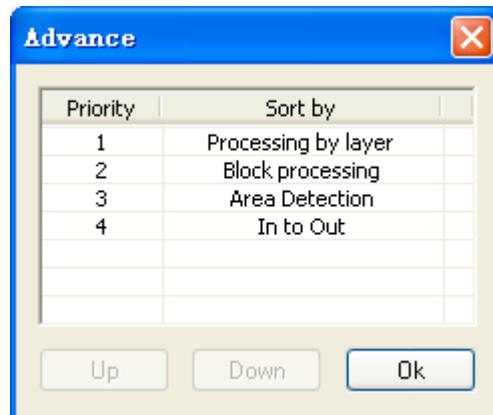
•Select 【Automatically confirm starting point and direction in cutting】 . The tool refers to automatically confirm starting and ending point and direction in cutting during graph arrangement.

•Select 【Processing by block】 . The graphs will be arranged in 【Block height】 and 【Direction】 which has been set, including direction from upper to lower, from lower to upper, from left to right and from right to left. In general, 【Processing by block】 is used for arranging ordered array graphs. There are many selections. At this time, set the height of single graph in array graphs as the 【Block height】 . Besides, 【Processing by block】 also can be used for arranging graphs with extremely large data quantity. At this time, set value among 100~200 as 【Block height】 .



#### •Senior

Click 【Senior】 , and then the following window will be displayed.



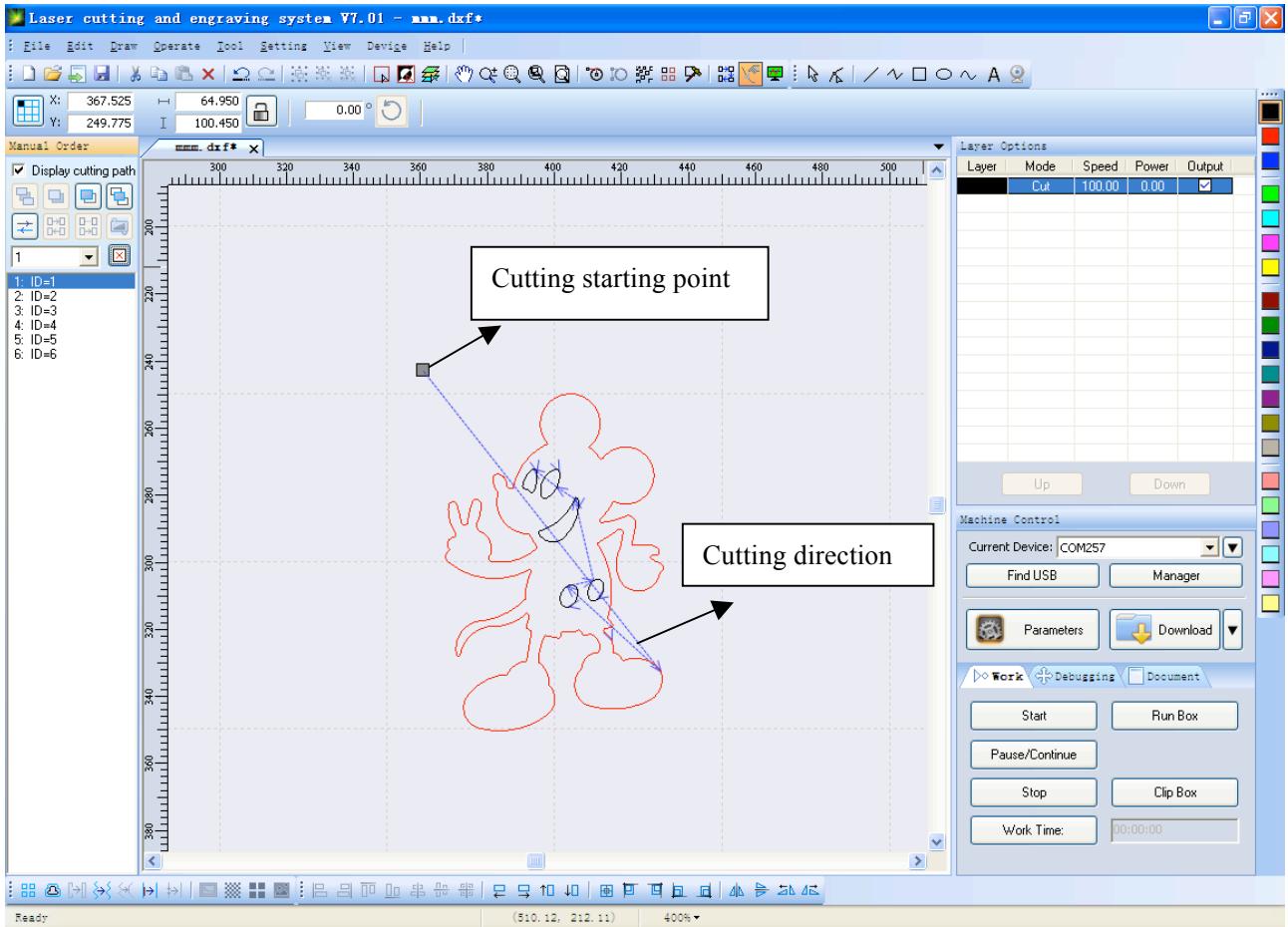
As to complex graph processing, prioritization can be carried out to graph

processing mode so as to guarantee that the processing sequence can meet client's requirements.

### 3.6.4 Manual sequencing

User can, through 【Manual sequencing】 , manually set cutting sequence, cutting starting point and cutting ending point of each object in graph.

Click 【Tools】 / 【Manual sequencing】 in menu bar, as shown in following figure:



Change cutting sequence No. of object

(1) Drag item in 【Manual sequencing】 by mouse to move the item to cursor position.

(2) Click item in 【Manual sequencing】 by mouse at twice to move the item to top.

(3) Click 【Inverted sequence】 in 【Manual sequencing】 to sequence all items in inverted way.

(4) Select cutting sequence No. or layer and press

to carry out backward, forward, backward to beginning and forward to ending.

(5) Select some graphs and then press

Note: item position in 【Manual sequencing】 is corresponding to cutting sequence No. of the relevant object. If an item is closer to top, the relevant object shall be processed earlier.

Change cutting starting point of object

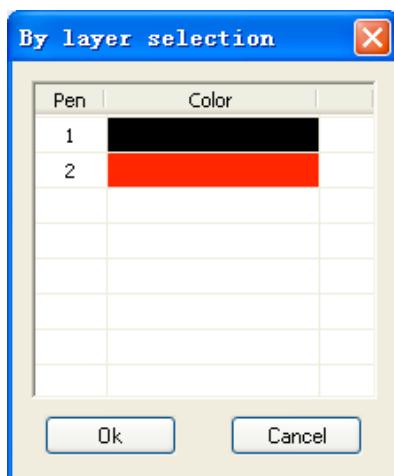
The cutting starting point of object is represented by “■”. Click an object to change cutting starting point of the object.

Change cutting direction of object

The cutting direction of object is represented by “↖”. Direction of arrow is the cutting direction. Click 【Reverse】 in 【Manual sequencing】 to reverse the cutting direction.

### 3.6.5 Select by layer

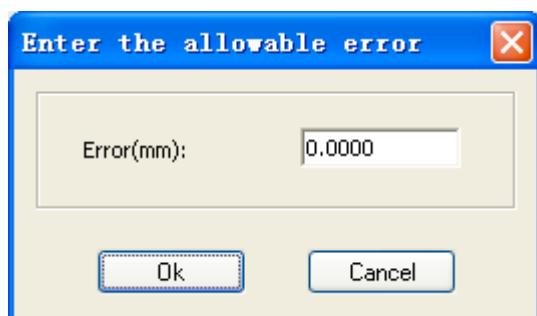
Click 【Tools】 / 【Select by layer】 in menu bar or click icon  in system operation bar, and then the following dialog will appear:



Select wanted color of object and then click 【Enter】. It means all objects in the color layer are selected.

### 3.6.6 Select approximate graphs

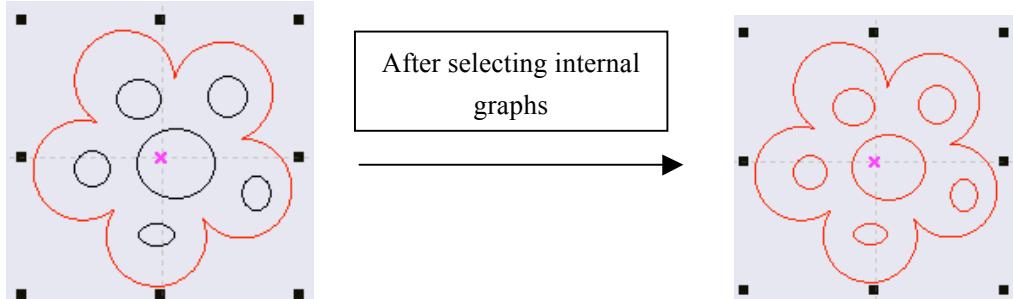
Click 【Tools】 / 【Select approximate graphs】 in menu bar or click icon  in system operation bar, and then the following dialog will appear:



Click 【Enter】

### 3.6.7 Select internal graphs

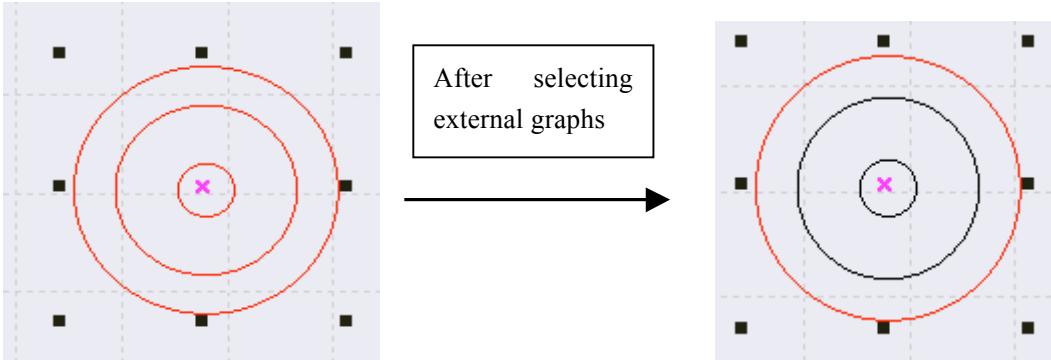
Select graphic peripherals, click 【Tools】/【Select internal graphs】 in menu bar or click icon  in system toolbar. All internal graphs are selected by frame, as shown in following figure:



### 3.6.8 Select external graphs

Select many graphs, click 【Select external graphs】 or click icon , and then the outermost one will be selected.

(Note: relation of many graphs is only limited to inclusion relation)



### 3.6.9 Move horizontally

Click 【Tools】 / 【Move horizontally】 in menu bar or click icon  in system toolbar, or press and hold the right key of mouse to move the current view.

### 3.6.10 Zoom

Click 【Tools】/【Zoom】 in menu bar or click icon  in system toolbar. Then, click view by pressing left key of mouse to zoom in and click view by pressing right key of mouse to zoom out.

### 3.6.11 Zoom selected graphs

Click 【Tools】/【Zoom selected graphs】 in menu bar or click icon  in system toolbar to zoom in selected object.

### 3.6.12 Zoom all graphs

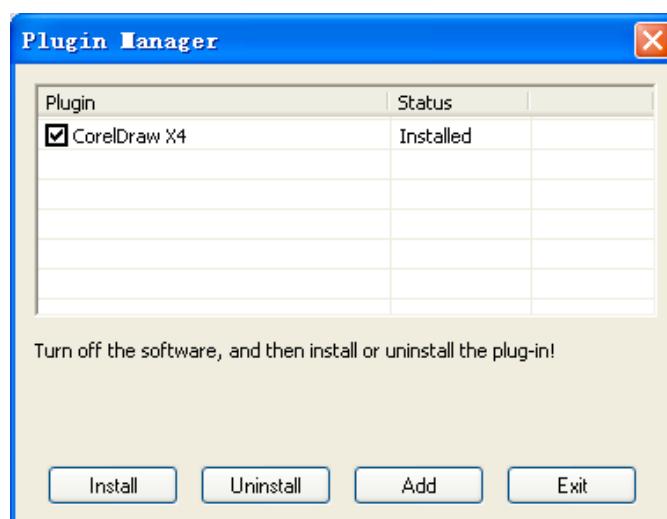
Click 【Tools】 / 【Zoom all graphs】 in menu bar or click icon  in system toolbar to completely display all objects.

### 3.6.13 Display by page

Click 【Tools】/【Display by page】 in menu bar or click icon  in system toolbar to display the whole page in view.

### 3.6.14 Plug-in management

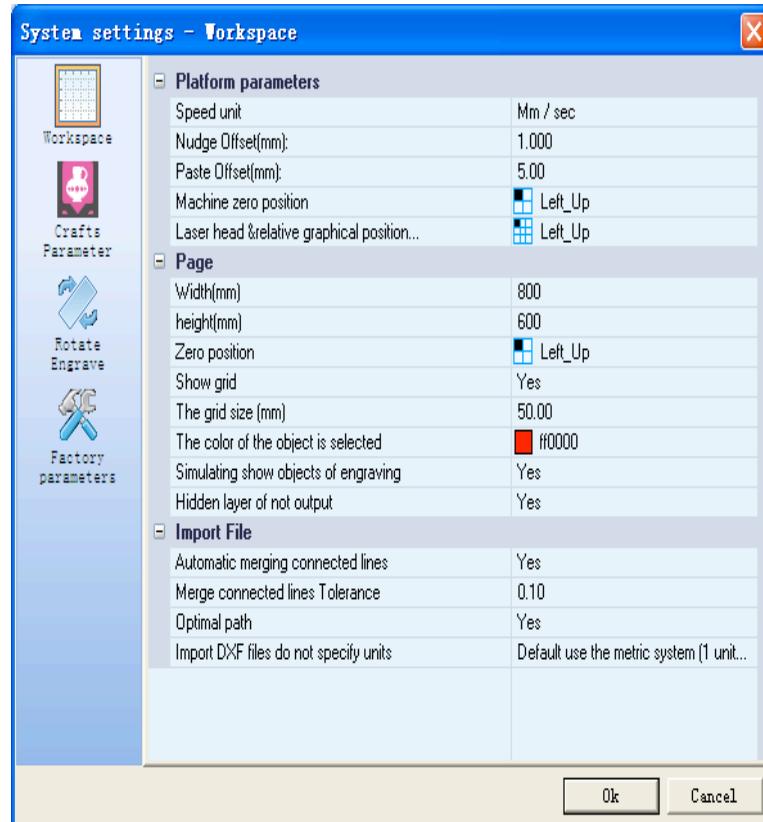
【Tools】 / 【Plug-in management】 is used for searching or managing plug-in of the computer, as shown in following figure:



## 3.7 Settings:

### 3.7.1 System settings

Click 【Settings】 / 【System settings】 in menu bar or click system parameter setting icon  in system toolbar, and then the following dialog will appear:



【Speed unit】 : Refer to unit of all speeds involved in software.

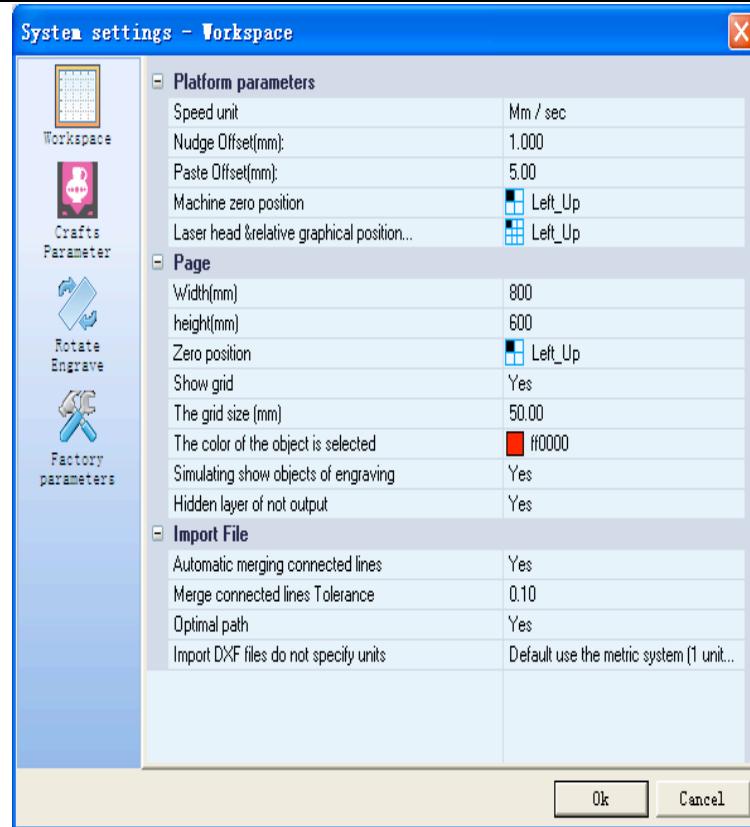
【Distance fine adjustment】 : The value shall be based on requirement.

【Paste offset】 : The value shall be based on requirement.

【Zero position of machine】 : Current zero position of machine shall be in consistent with actual zero position of machine. Otherwise, left side, right side, upside and downside of processed graph may be reversed (pay special attention to).

【Graph position corresponding to laser head】 : Refer to position of graph processed under laser head.

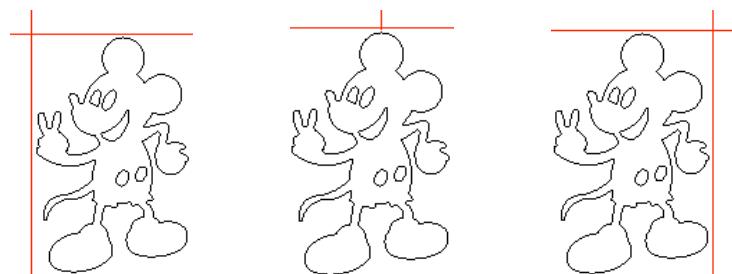
Specific operation of setting graph position corresponding to laser head: click 【Settings】 / 【System settings】 in menu bar or click icon in system toolbar and then select graph position corresponding to laser head based on requirements, as shown in following figure:



Based on actual demand, select proper value and then click 【Enter】.

According to custom, the default parameter shall be in consistent with zero position of machine, i.e. if the zero point is in “upper left”, the parameter shall be set as 【Upper left】; on the contrary, if the zero point is in “upper right”, the parameter shall be set as 【Upper right】.

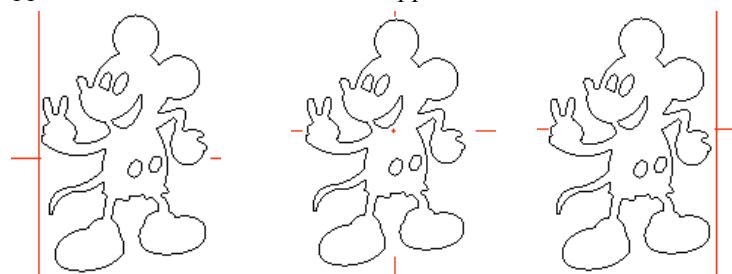
The following figures are effect drawings when settings of graph position corresponding to laser head are different (intersection of two red lines refers to laser head):



Laser head in “upper-left”

Laser head in “upper-middle”

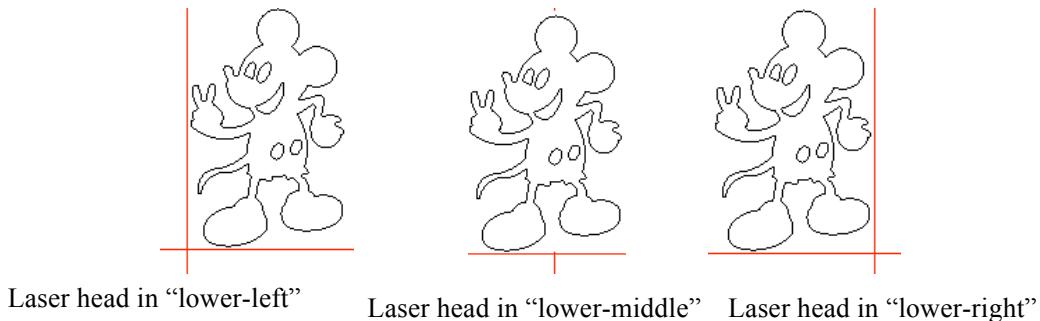
Laser head in “upper-right”



Laser head in “middle-left”

Laser head in “center”

Laser head in “middle-right”

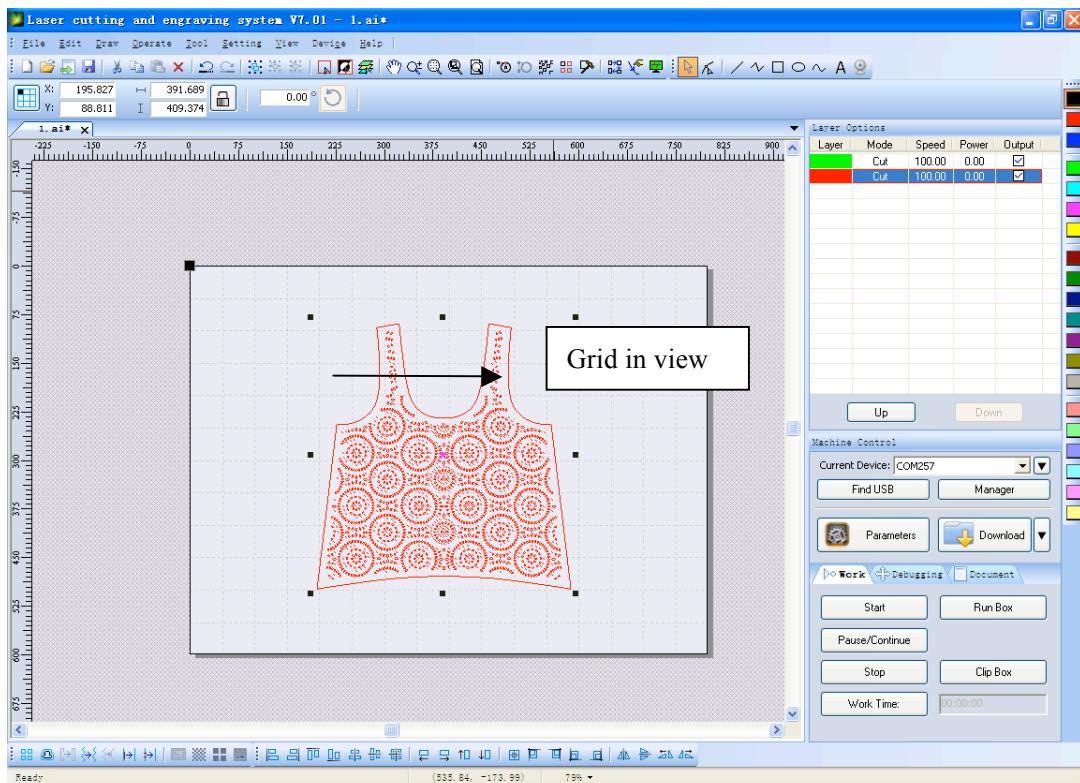


**【Width】** : Refer to width of page in the view. In general, it is set as X dimension of machine.

**【Height】** : Refer to height of page in the view. In general, it is set as Y dimension of machine.

**【Zero position】** : Refer to zero point on page in the view. In general, it is in consistent with **【Zero position of machine】**.

**【Display grid】** : select **【Display grid】**, and then the view will be displayed as grid, as shown in following figure:



**【Color of selected object】** : Refer to contour color of selected object.

**【Distance of grid】** : Refer to size of grid.

**【Display engraving layer by simulation】** : Refer to whether the engraved part is displayed in view during engraving graph.

**【Hide non-output layer】** : When selecting such option, if the selected layer will not be outputted, the layer will be hidden.

**【Automatically combine connected lines】** : Automatically combine nodes in connection of graph.

**【Permissible error of combination of connected lines】** : Enter permissible error of graph based on requirements.

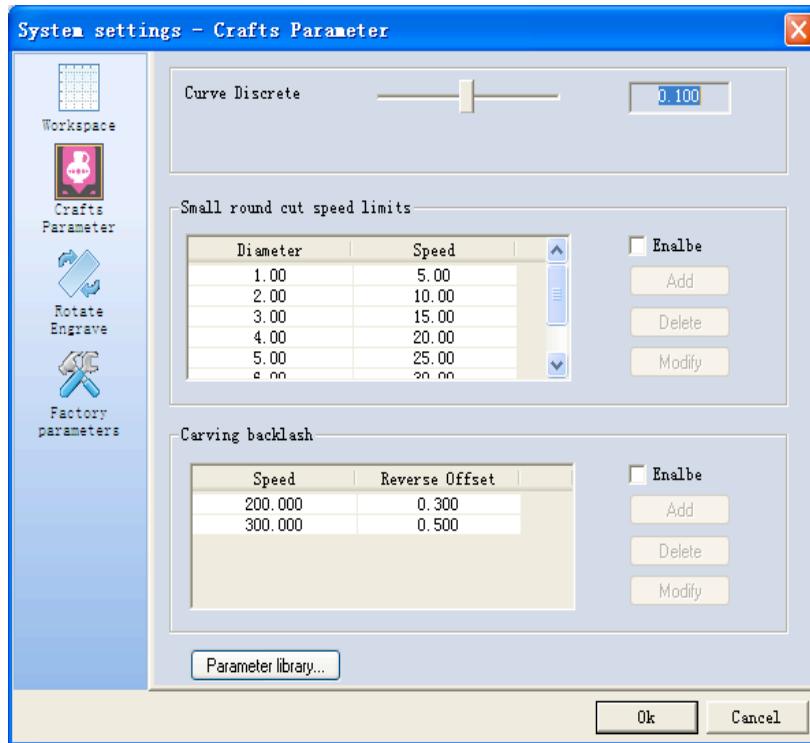
**【Optimize path】** : When the graph is imported in the software, preliminary optimization will be carried out.

**【Imported DXF file to define unit】** : Refer to unit of graph dimension in DXF file.

## □ Process parameters

Adjustment of process parameters can properly improve laser processing quality.

Click 【Settings】/【System parameters】 in menu bar or click  in system toolbar. After the dialog is displayed, click 【Process parameters】 to switch to process parameter setting page, as shown in following figure:



Introduction to parameters:

【Curve discrete length】: The smaller the value is, the higher the graph accuracy is, but the lower the computing speed is. Besides, it will influence the processing speed. In general, as to cutting of organic glass, the smaller value can be adopted. As to other applications, the default value (0.1) shall be adopted.

【Cutting speed limit of small circle】: During processing, the system will automatically check whether the processed object is speed limited small circle. Then, the currently set limit speed is adopted based on diameter of circle for processing the circle. If the parameter is proper, the cutting quality of small circle will greatly increase. Click 【Add】，【Delete】 or 【Change】 to set the parameter.

Meanings of current 【Cutting speed limit of small circle】 setting:



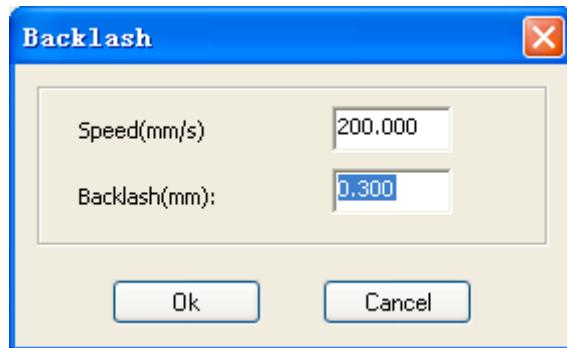
As to circle with diameter less than 5mm, processing speed is 10mm/s;

As to circle with diameter within 5~10mm, processing speed is 20mm/s;

As to circle with diameter more than 10mm, processing speed is not limited and equals to speed set for layer parameter;

**【Reverse gap in engraving】**: In bidirectional engraving by laser, machinery backlash may cause unsound edge of graph after scanning. Therefore, the reverse gas can be used for amendment. There is specific reverse gap at specific speed. In general, the larger the speed is, the larger the reverse gap is. The value can be positive number or negative number.

Meanings of current **【Reverse gap in engraving】** setting:



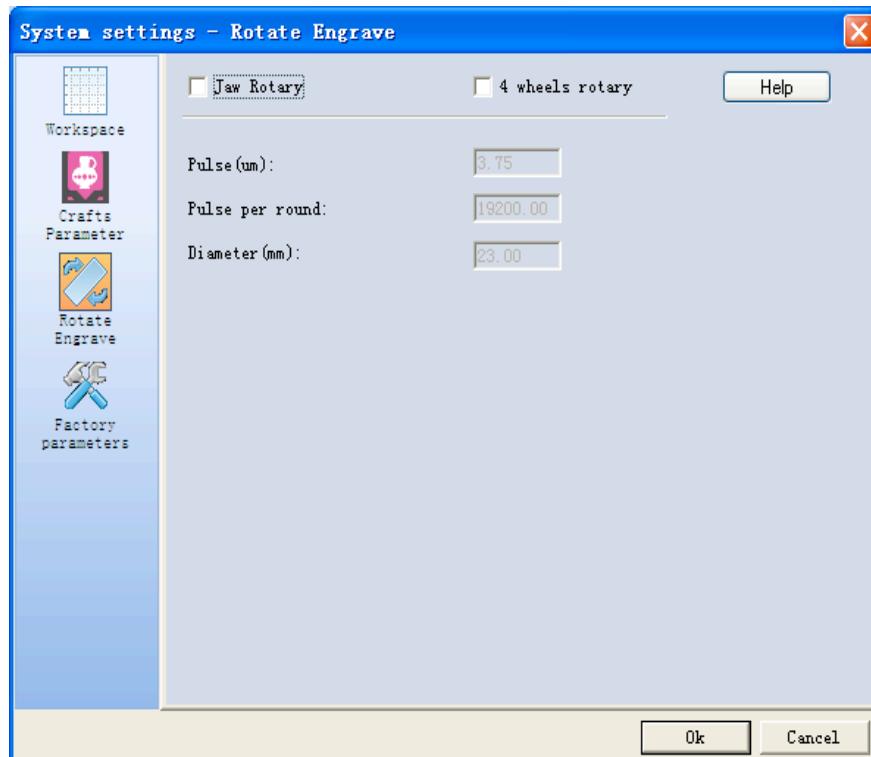
If the speed is 200mm/s, the reverse gap is 0.30mm. If the speed is less than 200mm/s, the reverse gap is directly proportional to speed; therefore, if the speed is 100mm/s, the reverse gap is  $0.30 \times (100/200) = 0.15$ mm.

If the speed is 300mm/s, the reverse gap is 0.50mm. If speed is within 200~300mm/s, the reverse gap is directly proportional to speed; therefore, if the speed is 250mm/s, the reverse gap is  $0.30 + (300-250)/(300-200) \times (0.5 - 0.3) = 0.40$ mm.

If the speed is higher than 300mm/s, the reverse gap equals to the reverse gap at speed 300mm/s (i.e. 0.50mm).

#### □ Rotary engraving

Click **【System parameters】** in **【Settings】** in menu bar or click in system toolbar. After the dialog is displayed, click **【Rotary engraving】** to switch to rotary engraving setting page, as shown in following figure:



**【Fixture rotary engraving】**: After selecting fixture rotary engraving, Y axis is rotary axis. Parameters can be

adjusted based on “rotary pulse equivalent”, “circular pulse number” and “current diameter”.

【Four-wheel rotary engraving】 : “Rotary pulse equivalent” and “circular pulse number” are valid.

【Rotary pulse equivalent (um)】 : It refers to absolute distance value (unit: um) of corresponding rotary shaft during sending a pulse to motor.

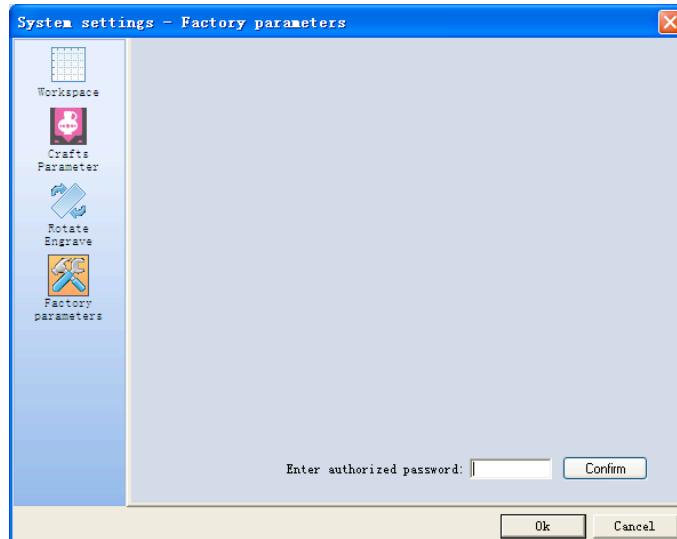
【Circular pulse number】 : Refer to pulse quantity required by rotation of one circle. Circular pulse number=motor driver subdivision \* transmission ratio

【Current diameter (mm)】 : Measure diameter of workpiece

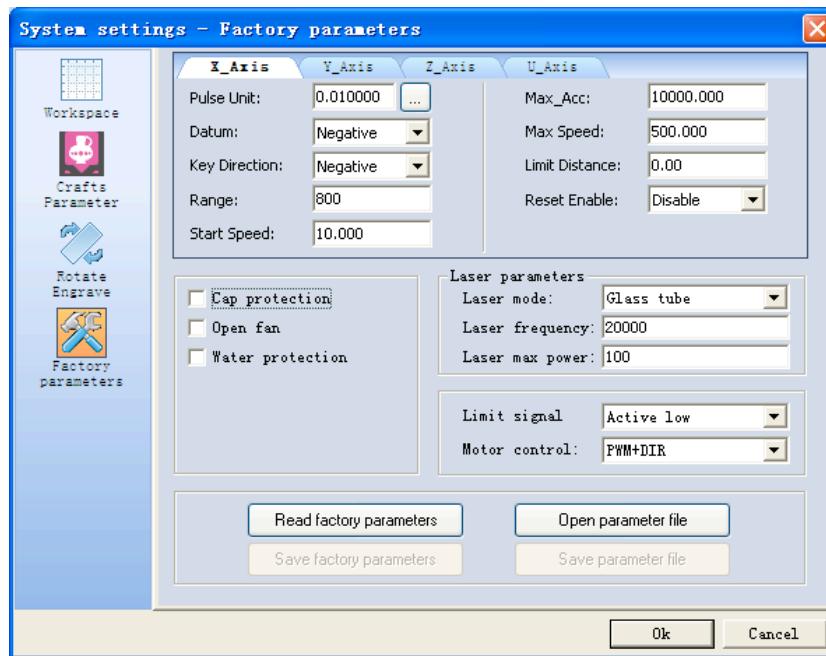
#### Manufacturer parameters

Manufacturer parameters include safety performance and settings of machine and other property parameters. Before leaving the factory, those parameters are set by manufacturer. Client has no authority to amend manufacturer parameters. Manufacturer parameters are saved in mainboard and therefore can not be lost during reinstallation of software.

Click 【Settings】 / 【System parameters】 in menu bar or click  in system toolbar. After the dialog is displayed, click 【Manufacturer parameters】 to switch to manufacturer parameter setting page, as shown in following figure:

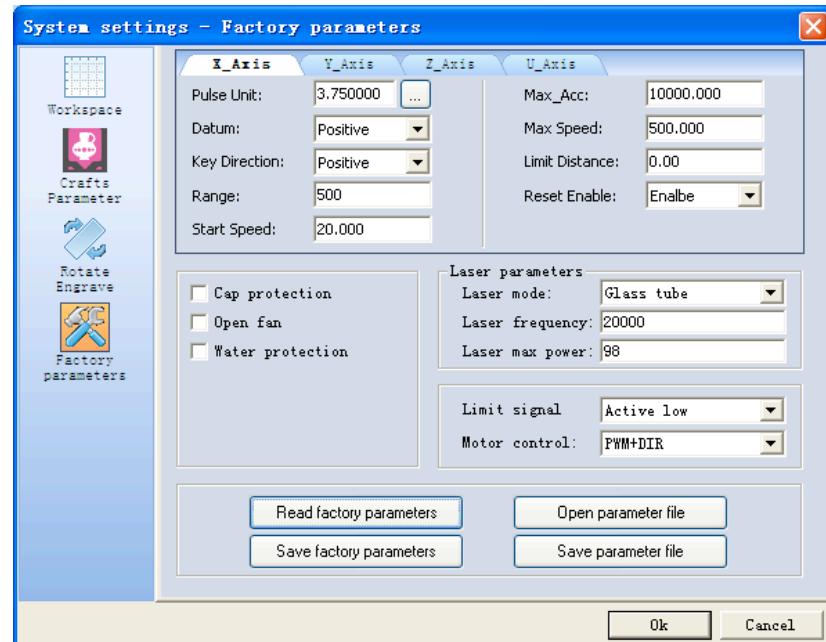


After entering authorized password, click 【Confirm password】. If the password is correct, the following figure will be displayed:



In the parameter page, there are two methods to amend parameters:

- ◆ Click 【Read manufacturer parameters】 and then manually change parameters. Then, click 【Save as manufacturer parameters】.
- ◆ Click 【Open parameter file】 and then click 【Save as manufacturer parameters】. By this method, all parameters can be set at one time. Click 【Save into parameter file】 to save the manufacturer parameters on current mainboard to parameter file.



After clicking 【Read manufacturer parameters】 , the page displays current parameter.

Introduction to main parameters:

**【Pulse equivalent】** : It refers to absolute distance value (unit: um) of corresponding movement shaft during sending a pulse to motor. If the pulse equivalent is not correctly set, dimension of processed graph is different from actual dimension.

**【Starting direction】** : It refers to movement direction of movement shaft. If the X limit position is in left, X origin direction is positive direction; if the X limit position is in right, X origin direction is negative direction. If

the Y limit position is in upper (internal), Y origin direction is negative direction; if the Y limit position is in lower (external), Y origin direction is positive direction.

**【Button direction】**: It refers to movement direction controlled by buttons on panel or software. If X button direction is positive direction, the button direction is in consistent with actual direction. Otherwise, these two directions are opposite. As to other axes, the situations are the same.

**【Breadth of work bench】**: Actual breadth of work bench of machine

**【Takeoff speed】**: It refers to takeoff speed of motor. In generally, the speed is within the range 5~20.

**【Maximum acceleration】**: It refers to maximum permissible acceleration of motor and machine. During working, acceleration of motor shall be no more than the maximum acceleration.

**【Maximum speed】**: It refers to maximum permissible speed of motor and machine. During working, speed of motor shall be no more than the maximum speed.

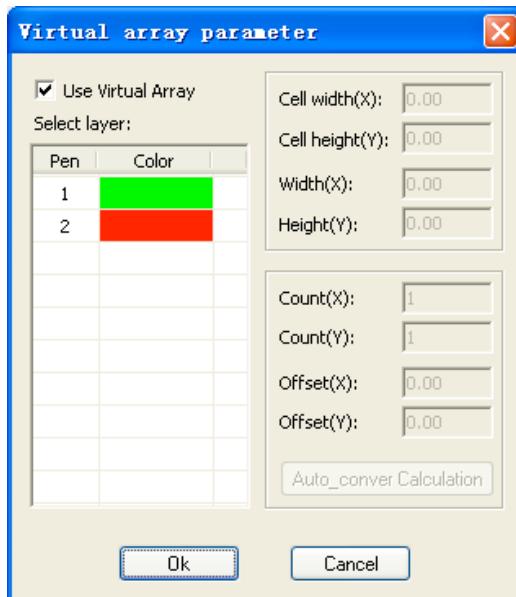
**【Laser mode】**: Include three modes: glass tube, radio frequency tube Co<sub>2</sub> (without pre-combustion) and radio frequency tube Co<sub>2</sub> (with pre-combustion).

**【Laser frequency】**: Laser frequency of glass tube is generally within range of 10000~20000.

**【Maximum power of laser】**: In general, the value is 98.

### 3.7.2 Virtual array (only for double-head mutual-moving in general)

Click **【Settings】** / **【Virtual array】** in menu bar or click  in system toolbar. Then, the following dialog will appear:



Individual width (X): original dimension for processing data.

Individual height (Y): original dimension for processing data.

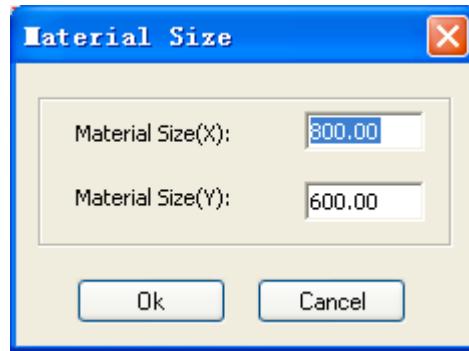
Quantity: number of rows or columns of data to be outputted.

Spacing: row or column spacing.

Total width: width of all data after array.

Total height: length of all data after array.

Automatic overspread computation: automatically compute number of rows and columns which can cover the whole breadth based on set spacing. After clicking **【Automatic overspread computation】**, the following dialog will appear.

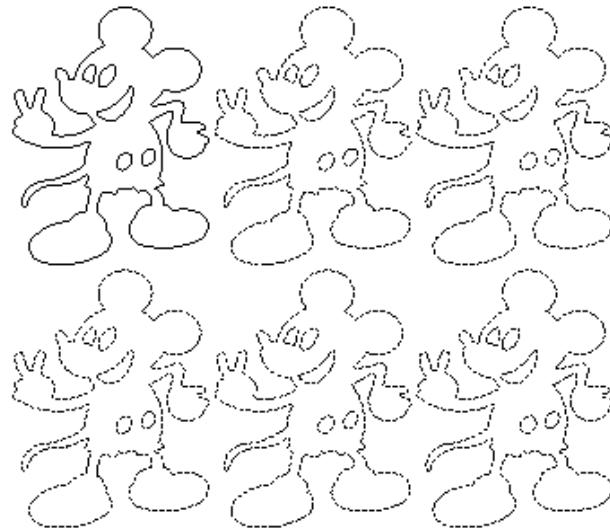


Material size (X): length of material to be processed (default value is length of work bench).

Material size (Y): width of material to be processed (default value is width of work bench).

The system will automatically compute quantity for overspread on the whole material to be processed based on set material size.

The following figure is the example of array parameter set:



### 3.7.3 Import parameter

Click 【Settings】/【Import parameter】 in menu bar to import the graph parameter which has been saved in computer.

### 3.7.4 Export parameter

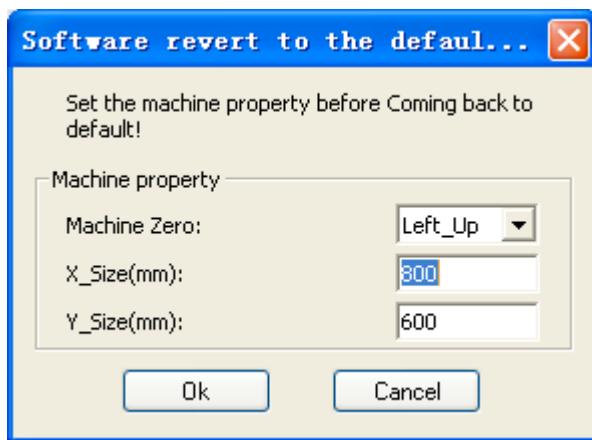
Click 【Settings】/【Export parameter】 in menu bar to export and save the graph parameter in corresponding position in computer.

### 3.7.5 Restore to default parameter

Restore software parameter to default value

If user set improper parameters, there may be abnormal situation in software operation and laser output. Restoration of software parameter to default value can restore all parameters of the software into proper default value (may not be ideal value).

Specific operation for restoration of software parameter to default value: click 【Settings】→【Restore to default parameter】 , and then the following dialog will appear:



Correctly select 【Origin position of machine】, set 【X breadth of machine】 and 【Y breadth of machine】 , and then click 【Enter】 .

Note: 【Origin position of machine】 , 【X breadth of machine】 and 【Y breadth of machine】 shall be correctly set. Otherwise, output graph may be inconsistent with actual graph (inconsistency in dimension and graphic mirror image).

### 3.8 View:

#### 3.8.1 System toolbar



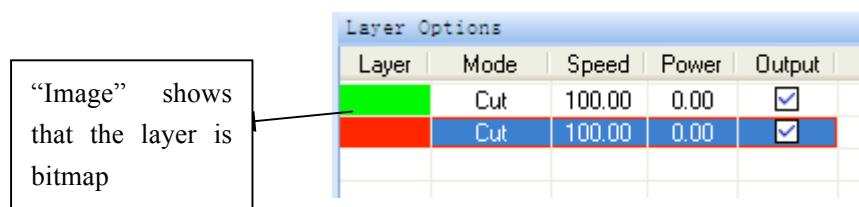
System toolbar includes: create, open, import file to current file, save, cut, copy, paste, delete, cancel, combine selected graph, select external graph, move, zoom out/zoom in, zoom out/zoom in selected graph, zoom out/zoom in all graphs, display by page, generate lead-in and lead-out line, edit lead-in and lead-out line, design of light guide plate, automatic sequencing, manual sequencing, light guide plate, set virtual array parameters, set system parameters, path optimization, manual sequencing and simulated image cutting. (Refer to Chapter II Basic Operation of General Version for all operation details).

### 3.8.2 Layer toolbar



#### Layer parameters

During processing, system can control power and speed etc. of graph object at each layer through layer parameter.



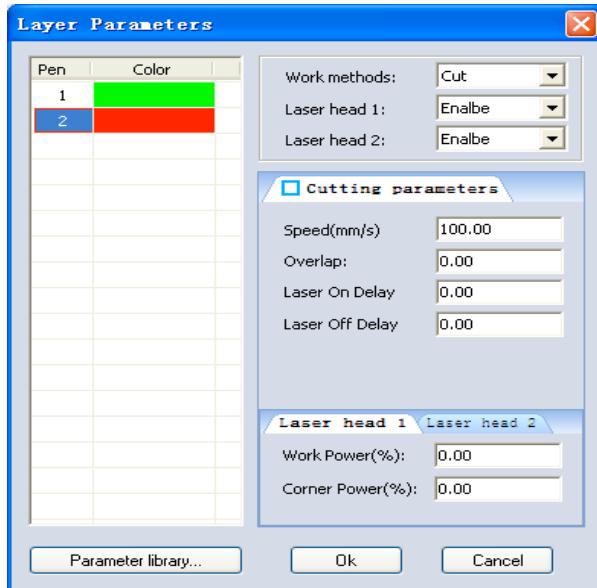
#### Set layer parameters

Click "Output" in layer parameters in layer toolbar to select whether the layer is outputted for processing.

shows that the layer will be outputted and  shows that the layer will not be outputted (hidden in working space) and invisible. In the view, only the outputted graph can be displayed.

Carry out double-click on any line in layer parameter list (such as:

Cut 100.00 0.00  ), and then the following dialog will appear:



**【Layer】:** It refers to layer which requires change of parameter. Click left layer bar to change layer to be changed.

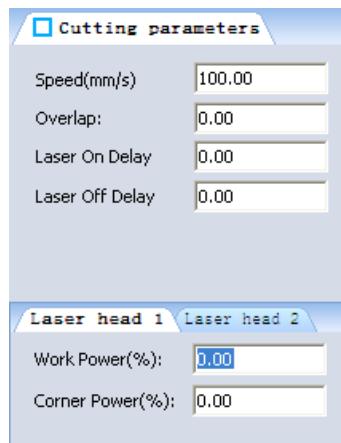
**【Processing modes】:** Include “laser cutting”, “laser engraving”, “laser drilling”, “cutting after engraving” and “drilling in center”. If current layer is bitmap “ (image)”, it only includes “laser engraving” (because bitmap layer can only be used for laser engraving).

**【Laser head 1】:** Be valid in double-head mutual-moving mode. Laser head 1 can work.

**【Laser head 2】:** Be valid in double-head mutual-moving mode. Laser head 2 can work.

#### ◆ Cutting parameters

Select “laser cutting” in **【Processing mode】**, and then the cutting parameters are valid, as following figure:



**【Speed】:** Maximum working speed of laser head during cutting

**【Sealing overlap length】:** Due to mechanical error, there may be a phenomenon that the closed graph may not be cut. The parameter is helpful to solve the problem. This parameter is not too large. It is suggested to adjust mechanical assembly precision to solve the problem.

**【Laser ON delay】:** Laser output time before laser cutting

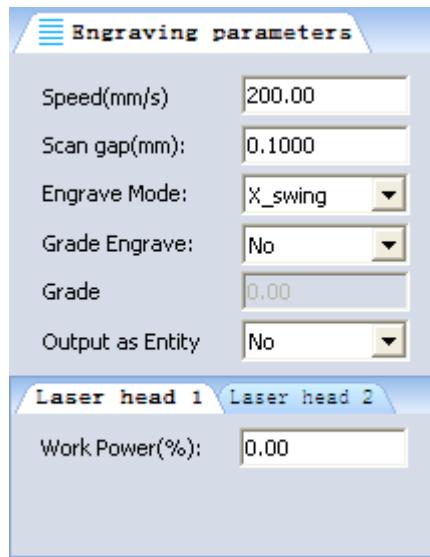
**【Laser OFF delay】:** Laser output time after laser cutting

**【Processing power】:** Maximum power of laser during adjusting and processing the layer (unit: %)

**【Turning power】:** Power at the lowest speed during variable motion (Adjustment of these two parameters can guarantee cutting effect of turning is same with that of straight line).

**Engraving parameters**

Select “laser engraving” in 【Processing mode】, and then the engraving parameters are valid, as following figure:



**【Speed】**: Scanning speed during engraving

**【Engraving step pitch】**: Space between scanning lines

**【Engraving mode】**: Include “horizontal bidirectional”, “horizontal unidirectional”, “vertical bidirectional” and “vertical unidirectional” mode.

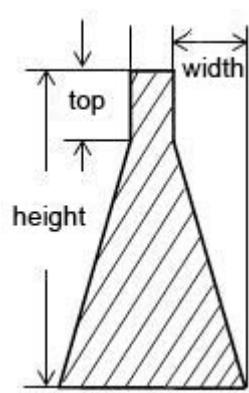
Horizontal bidirectional: Laser head emits laser back and forth in horizontal direction to scan graph.

Horizontal unidirectional: Laser head scans graph back and forth in horizontal direction, but emits laser in only one direction. For example: when laser head emits laser during scanning from right to left and doesn't emit laser during scanning from left to right.

Vertical bidirectional: Laser head emits laser back and forth in vertical direction to scan graph.

Vertical unidirectional: Laser head scans graph back and forth in vertical direction, but emits laser in only one direction. For example: when laser head emits laser during scanning from upper to lower and doesn't emit laser during scanning from lower to upper.

**【Slope engraving】**: If “Yes” is selected, 【Slope length】 and 【Minimum power】 are valid. Slope engraving schematic diagram is as follows:



**【Slope length】** refers to “gradient” in schematic diagram.

**【Output based on primitive】**: Whether the edge of graph is as starting or ending point, otherwise, the frame of graph is as starting or ending point during engraving scanning process.

**【Processing power】**: Power of laser during adjusting and processing the layer (unit: %)

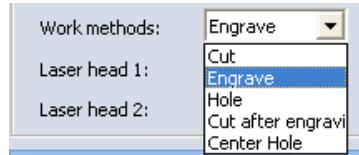
**【Minimum power】**: Minimum laser power during adjusting slope engraving; the value determines the

top depth.

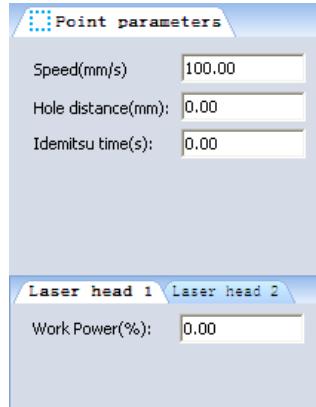
**【Laser 2】** : Power of laser 2 during adjusting and processing the layer (unit: %)

**Laser drilling**

If “Laser drilling” in **【Processing mode】** is selected, the drilling parameters are valid, as following figure:



Click **【Drilling parameters】**, then, the following dialog will appear:



**【Speed】** : Movement speed of laser head

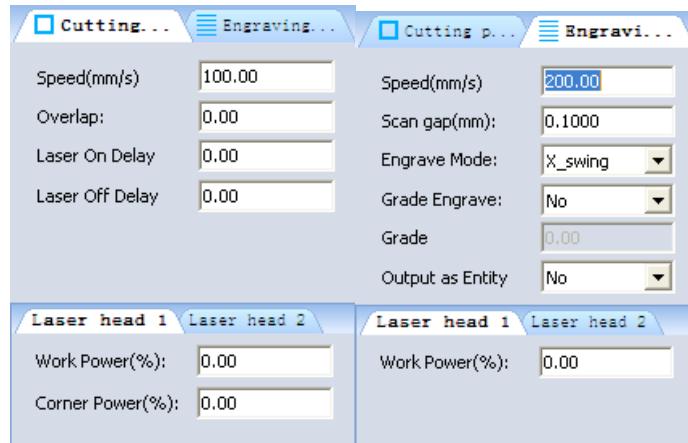
**【Hole layout distance】** : Distance between holes

**【Laser emitting time】** : Staying time of laser head during drilling

**【Processing power】** : Power of laser head (1 and 2) during adjusting and processing the layer (unit: %)

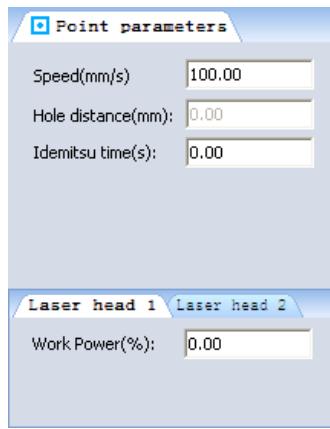
**Cutting after engraving:**

If “Cutting after engraving” in **【Processing mode】** is selected, the engraving and cutting parameters are valid, as following figure:



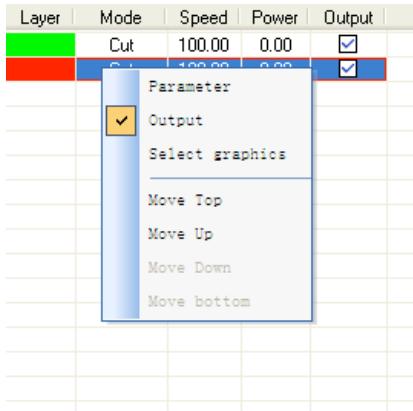
**Drilling in center**

Select “Drilling in center” in **【Processing mode】**, and then the following dialog will appear:



□ Adjustment of processing sequence of layer

Select color of processing layer to be moved and click right button of mouse, and then the following dialog will appear:



Select the requirement. Note: the function is designed for processing sequence based on layer.

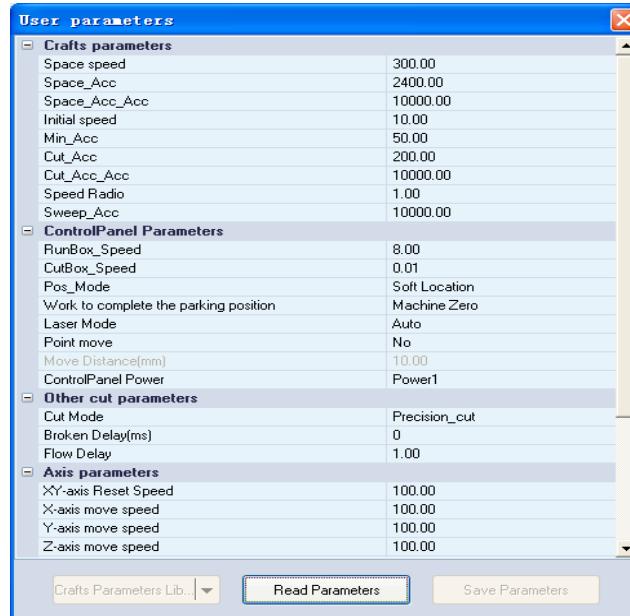
□ Device management: “Device management” can control load of graph, start of processing and other simple machine operation.



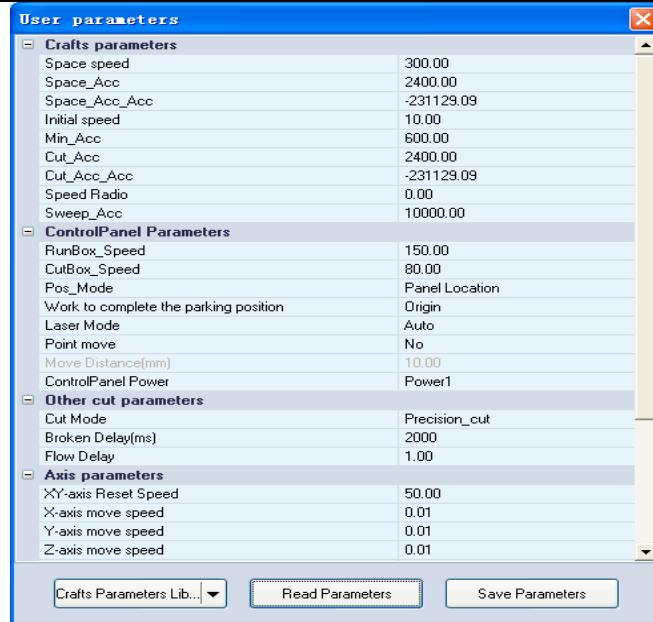
#### □ Device management parameters

Device control parameters are saved in mainboard. After software reinstallation, the parameters will not be lost.

Click  in 【Device management】 in layer toolbar, and then the following dialog will appear:



If the【Read parameters】 is clicked, the system will read parameters saved in mainboard and then display all parameters, as following figure:



Amend relevant parameters and click 【Save parameters】 to save the amended parameters in mainboard.

Introduction to device parameters:

◆ Process parameters

【Idle speed】 : Maximum movement speed of laser head without emitting laser during processing

【Idle acceleration】 : Maximum movement acceleration of laser head without emitting laser during processing

【Idle jerk】: Change speed of idle acceleration during work; the larger the parameter is, the faster the idle speed is and the more vibration the machine has. Therefore, in general, the value is 10000~60000.

【Initial speed】 : Initial movement speed of axis

【Minimum acceleration】 : Minimum movement acceleration of axis during processing

【Cutting acceleration】 : Maximum movement acceleration of laser head with emitting laser during processing

【Cutting jerk】 : Change speed of cutting acceleration during work; the larger the parameter is, the faster the idle speed is and the more vibration the machine has. Therefore, in general, the value is 5000~50000.

【Engraving acceleration】 : Maximum movement acceleration of laser head during laser engraving; in general, the value is higher than 8000.

◆ Button panel control parameters

【Frame along traveling speed】 : Speed of laser head traveling along frame of processing graph without emitting laser; it is mainly used for positioning.

【Frame cutting speed】 : Speed of laser head traveling along frame of processing graph with emitting laser; it is mainly used for positioning.

【Positioning mode】: Positioning mode is classified as software positioning and button positioning.

【Shutdown position after work】 : Include origin and positioning point of machine.

【Light control mode】 : Include manual and automatic. (Manual mode refers to running at power and speed set on panel and automatic mode refers to running at power and speed set in software).

【Jog】 : Default is NO. It can be changed based on demand.

【Panel corresponding power】 : Select corresponding output power based on individual demand.

The system includes power 1 and power 2.

◆ Other cutting parameters

**【Cutting mode】**: Include “precise cutting” and “fast cutting”. “Precise cutting” can be adopted for process with high requirements for cutting quality and “fast cutting” can be adopted for process with low requirements for cutting quality. Efficiency of “fast cutting” is higher than that of “precise cutting”.

**【Power-off delay】**: When the machine is shut down in failure during processing (such as power is off), the machine can continue to cutting the graph shutdown after restarting. Set **【Power-off delay】** can continue the “power-off position”. In general, it is 1000ms.

**【Reset speed】**: Speed of machine returning to origin; if the breadth is large, the parameter can be properly increased.

**【Blowing delay】**: If the blowing function is used, after cutting, the blowing function is delayed to stop.

Axis parameters

**【X axis movement speed】**   **【Y axis movement speed】**   **【Z axis movement speed】**   **【U axis movement speed】**

**【Z axis focusing speed】**   **【Z axis focusing distance】**   **【Z axis focus double frequency】**

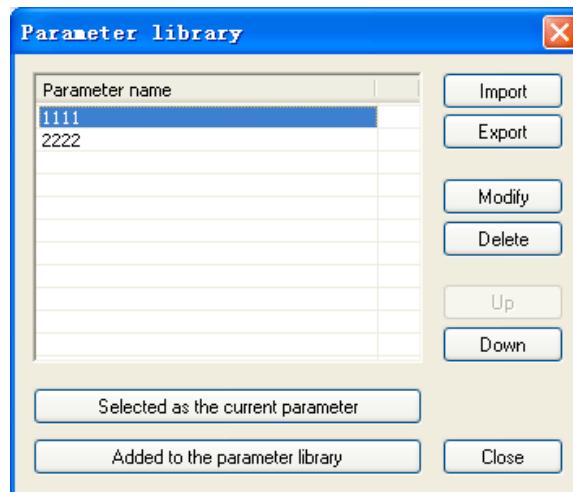
**【Z axis reset speed】**

Machine type

There are two types of machines for selection, i.e. common machine and double-head mutual-moving machine. In double-head mutual-moving mode, Z axis is the mutual-moving axis. In the mode, distance between two heads **【Distance between laser heads】** can be adjusted and power of double heads can be controlled.



**【Parameter library】**: The collection for saving parameters for different processes set by users; it is convenient for calling the proper parameters from parameter library when the process parameter is not properly set. Click **【Parameter library】**, and then the following dialog will appear.



**【Set selected parameter as current parameter】**: Call the parameter selected from left parameter list as the current process parameter.

**【Save current parameter in parameter library】**: Save current process parameter in parameter library.

**【Save current parameter as default parameter】**: Save the current process parameter in “default parameter” in parameter list (user has no authority to “save current parameter as default parameter”; before leaving factory, the manufacturer will save proper process parameter as default parameter); the default parameter is saved in mainboard. During reinstallation of software or installation of software in other computers, the default parameter

will be not lost.

**【Delete selected parameter】**: Delete parameter selected from parameter list (“default parameter” can not be deleted).

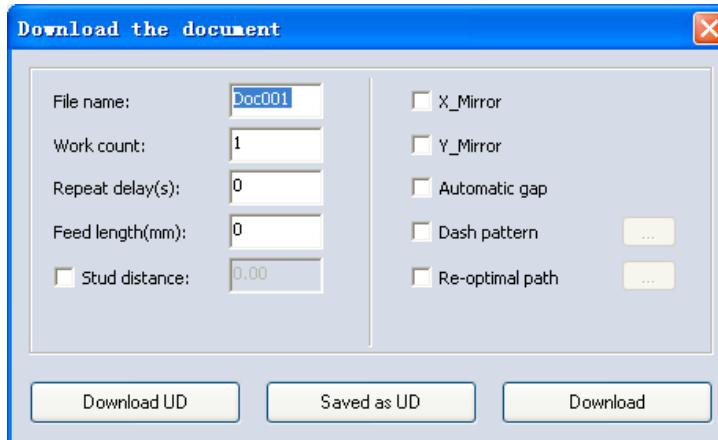
The following two kinds of process parameters are provided for users for reference:

<div style="border: 1px solid black; padding: 5px; width: 150px; height: 150px; background-color: #f0f0f0;"> <p>Be applicable to low speed cutting process, such as cutting acrylic plate.</p> </div>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: left;">Work Parameters</th> </tr> </thead> <tbody> <tr> <td>Space speed(mm/s):</td> <td>200</td> </tr> <tr> <td>Space Acc(mm/s<sup>2</sup>):</td> <td>1500</td> </tr> <tr> <td>Start Speed(mm/s):</td> <td>10</td> </tr> <tr> <td>Min_Acc (mm/s<sup>2</sup>):</td> <td>400</td> </tr> <tr> <td>Cut_Acc (mm/s<sup>2</sup>):</td> <td>1000</td> </tr> <tr> <td>Engrave_Acc (mm/s):</td> <td>10000.00</td> </tr> </tbody> </table>	Work Parameters		Space speed(mm/s):	200	Space Acc(mm/s <sup>2</sup> ):	1500	Start Speed(mm/s):	10	Min_Acc (mm/s <sup>2</sup> ):	400	Cut_Acc (mm/s <sup>2</sup> ):	1000	Engrave_Acc (mm/s):	10000.00
Work Parameters															
Space speed(mm/s):	200														
Space Acc(mm/s <sup>2</sup> ):	1500														
Start Speed(mm/s):	10														
Min_Acc (mm/s <sup>2</sup> ):	400														
Cut_Acc (mm/s <sup>2</sup> ):	1000														
Engrave_Acc (mm/s):	10000.00														
<div style="border: 1px solid black; padding: 5px; width: 150px; height: 150px; background-color: #f0f0f0;"> <p>Be applicable to high speed cutting process, such as cutting cloth and leather.</p> </div>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: left;">Work Parameters</th> </tr> </thead> <tbody> <tr> <td>Space speed(mm/s):</td> <td>300.00</td> </tr> <tr> <td>Space Acc(mm/s<sup>2</sup>):</td> <td>3000.00</td> </tr> <tr> <td>Start Speed(mm/s):</td> <td>20.00</td> </tr> <tr> <td>Min_Acc (mm/s<sup>2</sup>):</td> <td>700.00</td> </tr> <tr> <td>Cut_Acc (mm/s<sup>2</sup>):</td> <td>2500.00</td> </tr> <tr> <td>Engrave_Acc (mm/s):</td> <td>10000.00</td> </tr> </tbody> </table>	Work Parameters		Space speed(mm/s):	300.00	Space Acc(mm/s <sup>2</sup> ):	3000.00	Start Speed(mm/s):	20.00	Min_Acc (mm/s <sup>2</sup> ):	700.00	Cut_Acc (mm/s <sup>2</sup> ):	2500.00	Engrave_Acc (mm/s):	10000.00
Work Parameters															
Space speed(mm/s):	300.00														
Space Acc(mm/s <sup>2</sup> ):	3000.00														
Start Speed(mm/s):	20.00														
Min_Acc (mm/s <sup>2</sup> ):	700.00														
Cut_Acc (mm/s <sup>2</sup> ):	2500.00														
Engrave_Acc (mm/s):	10000.00														

□ Load graphic data and device file management



Click icon (load) in device management in layer toolbar, and then the following dialog will appear:



□ Load current file

Property of current file is the relevant property of file to be loaded to mainboard.

**【File name】**: Name of file loaded to mainboard.

**【Processing time】**: Processing time of loaded file; after starting processing, the system can automatically and repeatedly process data of the file.

**【Repeat delay】**: Delayed time after processing once during processing many times

**【Feeding length】**: Distance of feeding axis (Z axis) traveling after processing each time

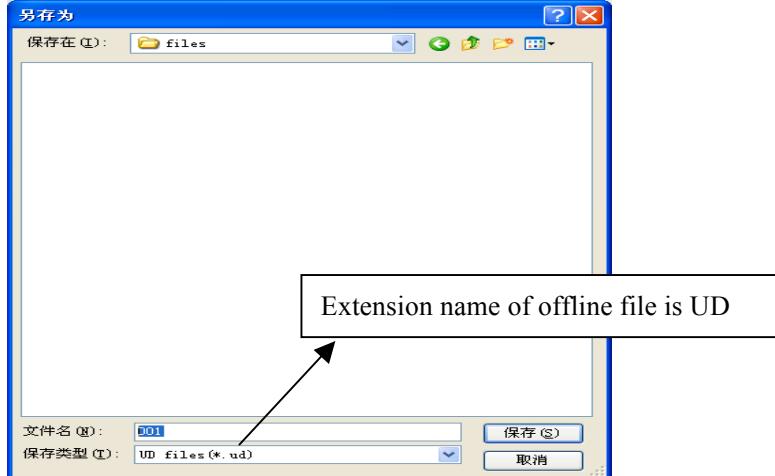
**【Load current file】**: Load the graphic data of file in current software in mainboard through USB cable.

The graphic data with file name in file property set by user will be saved in file system in mainboard. After loading, press “file” button on “control panel” matched with the system, and then you can find that the last file in file system is the file loaded just now (see operation instructions for “control panel” matched with the

【Save as offline file】: Offline file (extension name: ud) is saved in computer, and then copied to U disk and can be loaded in mainboard through U disk interface on mainboard. Click button

**Saved as UD**

(save as offline file), and then the following dialog will appear:

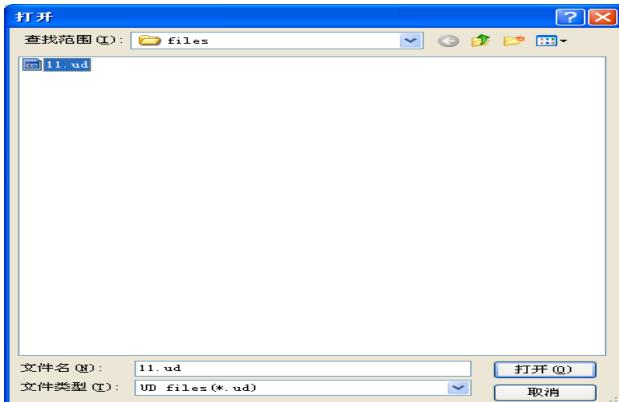


Enter file name in “file name” edit box and then click 【Save】.

【Load offline file】: load offline file (ud file) saved in computer in mainboard. Click button

**Download UD**

(Load offline file), and then the following figure will appear:

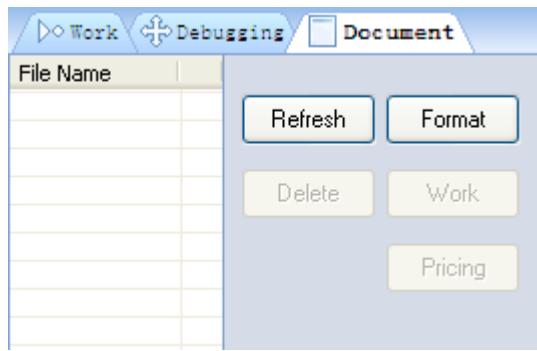


Select offline file (ud file) to be loaded, and then click 【Open】 button.

Device files

Manage files saved in memory of mainboard.

【Refresh】: search all files saved in mainboard. Click **Refresh** (refresh), and then list for device files will display file names of all files saved in mainboard and carry out 【Process】 and 【Delete】 , as following figure:



Currently, mainboard saves three files:  
“V4”, “PH001” and “ph12”.

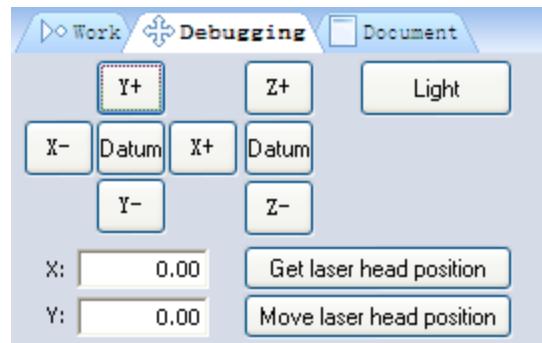
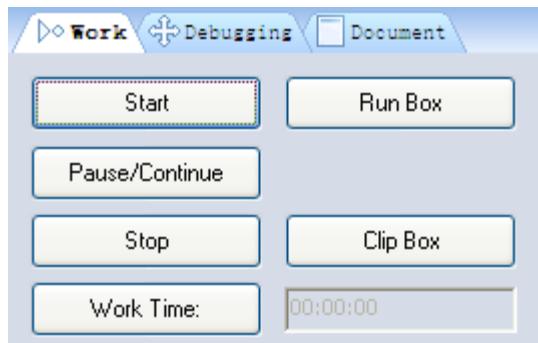
**【Process】**: Select a file in file list and click **Work** (processing) button to carry out file processing.

**【Delete】**: Select a file in file list and click **Delete** (delete) button to delete the file from mainboard memory.

**【Format】**: Format the mainboard memory. All files saved in mainboard will be lost.

**【Valuate】**: Standby for upgrade

□ Start processing and relevant control



**【Start】**: Start selected file processing in “control panel” which is matched with the system (see operation instructions for “control panel” matched with the system). (If a file is loaded in mainboard, the “control panel” will automatically select the file).

**【Pause/continue】**: If the machine is in work state, click **Pause/Continue** (pause/continue) to pause, if the machine is in pause state, click **Pause/Continue** (pause/continue) to continue.

**【Stop】**: Stop current work of machine.

**【Travel along frame】**: Laser head will travel along the frame (rectangle) based on processing data without emitting laser. The function is mainly used for determining position of workpiece to be processed.

**【Cut along frame】**: Cut the processed workpiece from processed material.

**【Emit laser】**: Press **Light** (emit laser) button to emit laser; loose **Light** (emit laser) button to stop emitting laser.

**【Origin】**: “Origin” refers to “reset”. After clicking the button, laser head (or Z axis) will slowly move to origin of machine firstly and then rapidly move to positioning place when laser head (or Z axis) contacts with limit block of machine. The function can eliminate accumulated error. In general, before work, the operation

shall be carried out at one time.

**【X-】【X+】【Y-】【Y+】【Z-】【Z+】**: Move laser head (or Z axis). When the current state is “jog” (see 4.8.1 *Device Control Parameters*), if you click one time, the laser head moves one time. The movement distance is the set “jog distance”; when current state is not “jog”, press the button, laser head (or Z axis) starts to move; loose the button, laser head (or Z axis) stops moving.

**【Obtain position of laser head】** : Read current coordinate of laser head.

**【Move position of laser head】** : Standby for upgrade

### 3.8.3 Drawing toolbar



### 3.8.4 Color toolbar

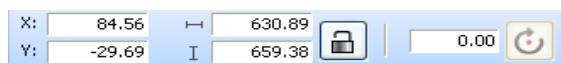


Color of object is the color of object contour. Click any color tool button in layer toolbar to change color of selected object.

### 3.8.5 Operation toolbar



### 3.8.6 Object toolbar

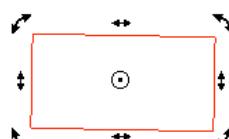


#### □ Rotate object

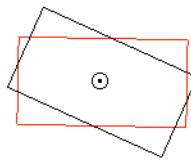
There are two methods to rotate object:

1. Rotate object by object operation toolbar . Enter rotation angle in  and then click to rotate object.

2. Click in operation toolbar and carry out double click on object to be tilted or rotated to enter “rotation/tilt” edit mode. At this time, control points around the object become rotation control arrow and tilt control arrow , as following figure:



Move cursor on rotation control arrow and drag control point along the direction of control arrow; during dragging, contour frame will also rotate, as following figure:



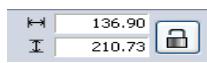
After rotating to proper position, release mouse to finish rotation of object.

◆ Tilt object

Method of object tilting is basically the same with that of object rotation (method 2).

◆ Change size of object

The simplest method of zoom or change of graphic object is utilization of (selection tool) to click object to be zoomed or changed and then drag control points around object. Such method is convenient and direct, but accuracy is low. Enter horizontal dimension (upper column) and vertical dimension (lower column) in



(zoom dimension) in object operation toolbar and then press “Enter” button to change

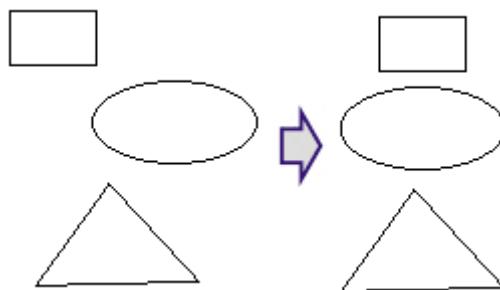
horizontal and vertical dimension of object. Click into . If horizontal dimension (vertical dimension) is changed, vertical dimension (horizontal dimension) will also change by length width ratio of object.

### 3.8.7 Alignment toolbar



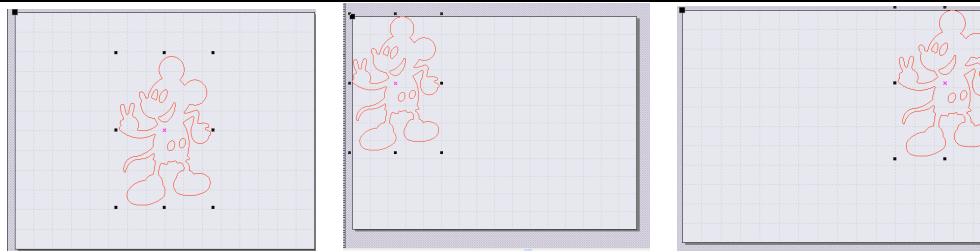
#### Align

After selecting many objects, click tool in alignment toolbar. If alignment is used, the effect drawing is as follows:



#### Move

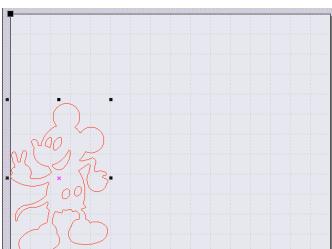
Set movement position of graph: in alignment toolbar respectively refer to moving to center, upper left, upper right, lower left and lower right, as following figure:



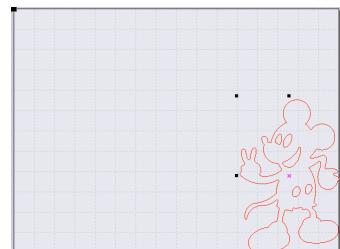
Center of interface

Upper left of interface

Upper right of interface



Lower left of interface



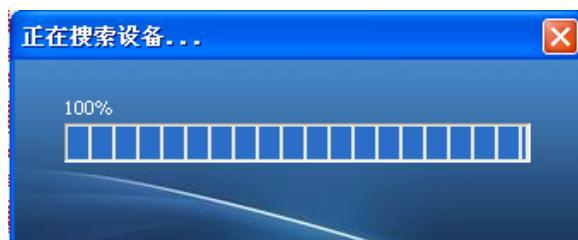
Lower right of interface

### 3.8.8 State bar



### 3.9 Device:

#### 3.9.1 Search device



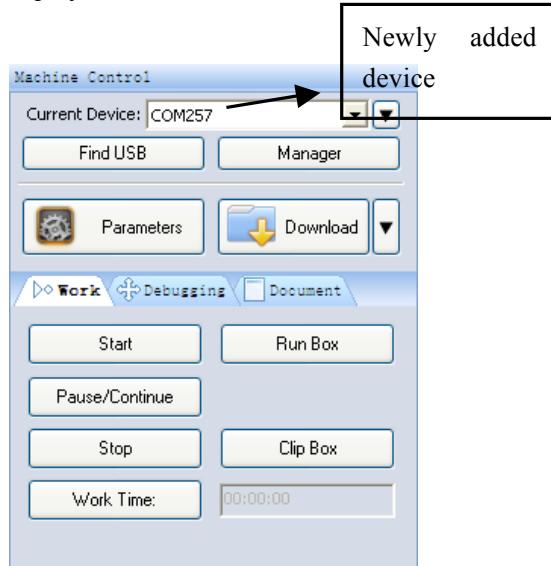
Communication port

Communication between computer and mainboard is via communication port and USB cable. If the communication port is not properly set, the computer can not control the machine.



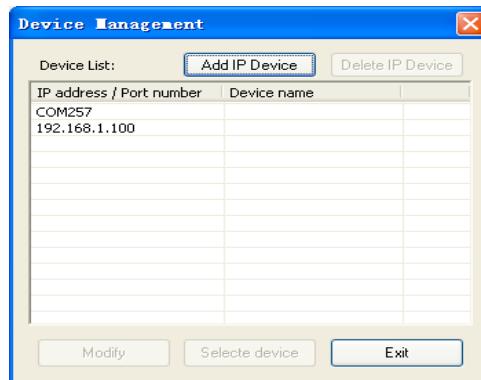
Click 【Search device】. At this time, if the machine normally starts and computer connects with the machine

by USB cable, correct port No. will be displayed, such as:



Above figure shows that the communication port between current computer and mainboard is COM24.

### 3.9.2 Device management



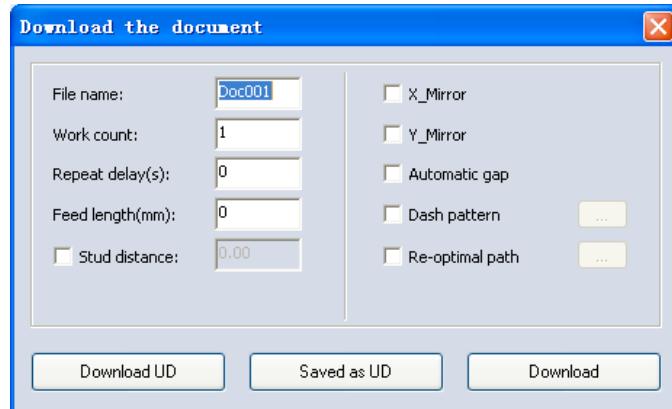
If network transmission is required, click “add network device” and enter IP address.

### 3.9.3 Device parameters



### 3.9.4 Load file

Import or open file to be processed and click 【Device】 / 【Load file】 in menu bar. Then, the following window will appear. Select corresponding demand based on requirements.



Save as offline file: Save as offline file for loading to board by U disk

Load offline file: Load saved offline file.

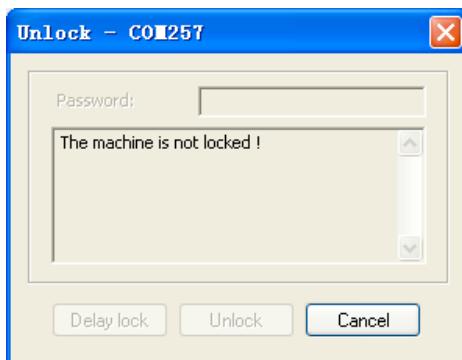
Load current file: Load current active file.

Real-time tracking: After loading graph, during cutting thumbnail on control panel, current cutting track will be displayed.

### 3.9.5 Load offline file

Click 【Device】/【Load offline file】 in menu bar. Offline file saved in computer will be displayed. The extension name of offline file is ud.

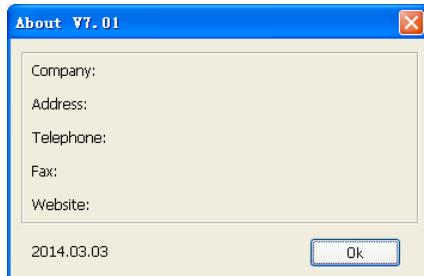
### 3.9.6 Unlock



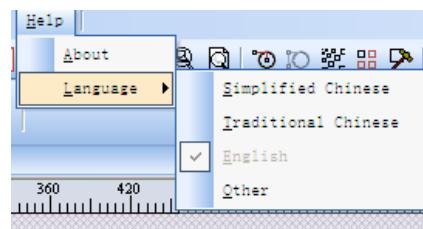
(The function shall be matched with dongle)

### 3.10 Help

#### 3.10.1 About



#### 3.10.2 Languages

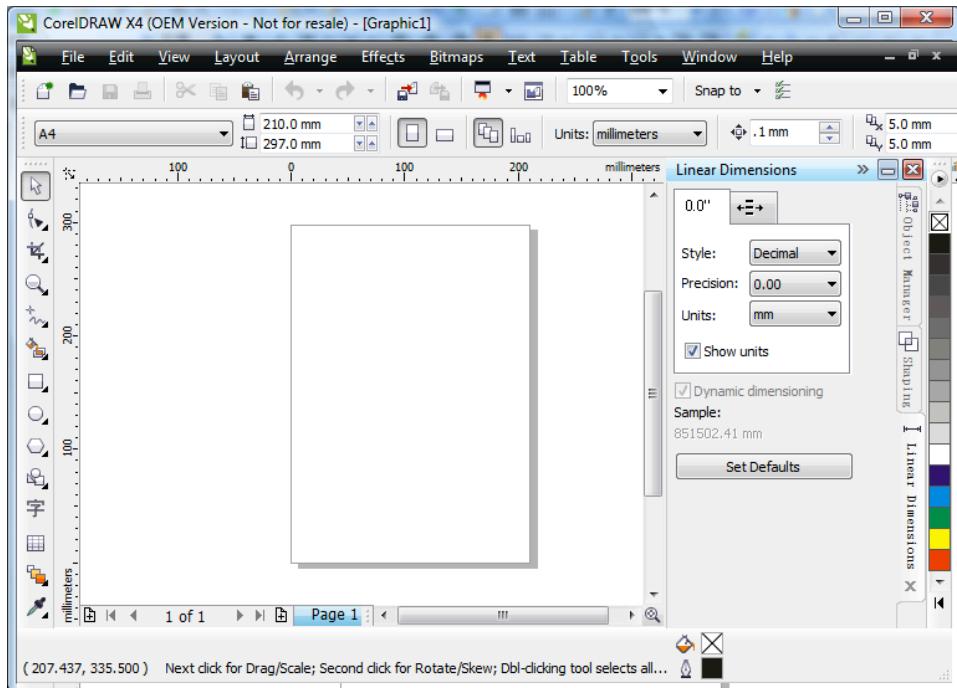


# Chapter V Brief Introduction to CorelDraw

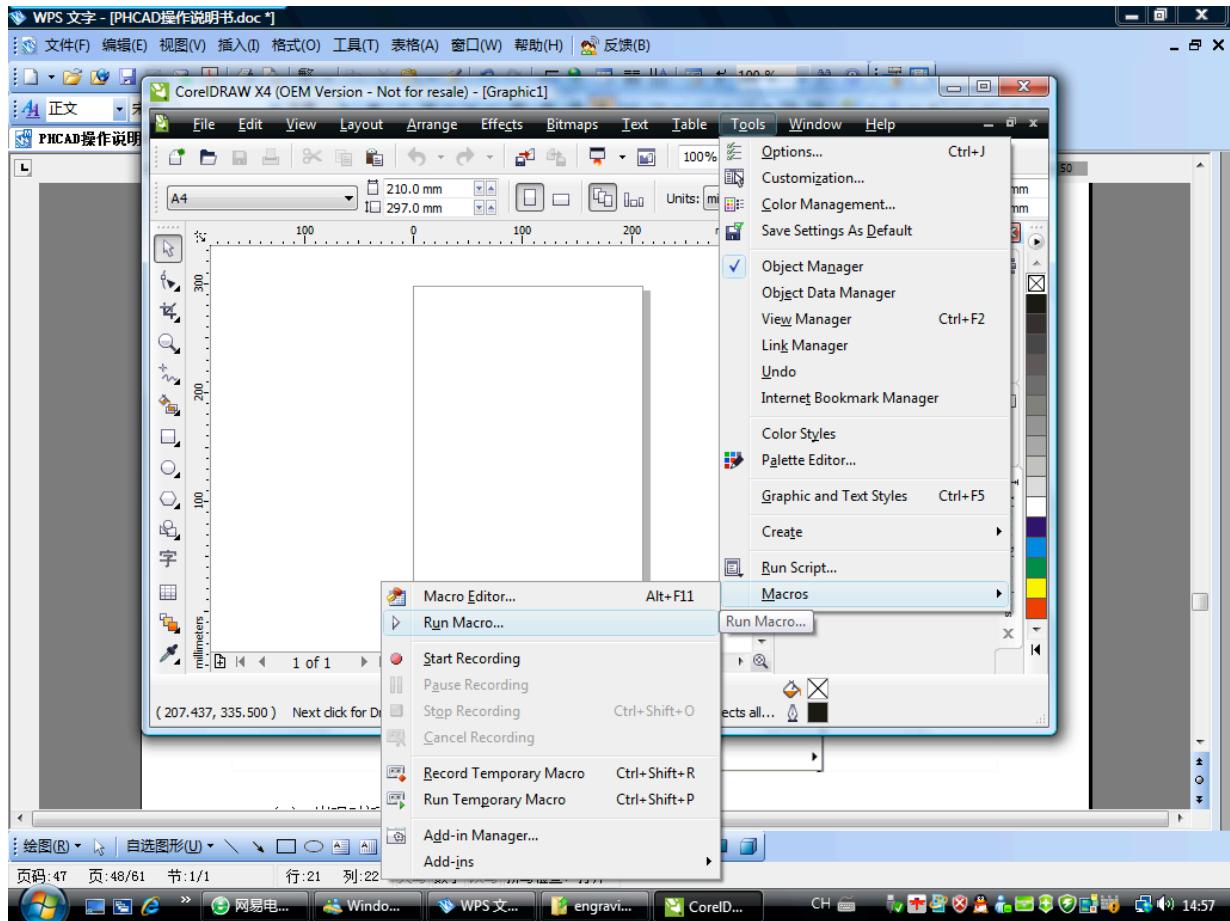
## Direct Output Software

### 5.1 Manual load of “PH\_LaserCut” tool

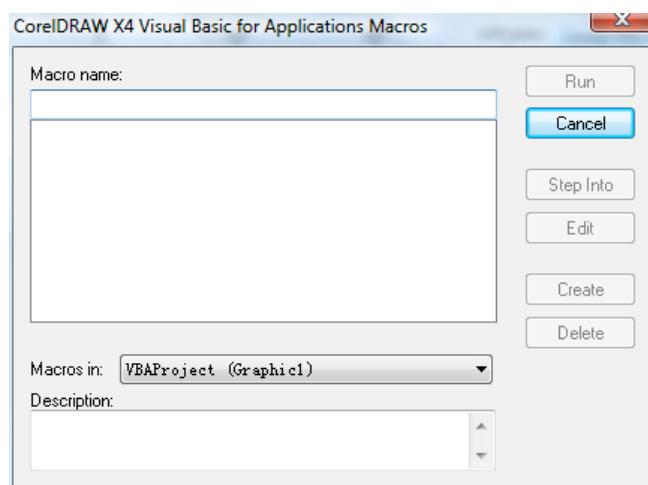
After installation of CorelDraw direct output software (see *Chapter II Installation of Software*), main interface for starting CorelDraw. CorelDraw12 is as follows:



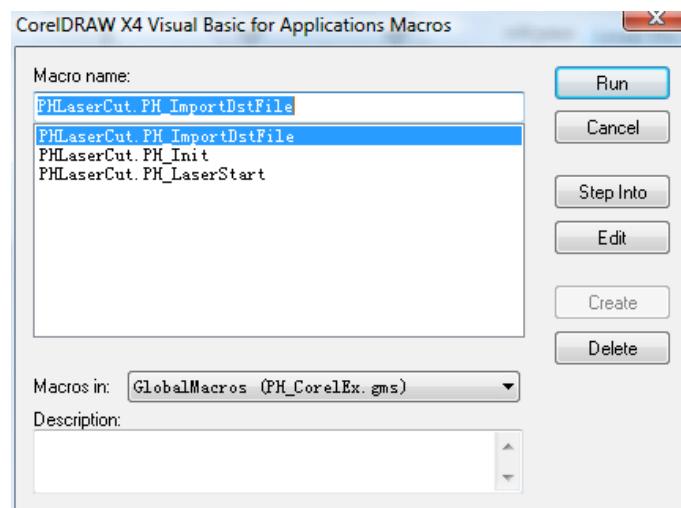
(1) Click 【Tools】 / 【Visual Basic】 / 【Play】 , as shown in following figure:



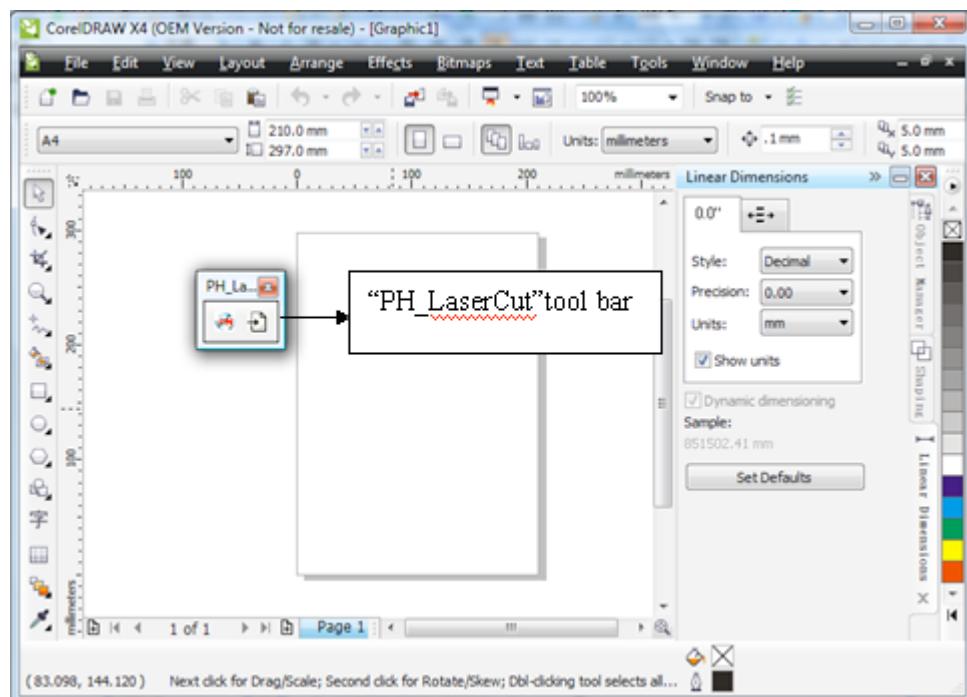
(2) The following dialog will appear:



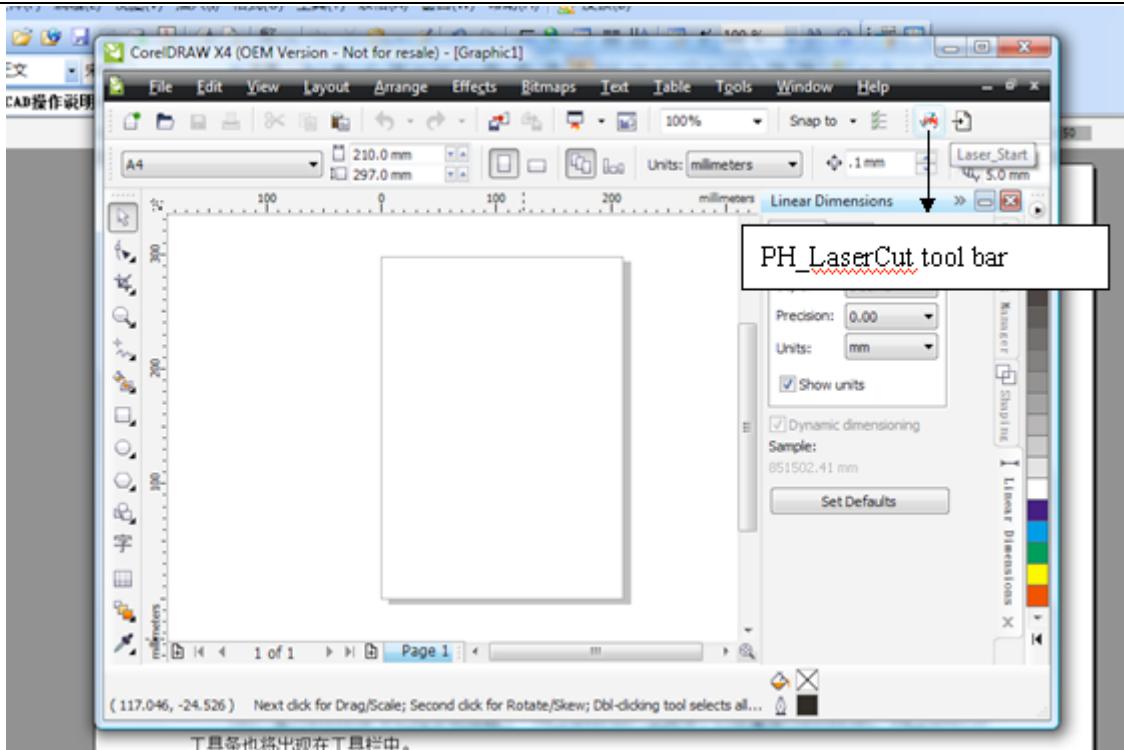
(3) Select “GlobelMacros(PH\_Corel12.gms)” in 【Position of macro】 and select “PHLaserCut.PH\_Init” in 【Name of macro】 , as shown in following figure:



(4) Click 【running】 button. CorelDraw main interface can add “PH\_LaserCut” toolbar, as following figure:



(5) Drag “PH\_LaserCut” tool to toolbar by mouse, as following figure:

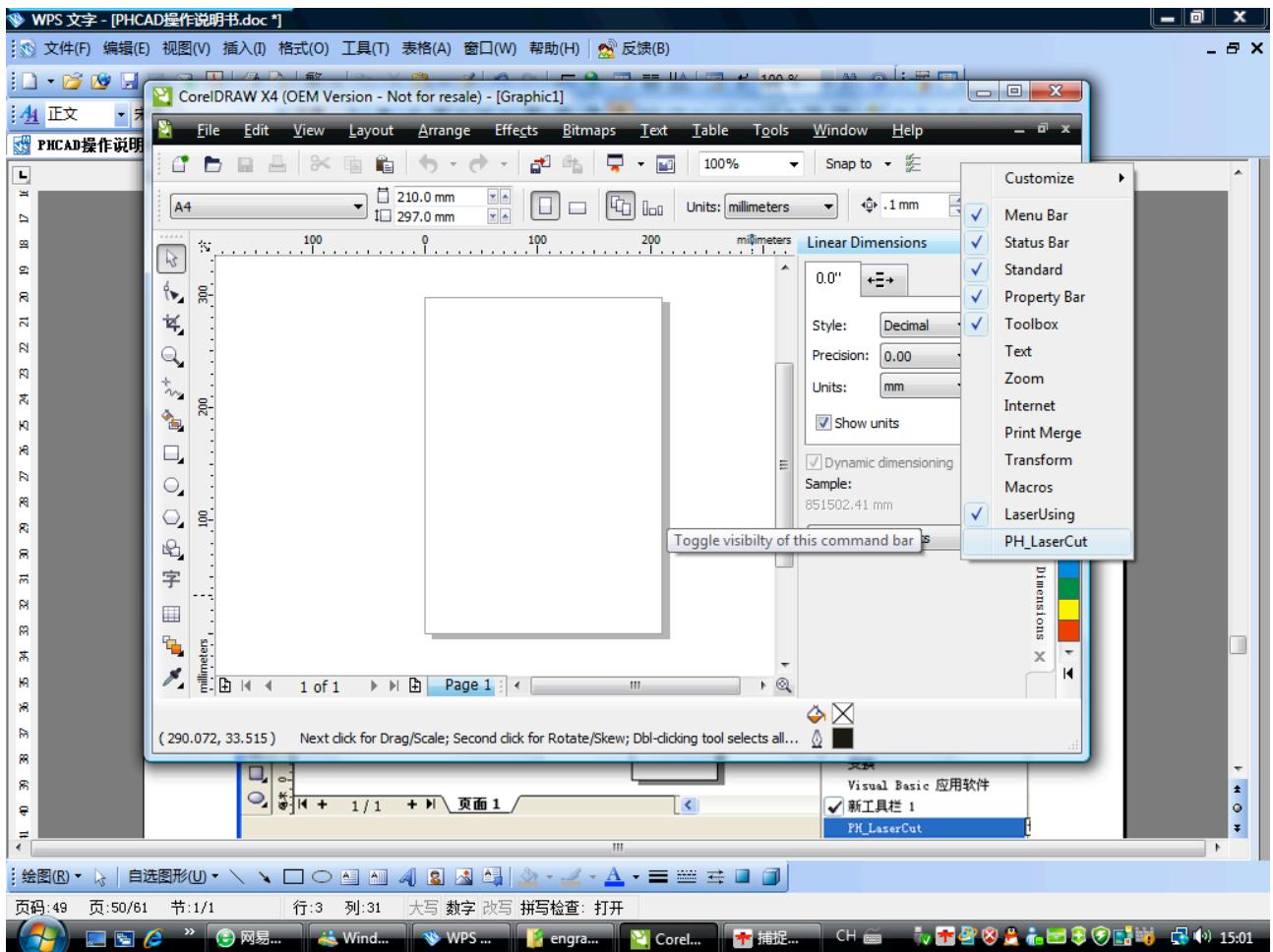


(6) In CorelDraw, “PH\_LaserCut” tool has be manually loaded. After restarting CorelDraw, “PH\_LaserCut” tool will appear in toolbar.

## 5.2 Display of hidden “PH\_LaserCut” tool

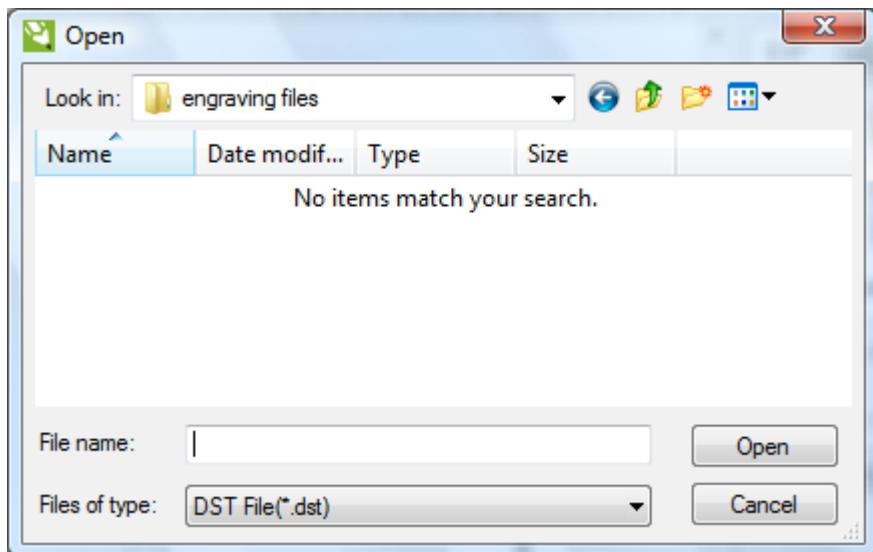
During using CorelDraw, user may close “PH\_LaserCut” tool by mistake. Therefore, the hidden tool shall be displayed. Operation is as follows:

Click toolbar by right button of mouse. The Pull-down Menu is displayed. Then, click 【PH\_LaserCut】 , as following figure:



### 5.3 Import of DST/DSB file

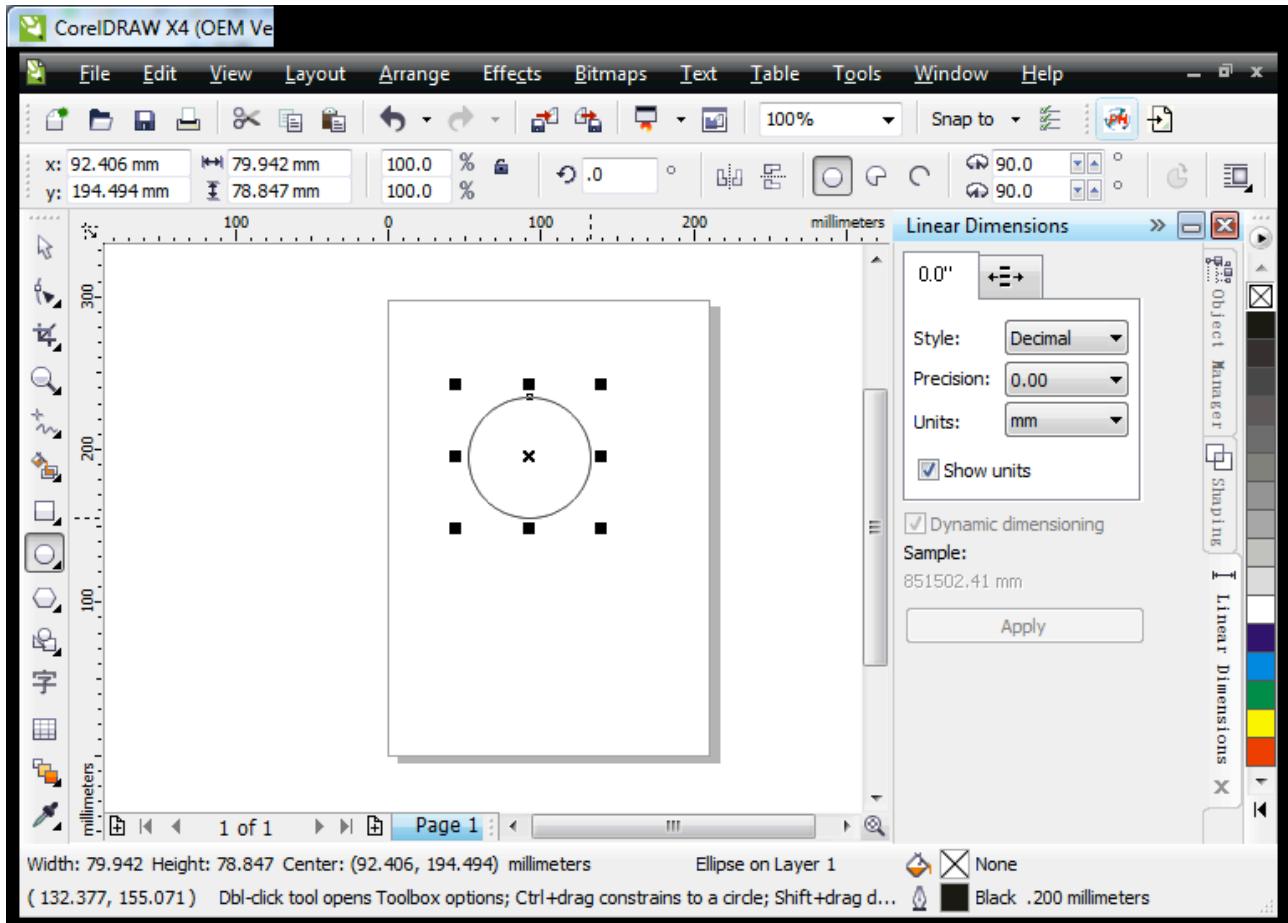
Click import button in "PH\_LaserCut" tool, and then the following dialog will appear:



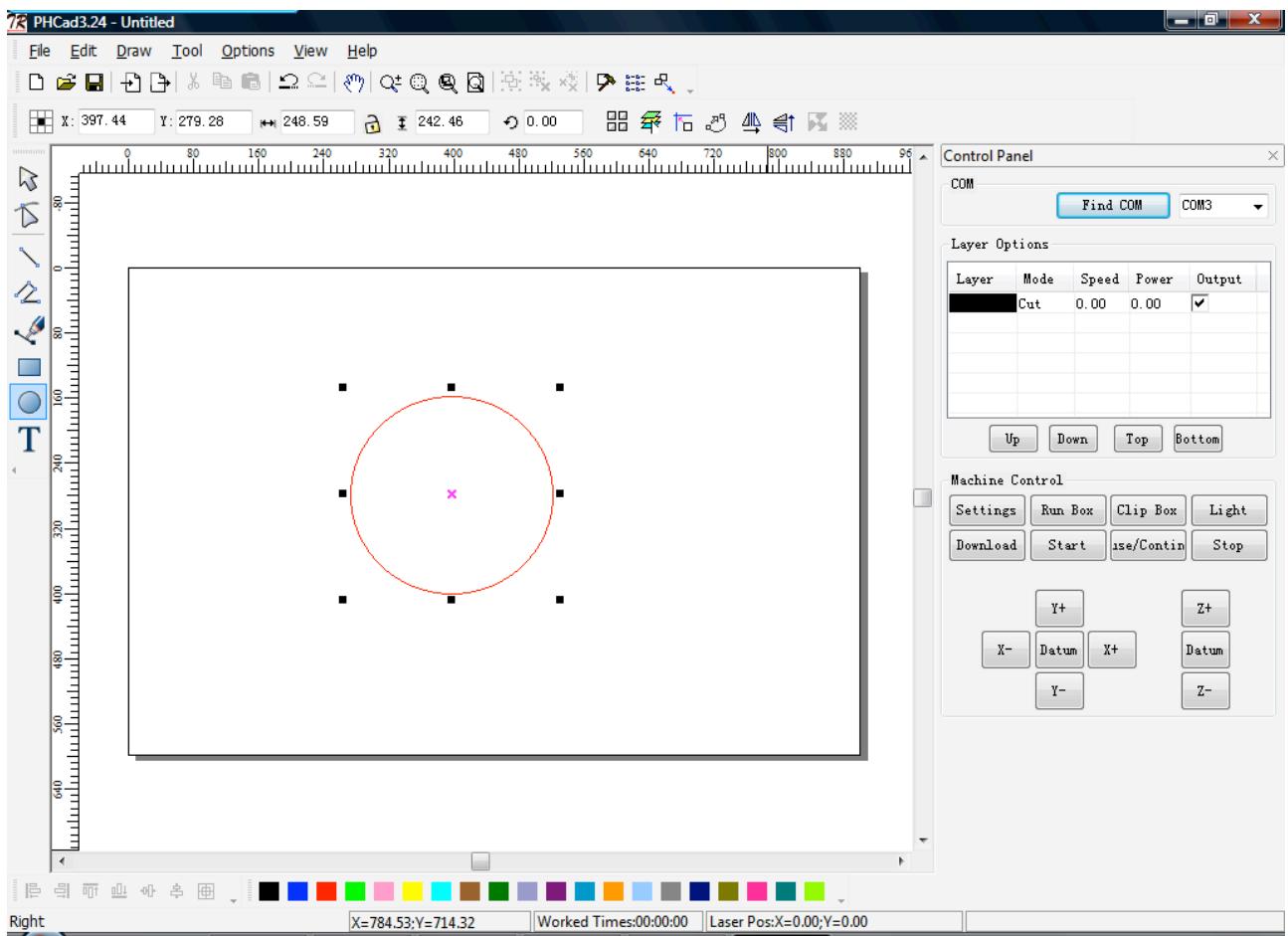
Select DST/DSB file to be imported, and then click 【Open】.

## 5.4 Change from CorelDraw to general software

Edit graph in CorelDraw, as following figure:



Click  in “PH\_LaserCut” tool to directly change to general software. The graph which is edited by CorelDraw will be displayed in view of general software, as following figure:



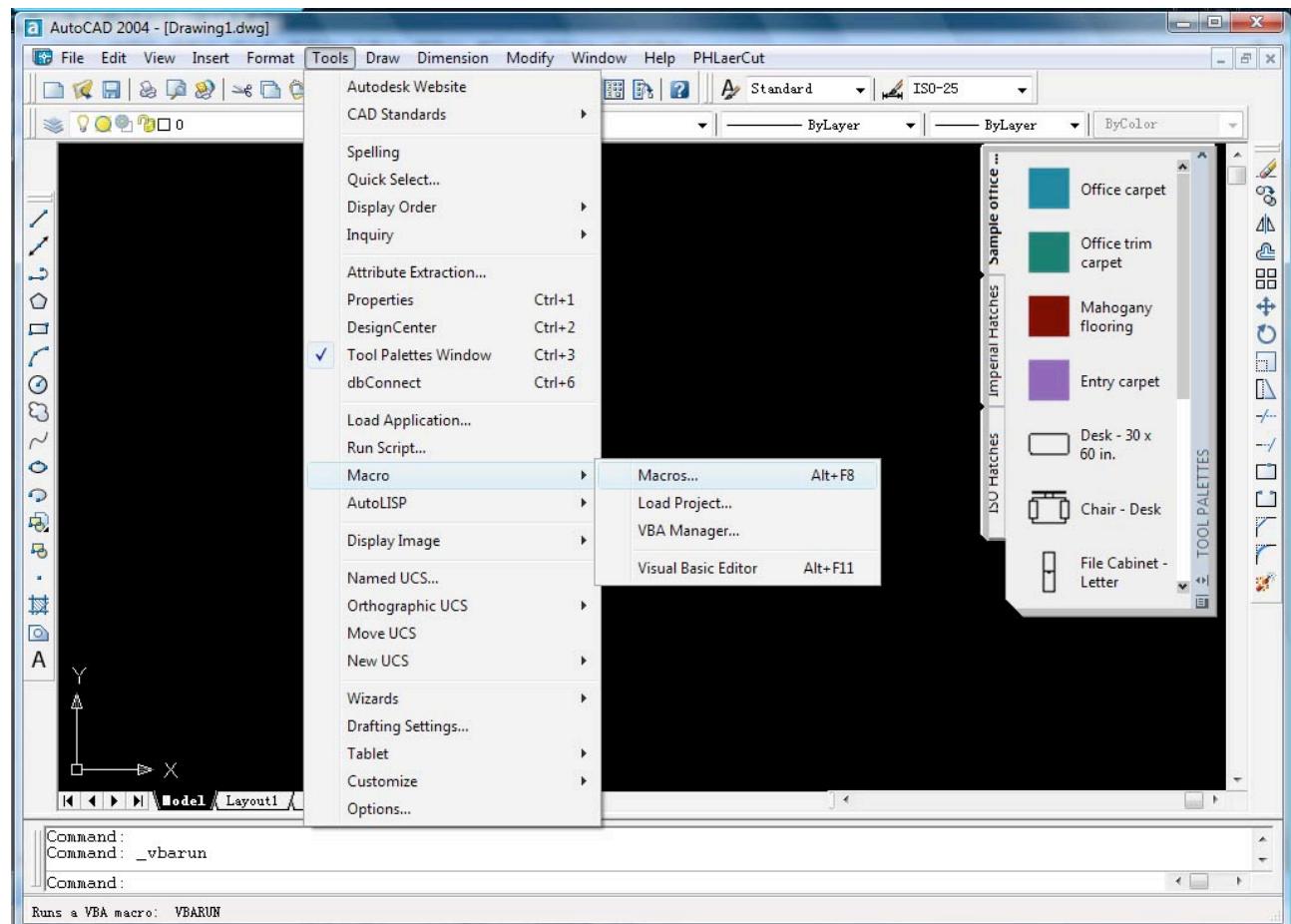
In such way, the general software can finish laser processing task (see: Chapter III Basic Operation of General Software and Chapter IV Laser Processing).

## Chapter VI Brief Introduction to AutoCAD Direct Output Software

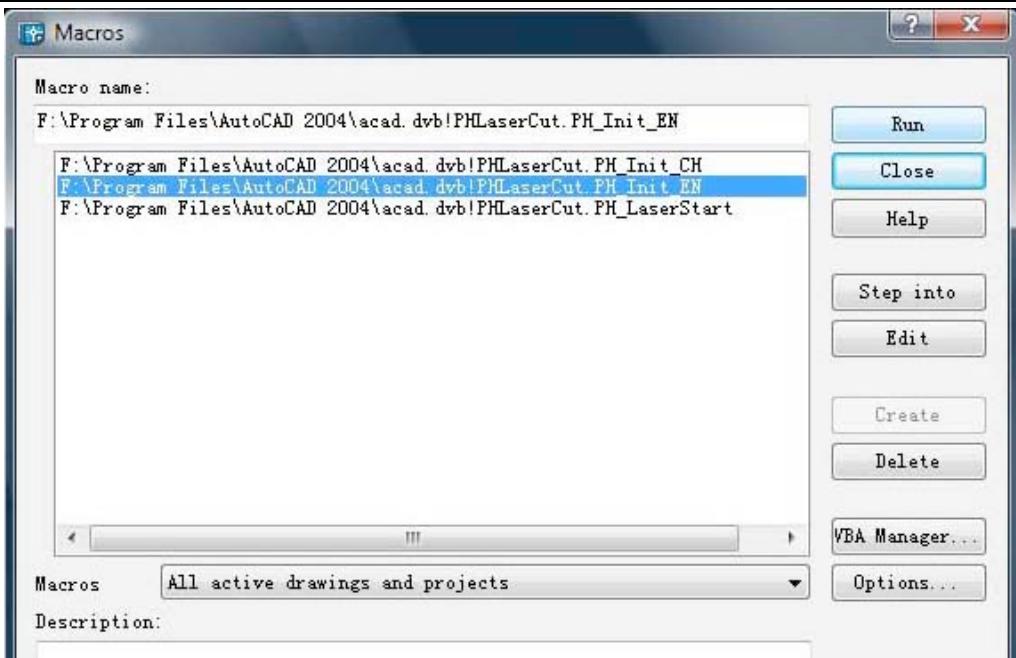
### 6.1 Manual load of “PH laser processing” menu and “PH laser processing” tool

After installation of AutoCAD direct output software (see: *Chapter II Installation of Software*), start AutoCAD and there is no 【PH laser processing】 menu and 【PH laser processing】 tool in main interface. Therefore, manual load is required. The operation is as follows:

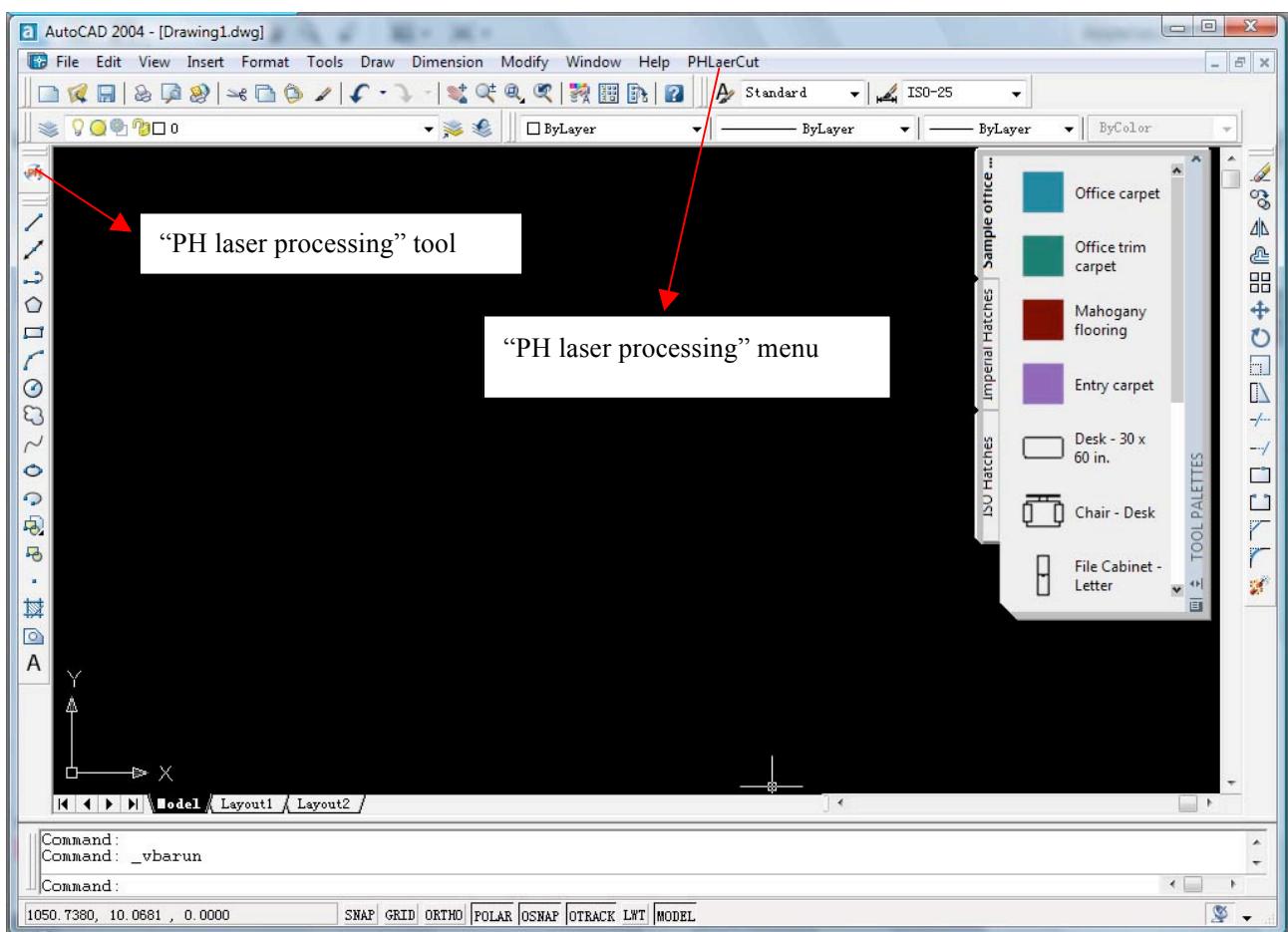
- (1) Click 【Tools】 / 【Macro】 / 【Macro】 , as following figure:



- (2) The following dialog will appear:

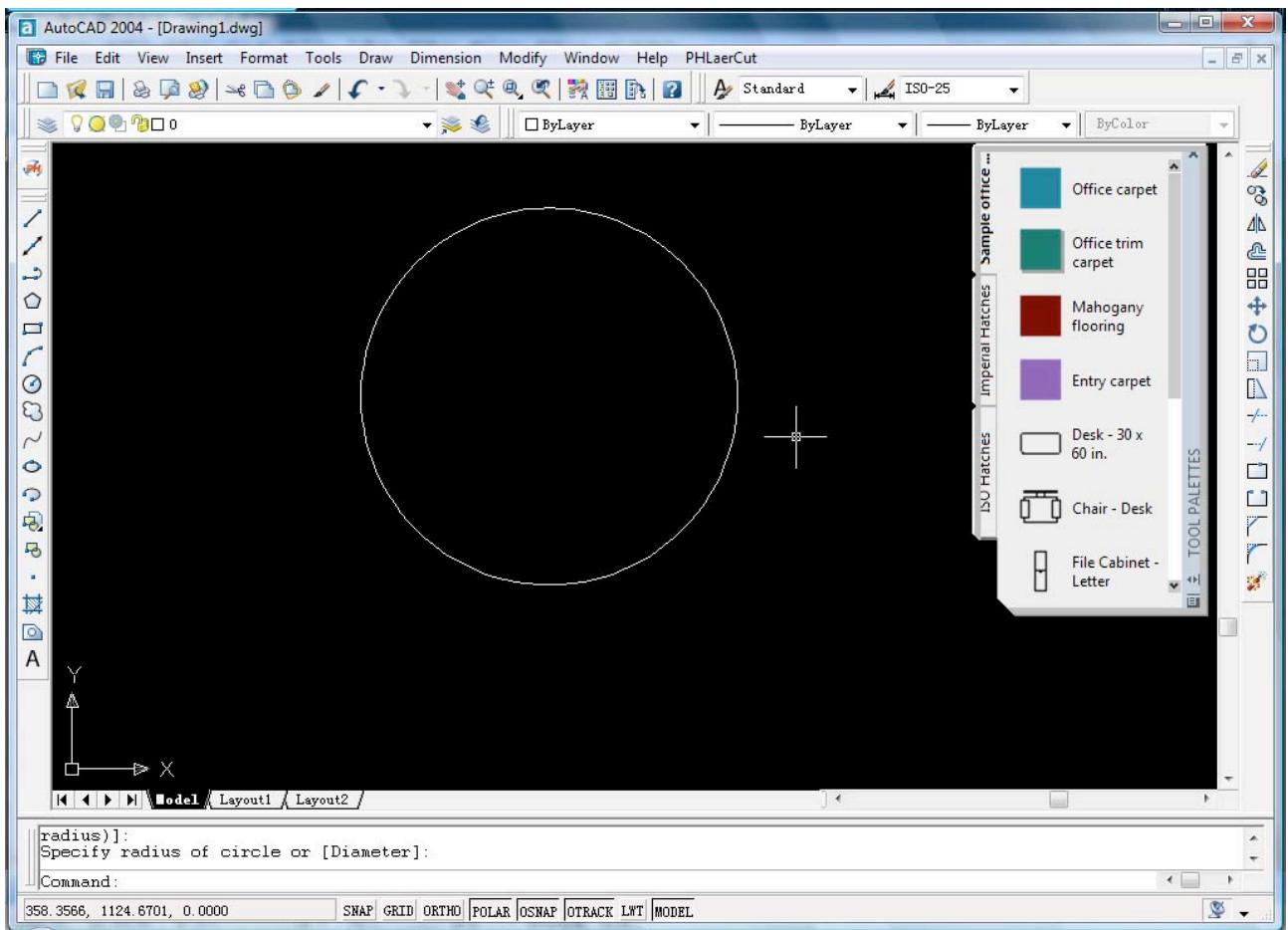


(3) Select “...PHLaserCut.PH\_Init\_CH” in 【Name of macro】 and click 【Running】 button to add “PH laser processing” menu and “PH laser processing” tool in AutoCAD, as following figure:

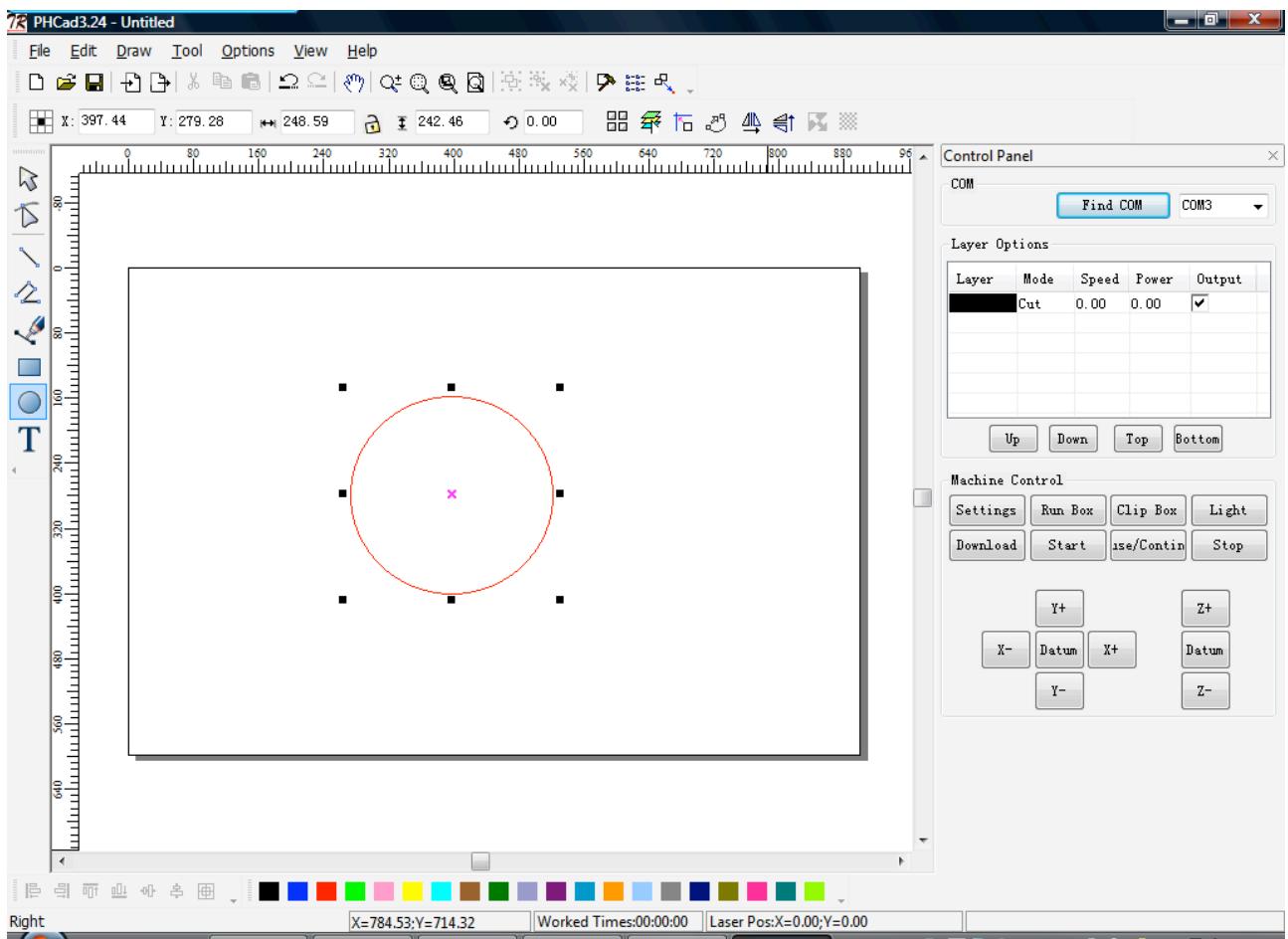


## 6.2 Change from AutoCAD to general software

Edit graph in AutoCAD, as following figure:



Click 【PH laser processing】/【Laser processing】 in menu or click  in “PH laser processing” tool to directly change to general software. The graph which is edited by AutoCAD will be displayed in view of general software, as following figure:



In such way, the general software can finish laser processing task (see: *Chapter III Basic Operation of General Software* and *Chapter IV Laser Processing*).

## Chapter VII Operation Instructions for Human Machine Interface



**Reset**: In all interfaces, if the Reset button is pressed (or system is powered), the mainboard will be reset, machine will find origin and interface will show “in resetting”. After the machine successfully comes back to origin, the laser head will automatically move to positioning point set last time. If last work before reset is successfully finished, system will show main interface 1. If last work before reset is not finished (power off during processing), after restarting the machine, the interface will show “whether continue to engrave”. If you click “Enter”, the machine will find the cutting point during power off and continue to cut the unfinished graph. If you click “Esc”, return to main interface.



**Stop**: Stop operation



**Start/Pause**: Start/pause processing.



**Enter**: Confirm



**退出** : Exit the current interface



**出光** : Laser ON/OFF



**功能** : Enter auxiliary interface



**边框** : Travel along frame. The laser head will not emit laser, but rapidly travel along frame of processing graph. The function is mainly used for positioning.



**文件** : Processing file saved in control mainboard



**定位** : If you press the button, the mainboard will take X/Y axis position of current machine as relative origin of graph.



: Direction buttons: upper, lower, left and right



**Z/U** : Click the button and and to move Z axis. The function shall be supported by device hardware.

## 7.1 Operation instructions for all display interfaces

Supply power to machine. The control panel will display “in resetting”, as

figure I . After resetting, main interface will be displayed, as figure II .



Fig. I



Fig. II

Note: in figure II , “speed” and “power” can be directly touched. Amend parameters based on requirements of clients.

7.2 In main interface, press function, and then the figure III will be displayed, i.e. system menu interface.



Fig. III

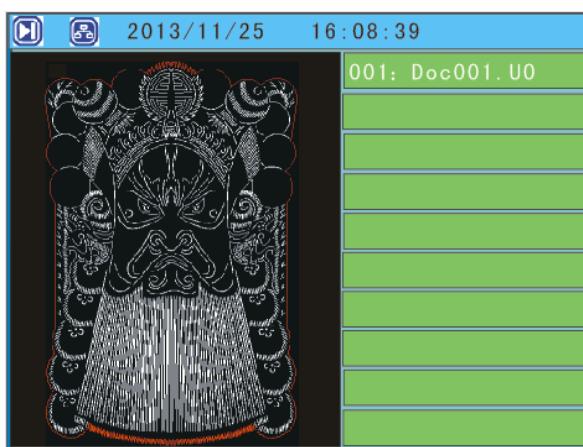


Fig. IV

### 7.3 File in U disk

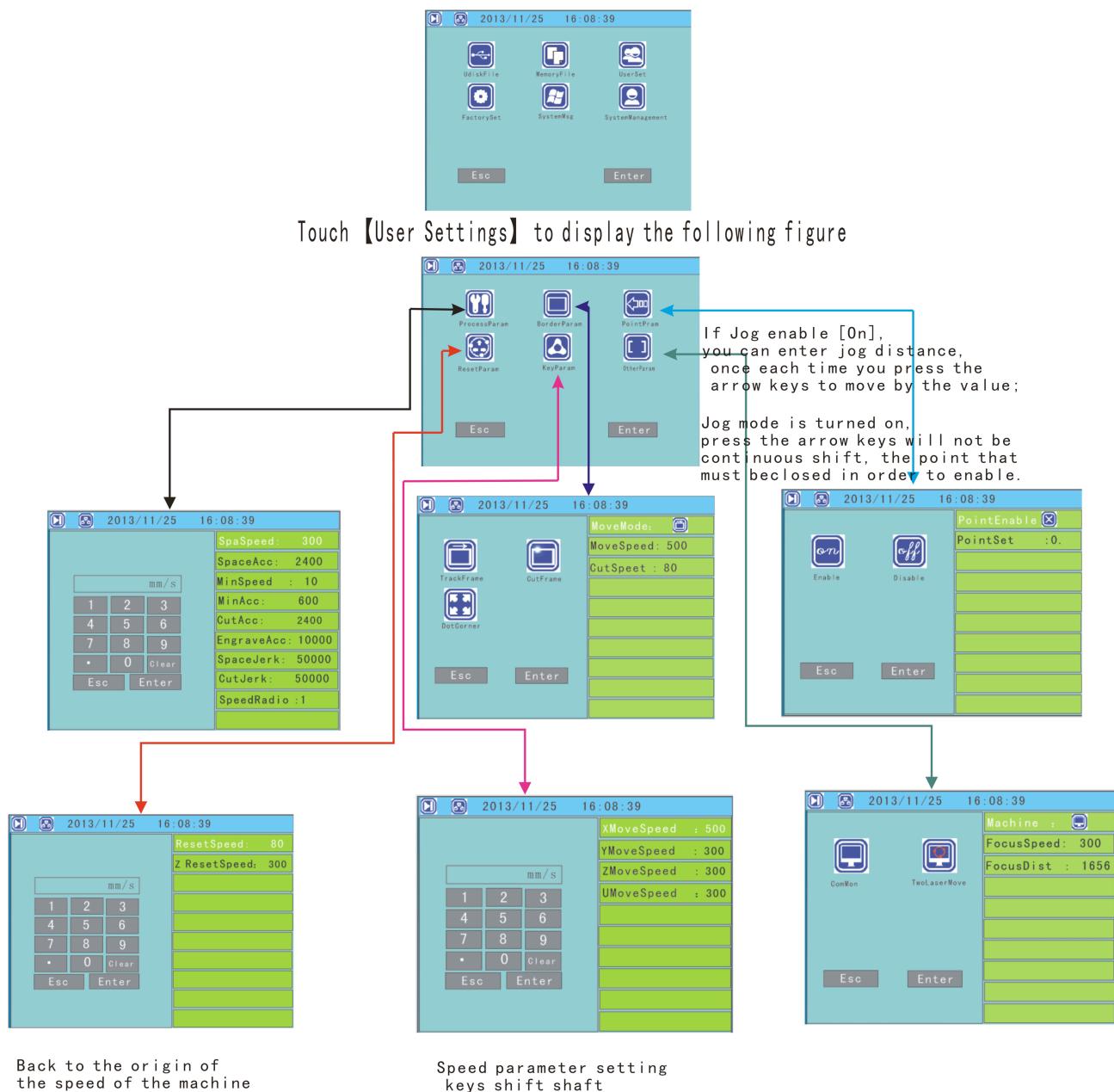
Plug in U disk which has processing file. Touch 【File in disk】 , and figure IV will be displayed. The file can be copied to memory or processed.

### 7.4 File in memory



Touch 【File in memory】 in window of figure III. Then, the file will be displayed. Direction button can be used to select and then, touch corresponding file name. At this time, you can carry out selection operation for the file.

## 7.5 Introduction to 【User settings】 interface

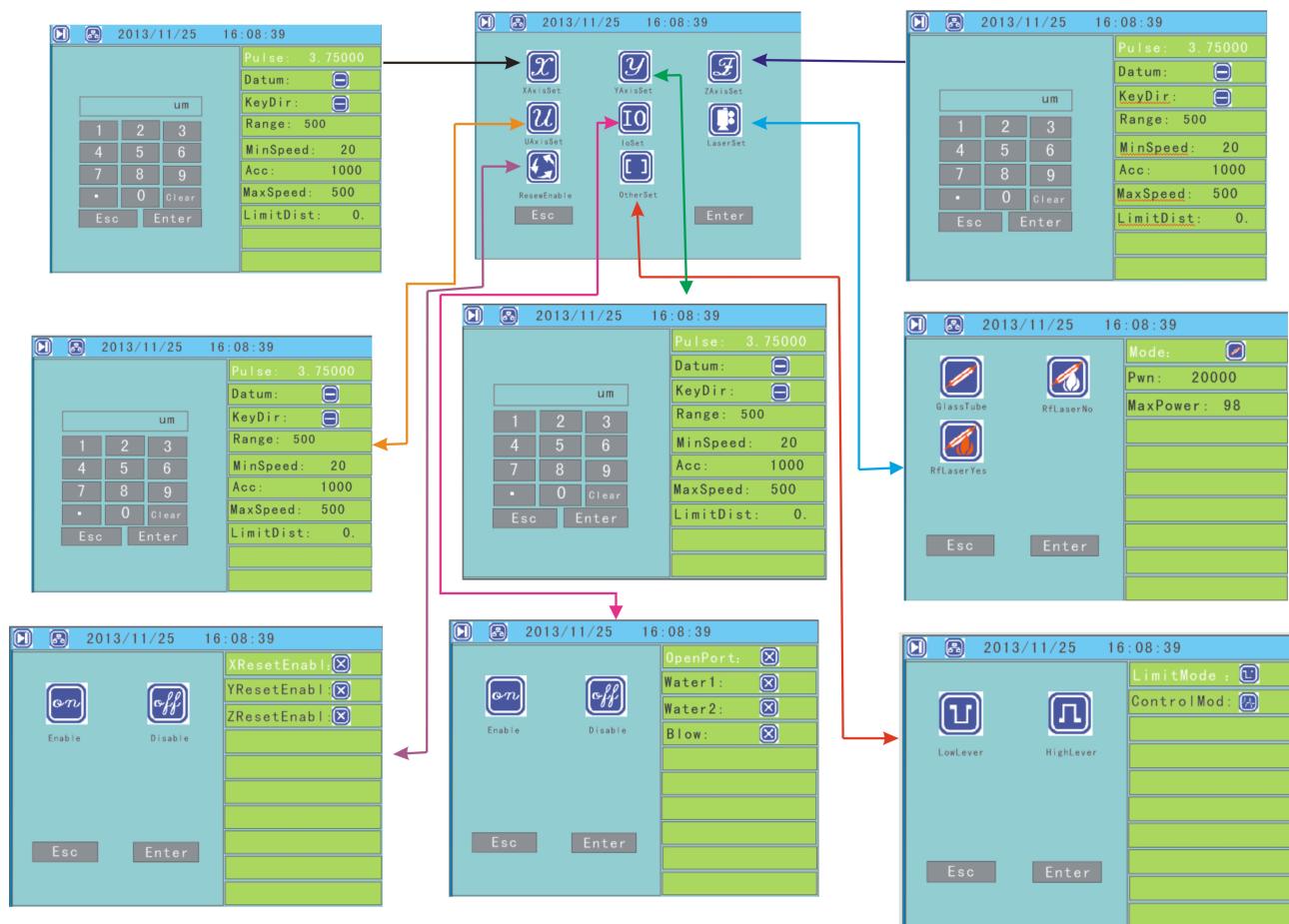


## 7.5 Introduction to 【Manufacturer settings】

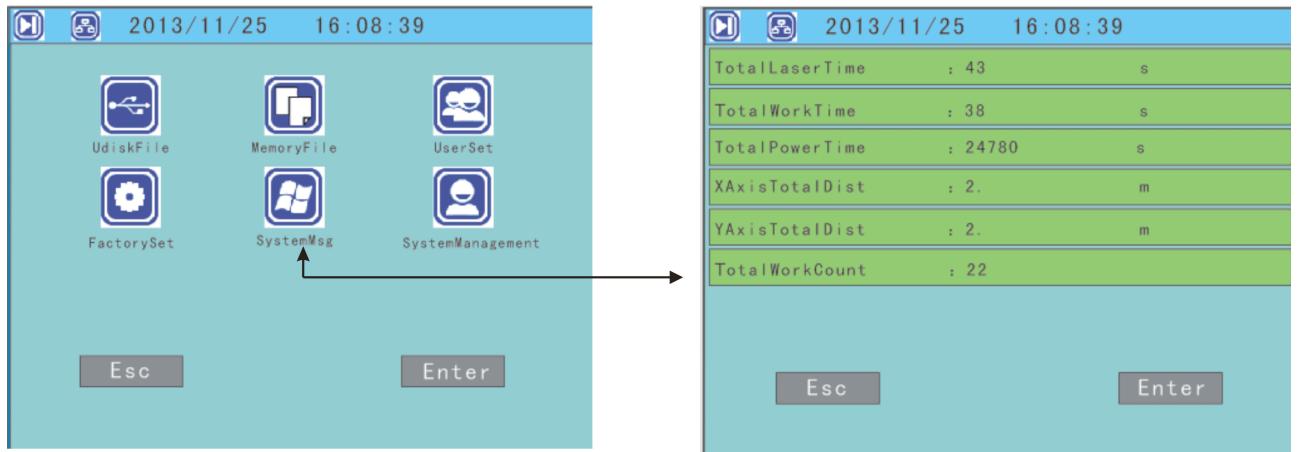
### interface



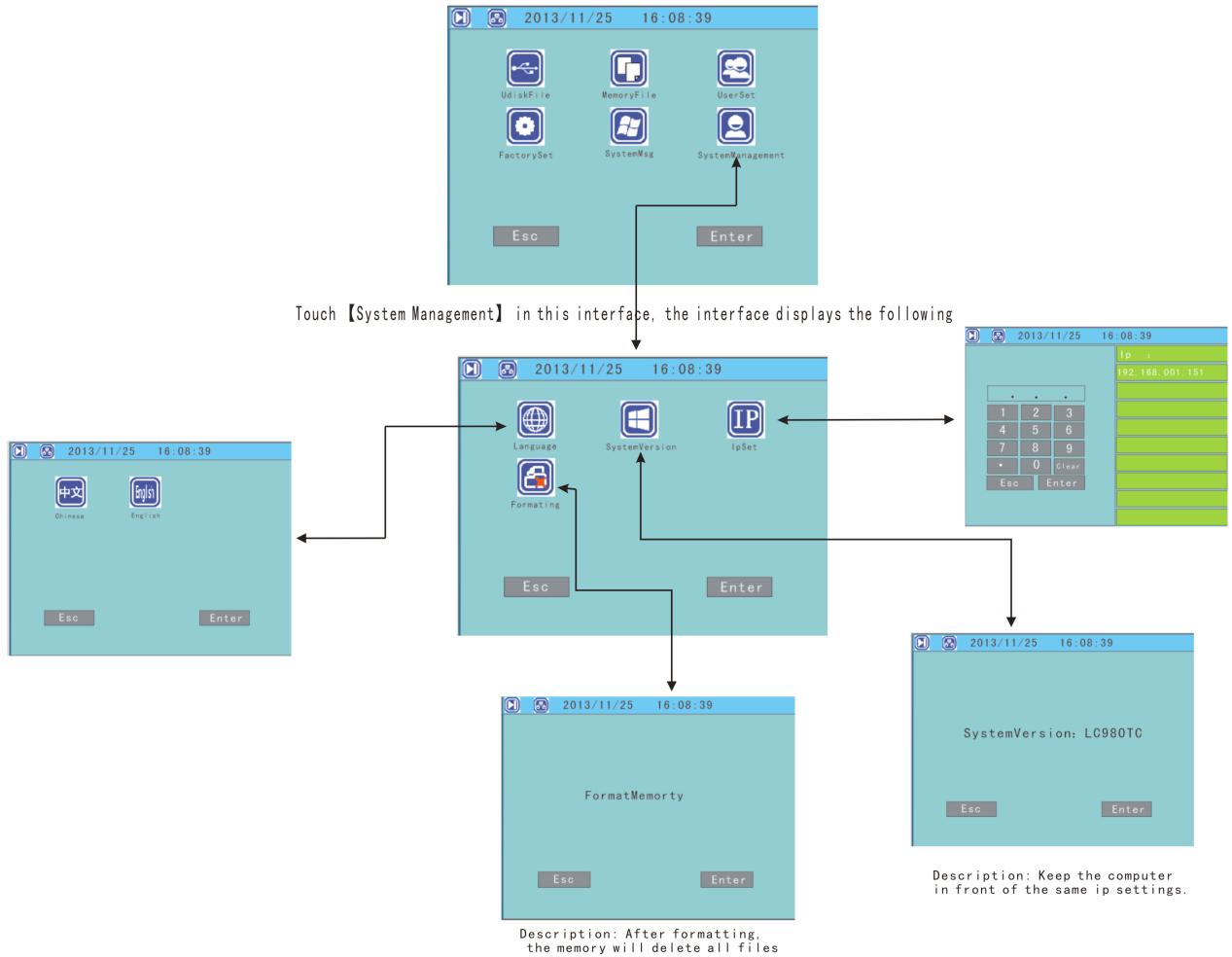
Touch 【Factory Parameters】 Enter the password, to display the following figure



## 7.6 Introduction to 【System information】 interface



## 7.6 Introduction to 【System management】 interface



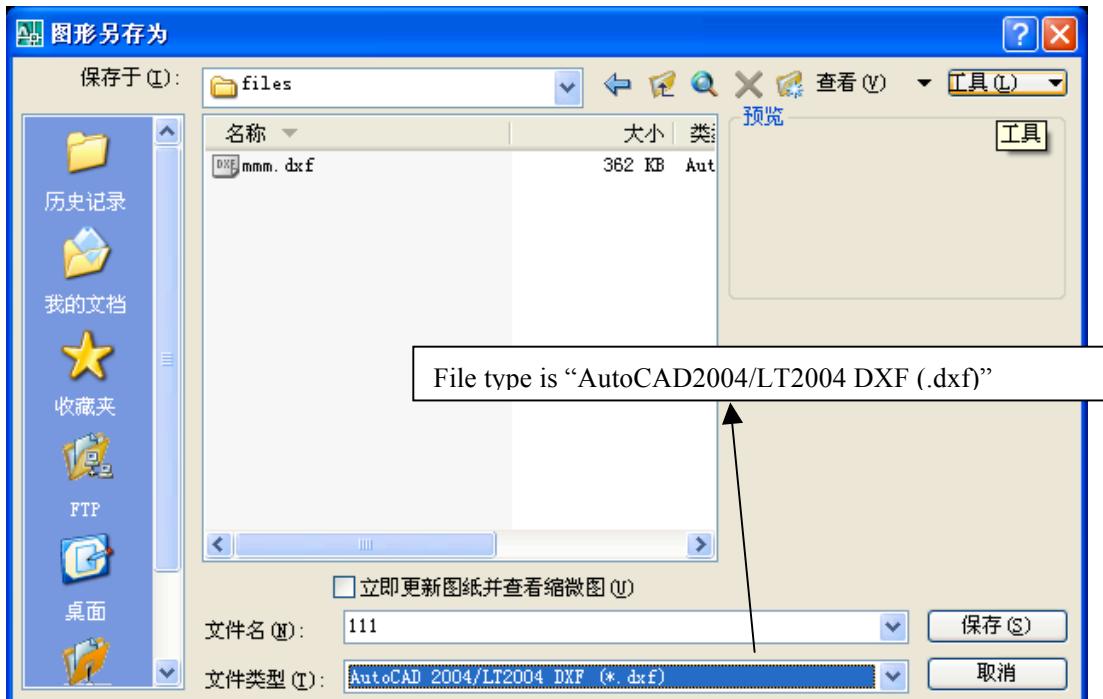
## Chapter VIII Common Questions and Answers

### 8.1 No action or wrong action of machine or no processing of partial graph during starting and processing

- Check whether graphic data is beyond breadth. Data beyond breadth will not be cut.
- Check “position of graph relative to laser head” (see *4.1 Position of Graph Relative to Laser Head*).

### 8.2 Automatic close of software during importing dxf file

Open dxf file by AutoCAD in AutoCAD2002 version or above, and then decompose graph by “decomposition” tool in AutoCAD. Select to save the file in format of “AutoCAD2004/LT2004 DXF(.dxf)”, as following figure:



Import the saved file by general software.

### 8.3 【Insufficient damping distance】 displayed in panel

- Check whether the process parameter engraving acceleration (see *4.4 Process Parameters*) is too small. In general, the engraving acceleration is no less than 8000.
- Guarantee external frame of graph not closing to boundary of machine breadth.

### 8.4 【Current file data is empty】 during loading file

- Check whether graph outputted from engraving is closed.
- Check whether outputs of all layers are “NO” (see *4.6.1 Layer parameter settings*)

### 8.5 Mirror image between processed graph and actual graph

Check whether “origin position of machine” (see *3.2 Working space settings*) is correct.