

MM3D

General Introductions

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General Introductions

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1. Menu Bar

“**Menu Bar**” is on the top of **MM3D** program window. It shows the main function of **MM3D**. Users can select the function they need through clicking the corresponding menu. “**Menu Bar**” includes the following 9 functions.

- **File Menu**
- **Edit Menu**
- **Draw Menu**
- **Image Menu**
- **Color Menu**
- **Execute Menu**
- **View Menu**
- **Window Menu**
- **Help Menu**

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1.1 File Menu

“FileMenu” offers the following functions:


New	Create a new MM3D file.
Open...	Open an existing MM3D file (*.EZM3D).
Close	Close a file.
Save	Save the current document using its original file name(Cover the original file).
Save As...	Save the current document using an assigned file name
Option...	Edit the program settings.
Import	Import an image file.
Export DXF	Export the file as a ‘*.DXF’ file for other applications to use.
Select TWAIN Device...	Select the supporting scanners.
TWAIN Acquire...	Scan an image.
Configuration Import/Export	Import or export the configuration files.
Change Language...	Change to different language version.
Print...	Print the file.
Preview	Preview the current document before printing.
Printer setting...	Select the printer and edit the printing settings.
MRU File	Display the last used file.
Exit	Exit MM3D .

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1.1.1 New

Create a new document. Users can create several new files at the same time.


Method:

- Click “**File**” from “**Menu Bar**” and select “**New**”.
- Click  from the **Toolbar**.
- Press [Ctrl+N] on the keyboard.

1.1.2 Open

Open an existing **MM3D** file. Users can open several files and switch to different document by using “**Window Menu**.”

Method:

- Click “**File**” from “**Menu Bar**” and select “**Open**”.
- Click  from the **Toolbar**.
- Press [Ctrl+O] on the keyboard.

The default file format of **MM3D** is ‘*.EZM3D’. Users can search the file they want to open under the folder they used to save **MM3D** files, refer to Fig.1.1.01.

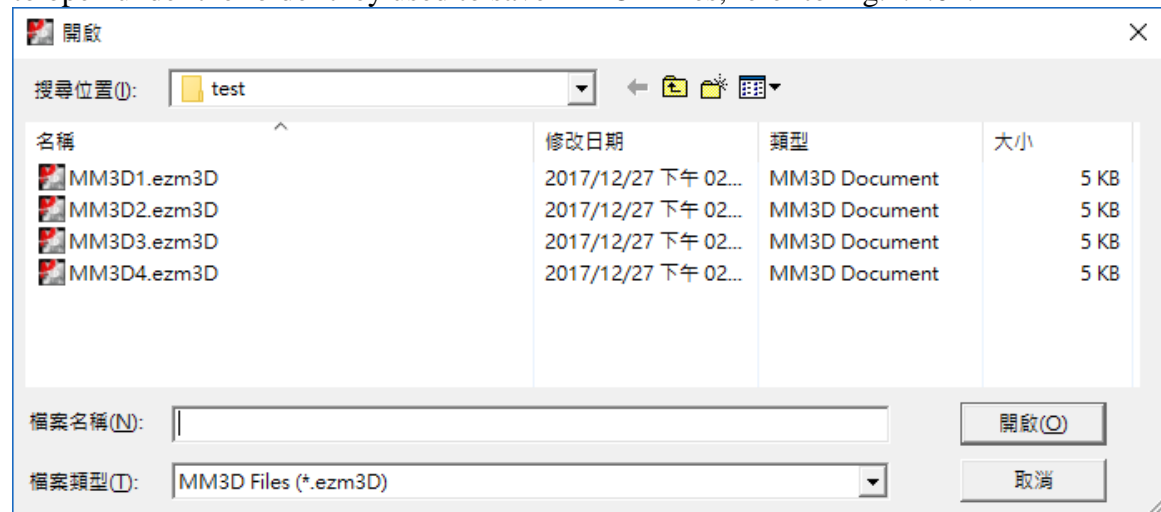


Fig.1.1.01

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1.1.3 Close

Close the current using file. Software will suggest users to save the editing file before closing it. Users will lose all the modifications they edit after the pervious saving when closing the file without saving it.

When closing an unnamed or new file, software will pop up a “**Save As**” dialog box for users to name and save that file.

Method:

- Click “**File**” from “**Menu Bar**” and select “**Close**”.
- Click the upper right button like Fig.1.1.02 to close the file.

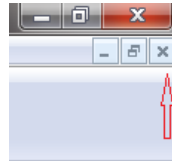



Fig.1.1.02

- Click the upper left icon  like Fig.1.1.03 and select “**Close**” to close the file.

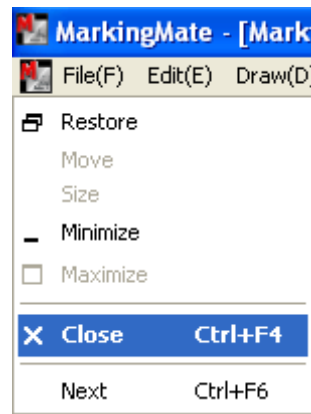



Fig.1.1.03

- Press [Ctrl + F4] on the keyboard.

1.1.4 Save

Save the current using document with the original file name under the same folder. Software will pop up a “**Save As...**” dialog box when the file is new or unnamed or when users want to change the file’s name or folder.

Method:

- Click “**File**” from “**Menu Bar**” and select “**Save**”.
- Click  from the **Toolbar**.
- Press [Ctrl + S] on the keyboard.

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1.1.5 Save As...

Save the current document using a new file name or changing the saving folder, see Fig.1.1.04.

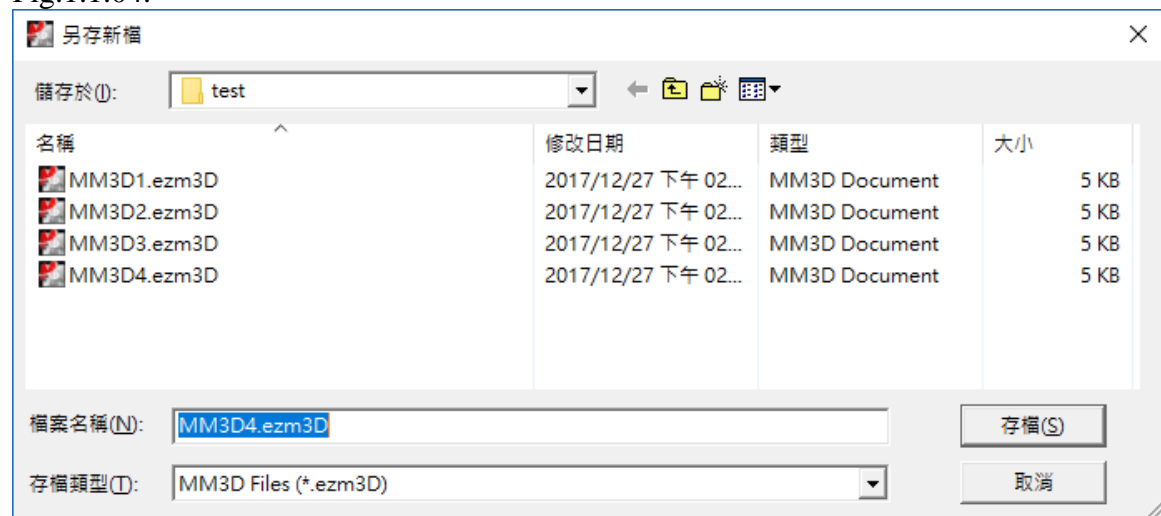


Fig.1.1.04

The following options are the functions users can select when using “Save As...”

Save in: Select the folder users want to save.

File name: Type or select a file name.

Save as type: The default file type of **MM3D** is ‘*.Ezm3D’

1.1.6 Load EZM File

Open EZM file in current software.

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1.1.7 Option

This function allows users to edit their own setting, such as ruler and grid.

1.1.7.1 System

Under the “System” option, there are several settings related to software system, see Fig.1.1.05.

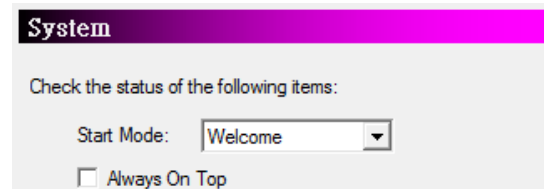


Fig. 1.1.05

Start Mode

Decide if show Welcome Dialog, open a new document, or open the latest file while MM3D is startup. Welcome dialog allows users to open file, open last edit file or create a new file, see Fig.1.1.06.

Always On Top

Make software on the top of all current using programs.

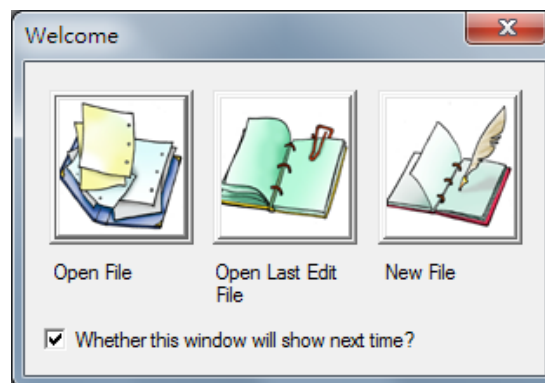


Fig. 1.1.06

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1.1.7.1.1 LogFile Setting

Enable/disable to use the log file, see Fig.1.1.07.

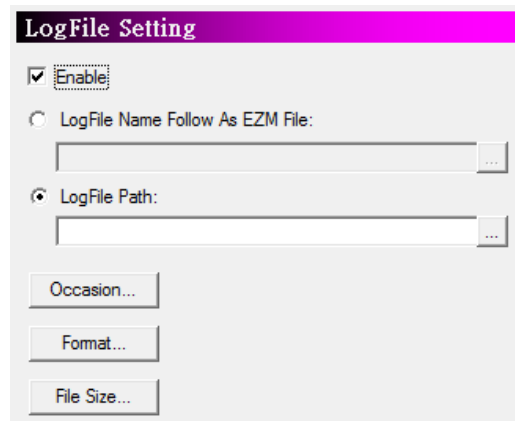


Fig. 1.1.07

Log File Path

Select the path of log file by clicking the  button.

Occasion

Click “**Occasion**” and a dialog box will appear as Fig.1.1.08. Check the items users want to record.

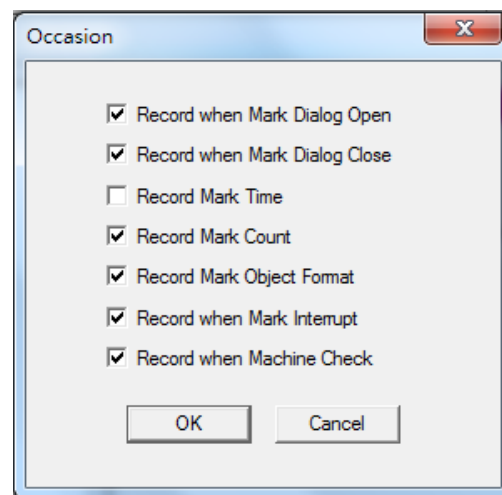


Fig. 1.1.08

Record when Mark Dialog Open

Record the message when mark dialog opened.

Record when Mark Dialog Close

Record the message when mark dialog closed.

Record Mark Time

Record the marking time.

Record Mark Count

Record the marking times.

Record Mark Object Format

Record the object format information.

Record when Mark Interrupt

Record the message while interrupt happened.

Record when Machine Check

Record the message of machine checking.

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Format

Click “**Format**” and a dialog box will appear as Fig. 1.1.09.
Format of each item in the log file can be edited here.

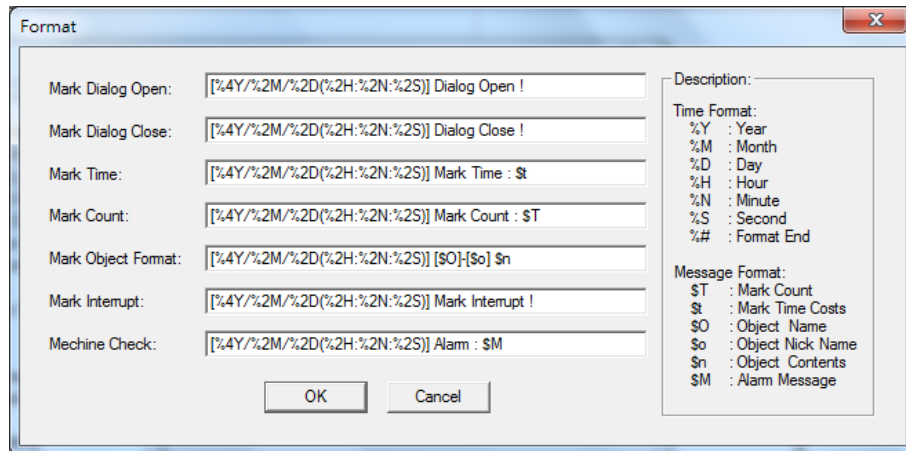


Fig. 1.1.09

Description:

All of the Time Format and Message Format are listed here.

Example:

If a format of Mark Dialog Open is set as below:

[%4Y/%2M/%2D(%2H:%2N:%2S)] Dialog Open ! %#

Then the log file will be recorded as:

[2007/10/15(09:32:24)] Dialog Open !

Please note that Time Format can be used in every fields, however, the Message Format must be placed at the related fields. For example: the Message Format “\$T” (Mark Count) can only be used in “Mark Count” field, if it is placed in “Mark Dialog Open” field, an unexpected result may occur.

File Size

This function is used for editing the log file’s size and division type.

There are four kinds of file type settings, see the following examples.

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Example 1: Select Maximum Size: 1000 KBytes (default).

If the file size is over 1000 Kbytes, the system will rename the original file, for example, TEST.TXT, to TEST-1.TXT and continue recording using a new file named TEST.TXT, see Fig.1.1.10.

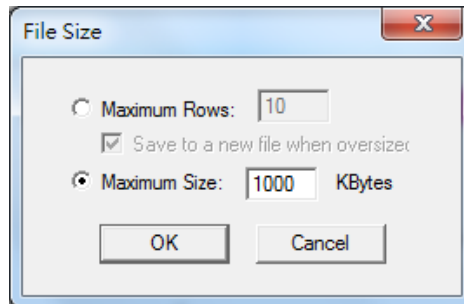


Fig. 1.1.10

Example 2: Select Maximum Rows: 10 and check “Save to a new file when oversized.”

If the file rows exceed 10, the system will rename the original file, for example, TEST.TXT, to TEST-1.TXT and continue recording using a new file named TEST.TXT, see Fig.1.1.11.

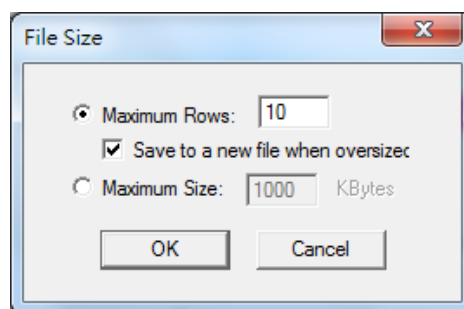


Fig. 1.1.11

Example 3: Select Maximum Rows: 10 without checking “Save to a new file when oversized.”

If the file rows exceed 10, the system will log the new message in the first row and delete row 11, see Fig.1.1.12.

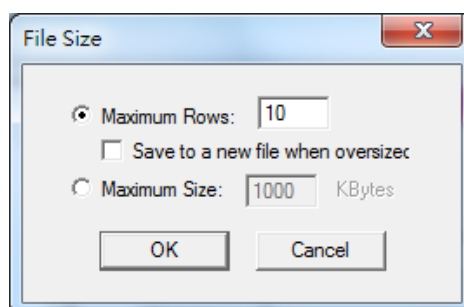


Fig. 1.1.12

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Example 4: Select Maximum Size: 0 Kbytes or Maximum Rows: 0

The system will not change the file during recording, see Fig.1.1.13.

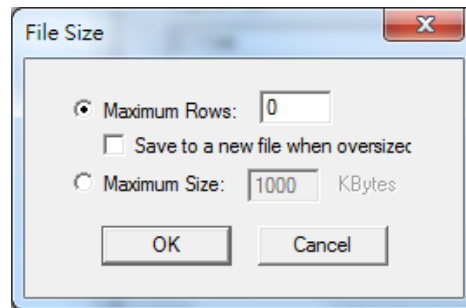


Fig. 1.1.13

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1.1.7.1.2 Mark On the Fly

Without the “Mark On Fly” function, the marking result will be incorrect while the working pieces are moving. Enable this function the system will pursue the object’s position and revise it to make sure the marking result is correct, see Fig.1.1.14.

Mark On Fly

☒ X Axis ☐ Y Axis

☒ X Encoder ☐ Y Encoder

Factor: 0.007800 mm/pulse Factor: 0.008200 mm/pulse

Delay: 0 pulse Delay: 0 pulse

Start Signal Lag: 1.000000 ms

Text Mark Order

☐ ☒

ABCD ABCD

Fig. 1.1.14

☒ Y Axis ☐ Y Encoder

Speed: 10.0000 mm/sec

Delay: 0 us

Fig. 1.1.15

☒ X Axis ☒ X Encoder

Factor: 0.00000 mm/pulse

Delay: 0 pulse

Fig. 1.1.16

X/Y Axis (checked)

Enable “Mark On Fly” on X/Y Axis.

X/Y Encoder (unchecked)

The system will use the setting value of “Speed” to pursue the object’s position, see Fig.1.1.15.

Speed

Theoretical speed of conveyer.

Delay

The time that laser needs to start marking after receive the start signal.

X/Y Encoder (checked)

The parameter will change from “Speed” and “Delay” to “Factor” and “Delay”, see Fig.1.1.16. The system will pursue the object’s position according to “Factor” which is the product of the encoder feedback pulse value and moving distance. When checking the encoder setting options, please make sure the encoder device is connected with the laser controller; otherwise an incorrect result will happen. As to the encoder connection method, please refer to encoder manual.

Factor

The moving distance of conveyer per pulse.

Delay

The pulses that laser needs to start marking after receive the start signal.

Set Ratio

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Counting the factor through the pulse from the encoder and the moving distance, see Fig.1.1.17.

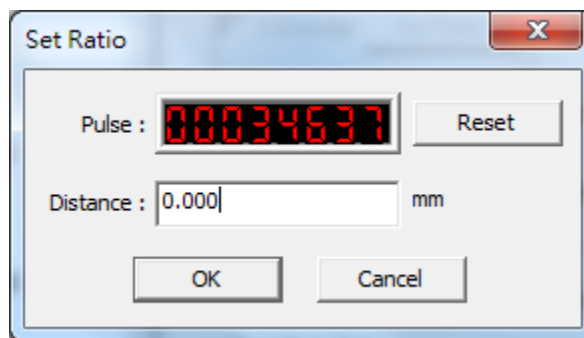


Fig. 1.1.17

Reset

Reset the value of pulse.

Delay application

In order to raise the accuracy of marking on the moving objects, the system will usually install a sensor instead of using an operator to measure whether the working pieces are located on the available place for marking. The sensor will trigger the start signal to mark when the working piece move through it. Since the sensor is unable to install right below the laser machine directly, users can apply the delay setting to make the laser machine wait for a period of time when it received the start signal, so the working pieces can move to the available marking position and then start marking. Besides, users can also apply “Automation Process” to “Mark on Fly.”

Delay setting method

Users can calculate the delay time through the setting speed or factor and the distance the object move from triggering the start signal to the correct marking position.

For example, assume that the X Axis is checked, and the moving distance of object from triggering start signal to the marking position is 50mm. If X Encoder is unchecked and the setting speed is 100 mm/sec, then the delay value should set as $(50/100) \times 10^6 = 5 \times 10^5$ us. If X Encoder is checked and the setting factor is 10 mm/pulse, then the delay value should set as $50/10=5$ pulse.

Start Signal Lag

When using “Mark On Fly” function, users will find that the preview mark position and the real marking position are not the same, see Fig.1.1.18. This is because there will have a tiny delay time between the sensor inducts the work piece and the laser starts to mark. This delay time and the speed of conveyer will cause this status. As a result, users can fix this status by modifying “Start Signal Lag” and make the position of preview and real marking be the same, see Fig.1.1.19.

This value can be positive or negative according to the actual result. Users must satisfy the following conditions to set “Start Signal Lag.”

- I. Do not check X/Y encoder.
- II. Set an optimize speed for X/Y axis, and set “Delay” as 0.
- III. The arrangement of Mark On Fly device, working-piece and sensor must be placed such as Fig.1.1.18.

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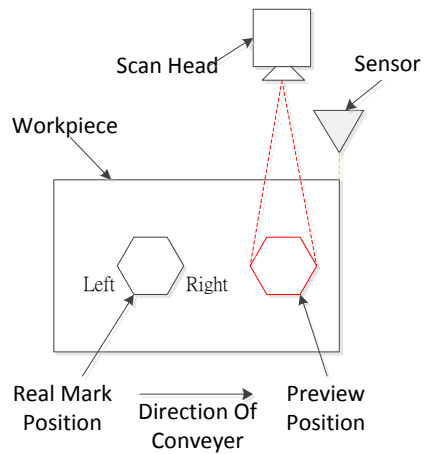


Fig. 1.1.18 Different

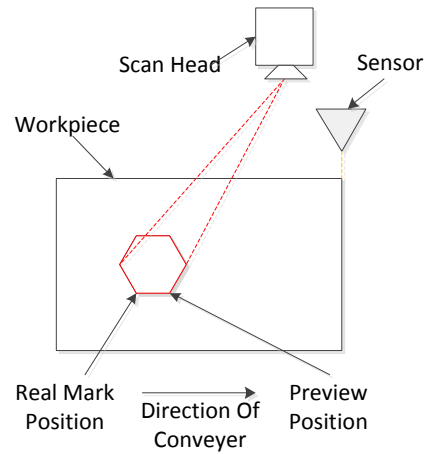


Fig. 1.1.19 Same Position

Adjustment Description

Take Fig.1.1.18 for example. Suppose users set this value as 100. If the preview result located on the right side of real mark position, then increase the setting value. On the contrary, decrease the setting value.

Text Mark Order

Select the marking direction. The direction of arrow represents the conveyer moving direction.



: Conveyor moving direction is right-to-left. The marking direction will be $D \rightarrow C \rightarrow B \rightarrow A$.



: Conveyor moving direction is left-to-right. The marking direction will be $A \rightarrow B \rightarrow C \rightarrow D$.

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1.1.7.1.3 Extend DLL

Enable this function when users need to import DLL modules, see Fig.1.1.20. Click the “Import” button, and then select the assigned DLL module and click “**Open**”, “**Apply**” button to import it.

More details please refer to “**Extend DLL User Manual**”.

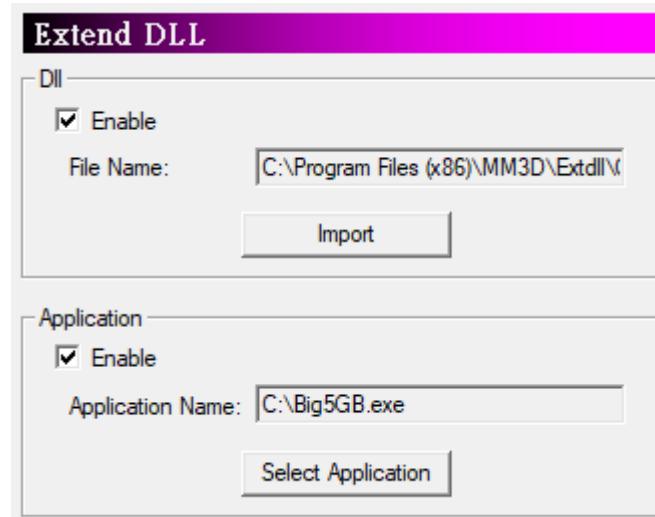


Fig. 1.1.20

Check **Enable** at Application sector will allow user call external program from software.

1.1.7.1.4 Auto Text Macro

The system provides three Auto Text DLLs, see Fig.1.1.21. If users need to add more Auto Text DLL modules, they can import the assigned DLL modules by themselves using “Import DLL” function.

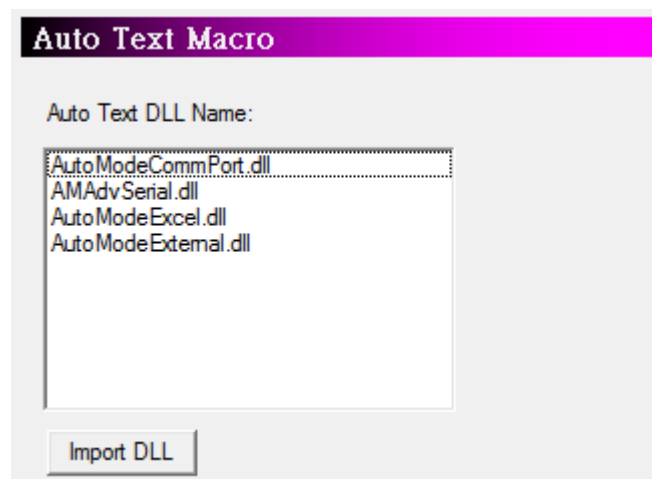
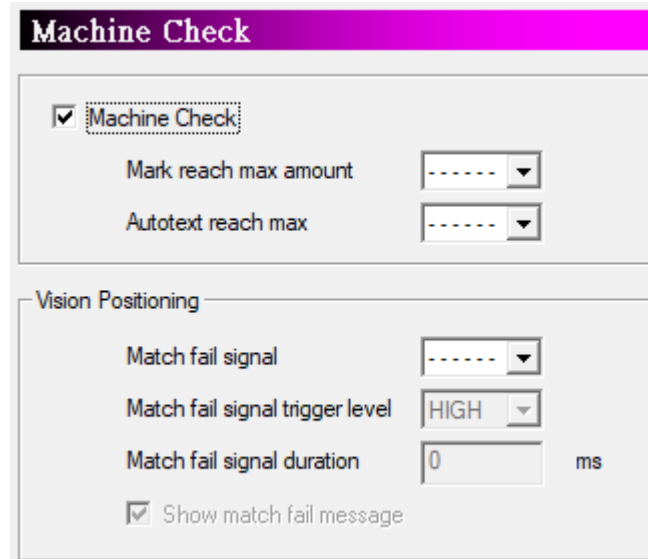


Fig. 1.1.21

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1.1.7.1.5 Machine Check

Enable this function, the assigned output signal will shine when the marking reaches the setting max mark or auto text amount, see Fig.1.1.22.



The 'Machine Check' window has a title bar with the text 'Machine Check' in white on a blue background. Below the title bar, there is a section with a checked checkbox labeled 'Machine Check'. Underneath this checkbox are two rows: 'Mark reach max amount' and 'Autotext reach max', each followed by a dropdown menu showing '-----'. Below these is a section titled 'Vision Positioning'. Inside this section, there are three rows: 'Match fail signal' followed by a dropdown menu showing '-----', 'Match fail signal trigger level' followed by a dropdown menu showing 'HIGH', and 'Match fail signal duration' followed by a text input field containing '0' and the unit 'ms'. At the bottom of the 'Vision Positioning' section is a checked checkbox labeled 'Show match fail message'.

Fig. 1.1.22

Vision Positioning

Match fail signal

Select output signal when fail to match target.

Match fail signal trigger level

Output signal level HIGH or LOW

Match fail signal duration

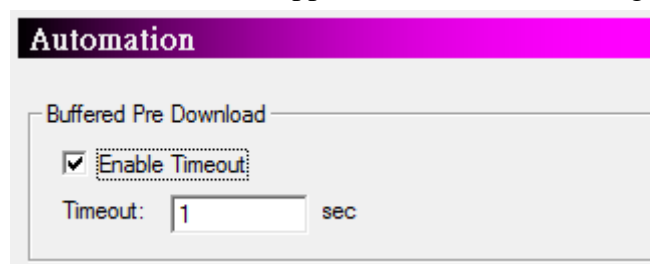
Output signal duration

Show match fail message

Appear match failure window.

1.1.7.1.6 Automation

Only MC-1, MC-3 and PMC2 driver supports this function. See Fig.1.1.23.



The 'Automation' window has a title bar with the text 'Automation' in white on a blue background. Below the title bar, there is a section titled 'Buffered Pre Download'. Inside this section, there is a checked checkbox labeled 'Enable Timeout'. Below this checkbox is a row with the label 'Timeout:' followed by a text input field containing '1' and the unit 'sec'.

Fig. 1.1.23

Buffered Pre Download

The system will pre download the marking data to the controller's memory buffer to fasten the marking speed. Enable timeout can make sure the buffering data will be refreshed every setting time period.

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1.1.7.1.7 Motion Config

Users can do setting for XY-Table through this option, see Fig.1.1.24.

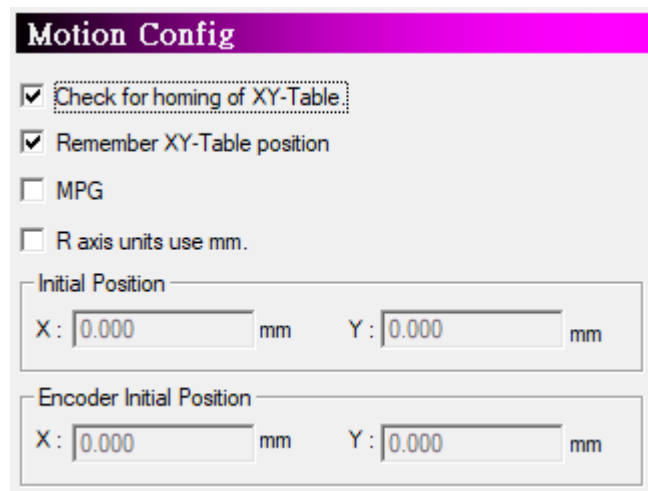


Fig1.1.24

Check for homing of XY-Table.

Enable this function, the system will display a warning dialog box when users want to start marking if the XY table is not yet homed, see and Fig.1.1.25.

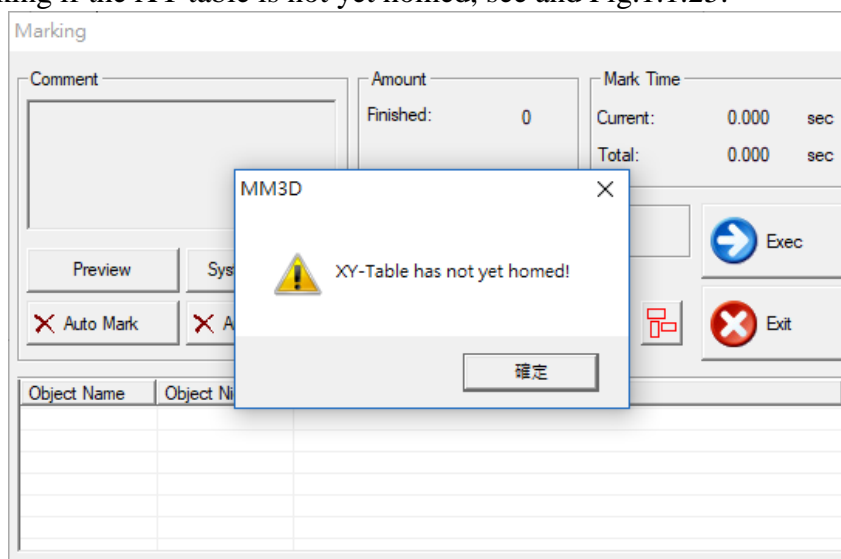


Fig1.1.25

Remember XY-Table position.

Save the current position of XY-Table when exiting software.

MPG

Enable MPG control XY-Table

Raxis unit change to mm.

Degree change to mm

Initial Position

Set the initial position for XY-Table.

Encoder Initial Position

Set the initial position for encoder.

MM3D 3.2

1.1.7.1.8 ShortKey

Users can assign the short-key for each function through this option, see Fig.1.1.26.

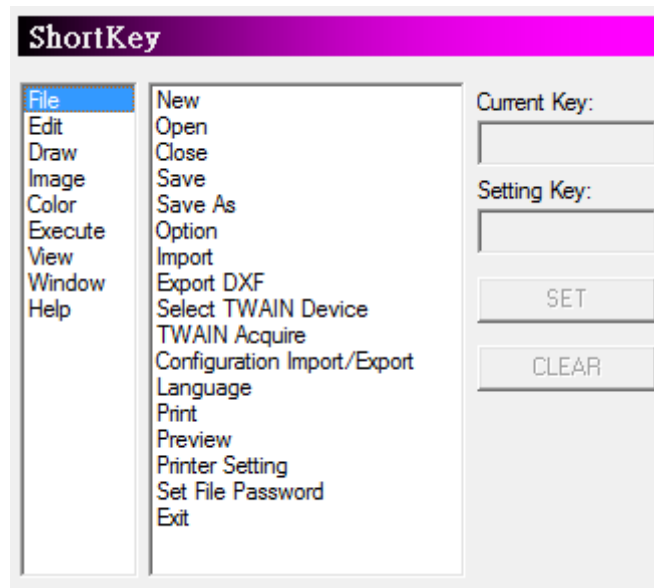


Fig.1.1.26

Current Key The current using short-key of selected function.

Setting Key Set the short-key for selected function. If the assigned key has not been used, then the “**SET**” button will be enabled for users to click and set that key as the default value. Otherwise, a warning message “Short-key is used” will pop up.

Clear Clear the short-key setting.

MM3D 3.2

1.1.7.1.9 CommPort Setting

The Com Port transmission of Auto Text will be effected after enabling this function and setting the Com Port parameters, see Fig.1.1.27.

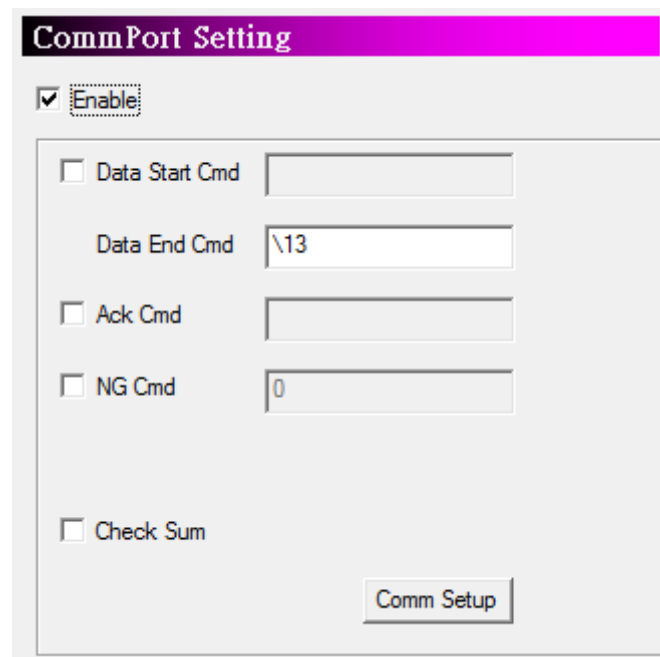


Fig1.1.27

Enable

Decide to use Com Port or not.

Data Start Cmd

When system receives this value from the host, it means that the next received character is the correct marking content. If this column is blank, the system will treat the first received character as the Auto Text content.

Data End Cmd

This is an essential setting. When the system receives this parameter, it means the transmission is finished. The default value is “\13,” the line feed symbol. This parameter cannot be blank; otherwise the system will pop up a warning dialog box like Fig.1.1.28.

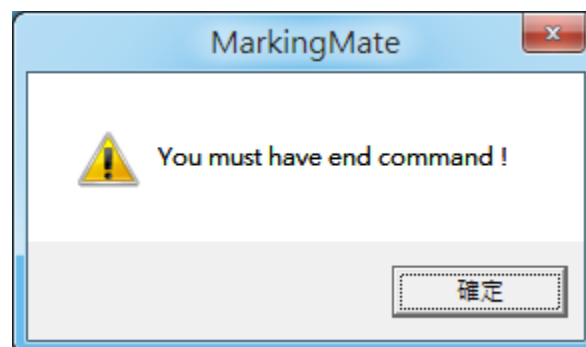


Fig1.1.28

Ack Cmd

Setting this parameter, the software will transmit this value to the host to report the transmission is regular after system receives the value of “Data End Cmd” and “Check Sum” and confirms that both values are correct.

MM3D 3.2

NG Cmd

The software will report to the host that the transmission is wrong when the “Check Sum” is incorrect while using this function.

Check Sum

Decide to transmit the “Check Sum” or not to do the further verification of information. The operation of “Check Sum” is to convert each character of information into Hex first and then do XOR operation for each one in order. The Hex of final result is the “Check Sum.” For example, the “Check Sum” of “2578” is “8,” see Fig.1.1.29.

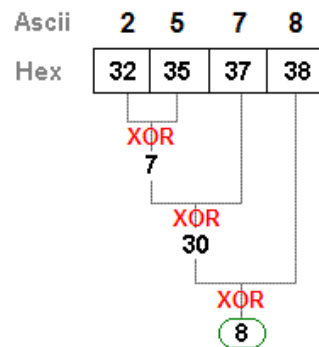


Fig1.1.29

Comm Setup

Click “Comm Setup” bottom and enter the setting dialog box, see Fig.1.1.30.

Com Port Use

Select the suitable Com Port basic on the host equipment.

RS-232 Parameters Setting

Do the same setting as the information transmission source. Please do not change the parameters which are not in the red flame if unnecessary.

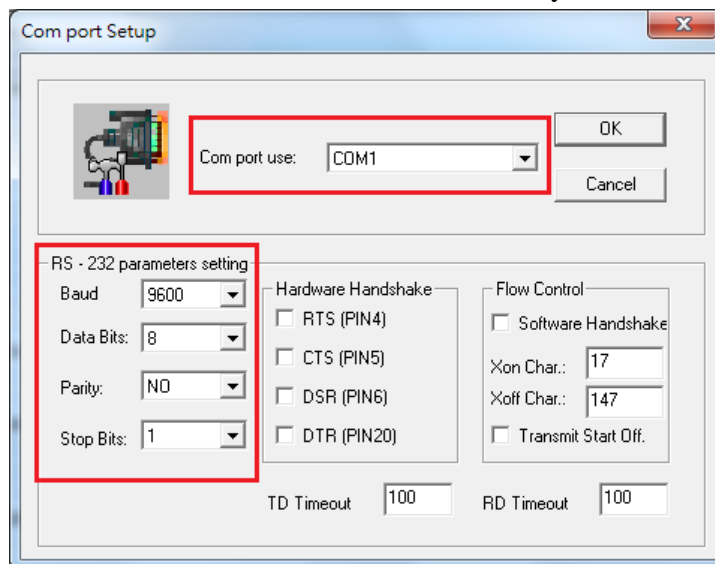


Fig1.1.30

MM3D 3.2

1.1.7.1.10 Config

Allow users to adjust the config setting of system, see Fig.1.1.31.

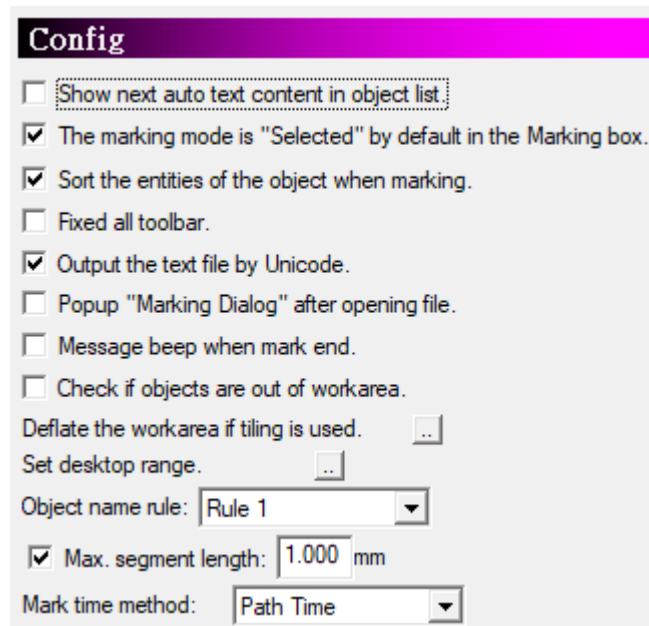


Fig1.1.31

Show next auto text content in object list.

Checked this option, the marking object list will present the oncoming marking content of Auto Text. Otherwise, it will show the previous marking content.

The marking mode is “Selected” by default in the Marking box.

Decide the default value of marking mode is “All” or “Selected,” see Fig.1.1.32.

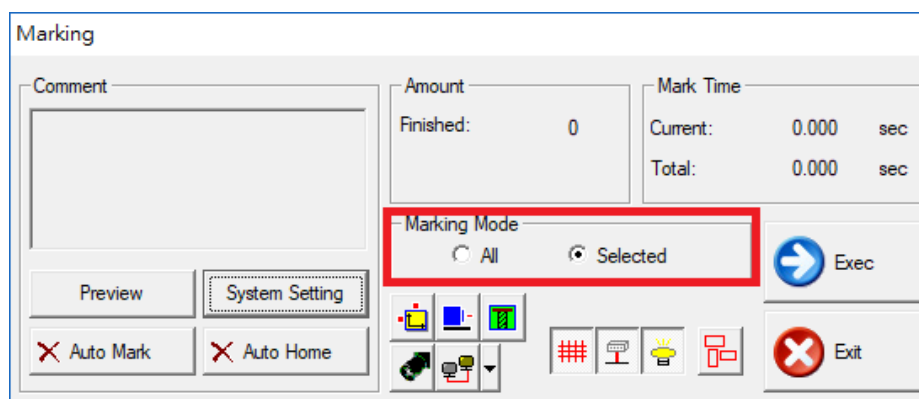


Fig1.1.32

Sort the entities of the object when marking.

Adjust the marking order according to the position of objects to optimize the marking speed.

Fixed all toolbar.

Keep all the Tool Bar at the current location and become immovable.

Output the text file by Unicode.

Decide to encode the output text file by Unicode or not.

Message beep when mark end.

The system will sound a beep when mark end.

Check if objects are out of workarea

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If there is object exceed work are, the marking process will not start.

Deflate the workarea if tiling is used.

Set the deflate range of work area when using “Graphic Split” function. The value cannot be negative, see Fig.1.1.33.

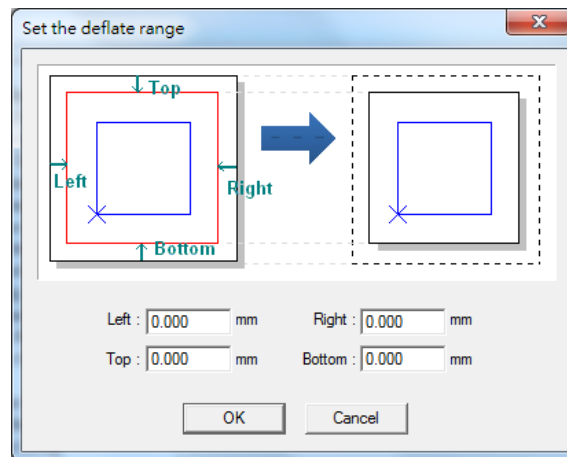


Fig1.1.33

Set Desktop range.

Allow users to set a new working area range and coordinates according to their demand, see Fig.1.1.34.

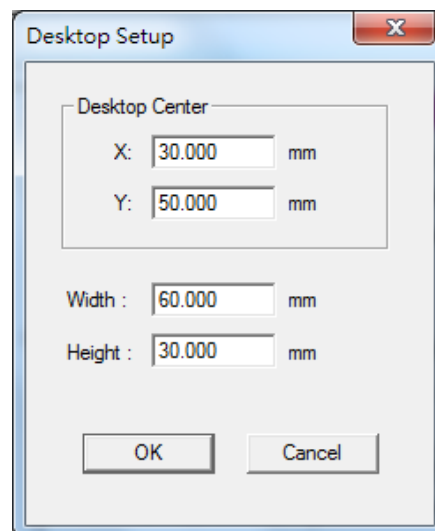


Fig1.1.34

When open file.

Choose a default action while opening a file.

Object name rule.

Select the name rule of objects which are in a copy group. Fig.1.1.35 is the “**Object Browser**” of Rule 1, and Fig.1.1.36 is Rule 2.

MM3D 3.2

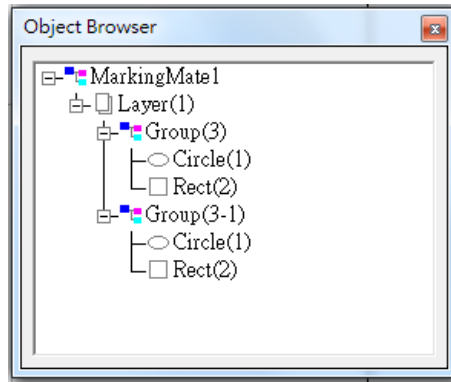


Fig1.1.35

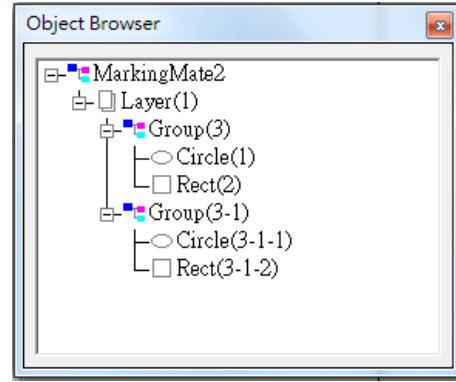


Fig1.1.36

Max. segment length.

Set the segment length when marking. There will be no partition if users didn't check this option.

Mark time method

Select different marking time counting methods.

Path time: The duration since beginning marking to end marking of controller.

Real time: The duration since beginning marking to end marking of software.

MM3D 3.2

1.1.7.2 Scan Head

1.1.7.2.1 Lens Manager

All lenses users have will be listed here, see Fig.1.1.37.

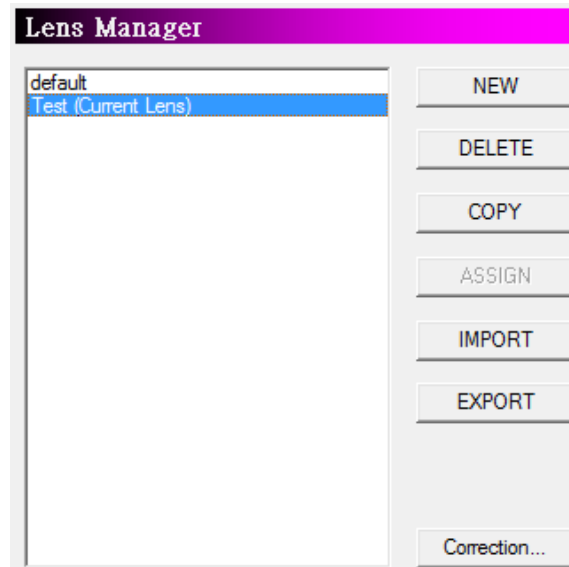


Fig1.1.37

NEW	Click this button to add a new lens.
DELETE	Click this button to delete the selected lens.
COPY	Click this button to copy the selected lens.
Assign	Click this button to set the selected lens as the default lens.
Import	Allow users to import lens file.
Export	Allow users to export selected lens file.
LensCor...	Select the one lens and click this button to enter the Lens Correction function.

Click “**Lens Cor...**” button and do further settings for lens.

MM3D 3.2

Lens Setup

The system will use math formula to correct the barrel distortion, trapezoid distortion, or parallelogram distortion resulted from lenses and optical devices. Adjust lens parameter properly will make the marking result be the same as the original design.

Fig.1.1.38 shows the lens setup under normal mode. Fig.1.1.39 is the lens setup under dot mode.

The screenshot shows the 'Lens Setup : default' dialog box. The 'LensCor: Formula Method' tab is selected. The 'Mark Area' is set to 100.000 mm. The 'Use Cor File' checkbox is unchecked, and the 'Cor File' dropdown is set to 'default'. The 'Offset' section has X: 0.000 mm and Y: 0.000 mm. The 'Scale' section has X: 100.000000 % and Y: 100.000000 %. The 'Rotate' section has Angle: 0.000, CX: 0.000, and CY: 0.000. The 'PreMark Parameters' section has Speed Mode: Normal Mode, Power: 10.00 %, Speed: 100.0 mm/sec, and Frequency: 10.0 KHz. The 'Correction' section has Advance checked, and the X and Y correction values are all 0.0000. There is an 'Exit' button at the bottom right.

Fig. 1.1.38 Under Normal

The screenshot shows the 'Lens Setup : default' dialog box. The 'LensCor: Formula Method' tab is selected. The 'Mark Area' is set to 100.000 mm. The 'Use Cor File' checkbox is unchecked, and the 'Cor File' dropdown is set to 'default'. The 'Offset' section has X: 0.000 mm and Y: 0.000 mm. The 'Scale' section has X: 100.000000 % and Y: 100.000000 %. The 'Rotate' section has Angle: 0.000, CX: 0.000, and CY: 0.000. The 'PreMark Parameters' section has Speed Mode: Dot Mode, Power: 10.00 %, Pitch: 2.0 mm, Delay: 200.0 ms, and Frequency: 10.0 KHz. The 'Correction' section has Advance checked, and the X and Y correction values are all 0.0000. There is an 'Exit' button at the bottom right.

Fig. 1.1.39 Under Dot

Working Area

Working area of the lens.

Use Cor File

Use the correction files from manufacturers or use the file created by using Scale or Grid Methods and then adjust parameters.

Correction file

Select the file name same as the lens name from dropdown menu or select "Import..." item from the dropdown menu to import the correction file such as COR, CTB (from ScanLab), or GCD (from RayLase). If the selected correction file has the same name as the assigned lens, users are able to click "Cor File..." button and do correction through "Using Correction File" function.

Offset

If the working pieces cannot be put in an ideal position, users can modify the design or change the offset value to fix this problem. For example, if the position has 5mm deviation to the right side, then input -5mm in Offset X to correct it.

Scale

If the size of marking result (real size) are different from the original design (theoretical size), user can use the scale function of X and Y to fix it. The unit of scale is percentage (*theoretical*

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	<i>size / real size * 100</i> , the default value is 100). For example, if real size is smaller, this value should be larger than 100.
Rotate	If the working pieces cannot be put in an ideal position, users can modify the design or input suitable values in these fields to amend it.
Correction	When the barrel distortion, trapezoid distortion, or parallelogram distortion happen, enter the suitable X/Y values to do the correction. Please refer the following description of Distortion Correction .
Advance	Allow users to input different correction values at negative X and Y direction.
PreMark Parameters	Setting the parameters for PreMark.
Speed Mode	Select to use Normal Mode or Dot Mode to PreMark.
Power	Laser power percentage for PreMark.
Speed	Laser speed (mm/sec) for PreMark.
Frequency	Laser frequency for PreMark.
Pitch (Under Dot Mode)	The distance between dot and dot on the marking route when doing PreMark.
Delay (Under Dot Mode)	The waiting time a lens needs to start radiating when move to a dot while doing PreMark.
Pulse Width (YAG Laser)	The spending time for each pulse.
PreMark	Click the “PreMark” button, the laser will mark according to the parameters setting above.


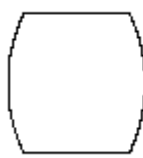
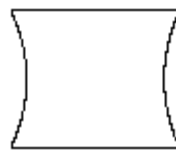
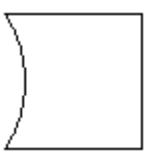
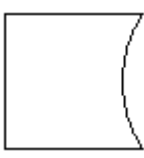


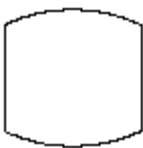
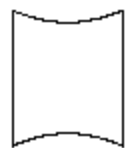
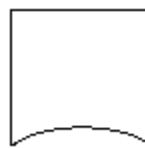
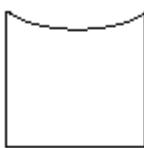


Please follow the steps listed below to do the correction and note that the direction of X and Y means the output port of GALVO motor:

- Step 1:** Select the lens user want to correct and adjust its focus.
- Step 2:** Input the value of lens working area.
Input the value of scale percentage according to the output voltage ratio of lens and driver. **Attention, users need to complete this step first and then start executing PreMark, otherwise the lens would be damaged.**
- Step 3:** When barrel distortion happened, follow the rules of “Distortion Correction” as Table 1.1 to do the correction until four square sides are all straight lines.
- Step 4:** When trapezoid distortion happened, follow the rules of “Distortion Correction” as Table 1.2 to do the correction until four square sides are equal in length.
- Step 5:** When parallelogram distortion happened, follow the rules of “Distortion Correction” as Table 1.3 to do the correction until four square sides are all vertical.
- Step 6:** Measure the dimension of marking result. Input the value of scale according to the formula (*theoretical size / real size * 100*). If the real size is larger than theoretical size, then reduce its value and retry. On the contrary, increase its value and retry.
- Step 7:** Repeat Step 6 until the theoretical size and real size are equal.

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Distortion Correction

Correction of barrel distortion

Original				
Mark Results				
Solutions	Increase the X value of  field	Reduce the X value of  field	Reduce the value of $-X$ (Advance)	Reduce the value of $+X$ (Advance)
Mark Results				
Solutions	Increase the Y value of  field	Reduce the Y value of  field	Reduce the value of $-Y$ (Advance)	Reduce the value of $+Y$ (Advance)

Correction of trapezoid distortion

Table1.1


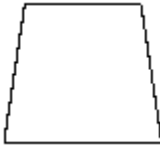
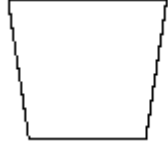


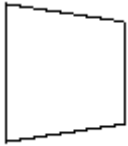
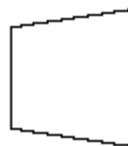


Original		
Mark Results		
Solutions	Enlarge the X value of  field	Reduce the X value of  field
Mark Results		
Solutions	Enlarge the Y value of  field	Reduce the Y value of  field

Table1.2

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Correction of parallelogram distortion


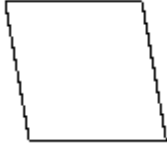
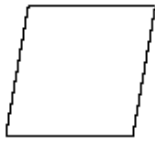



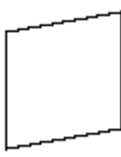


Original		
Mark Results		
Solutions	Enlarge the X value of  field	Reduce the X value of  field
Mark Results		
Solutions	Enlarge the Y value of  field	Enlarge the Y value of  field

Table1.3

● Using Correction File

Correction files are provided by lens manufacturers such as SCANLAB and RayLase for users to do lens correction. Mostly, the results of using these files are acceptable. Users only need to adjust some of the scale parameters.

If require more accurate result or the correction files from lens manufacturers are unable to meet the requirement, users can do advanced correction through using the “Cor File...” function to reach the goal. Before using this function, please make all the parameters as the default values as Fig. 1.1.40.

Once finding that still need to adjust these values after finishing lens correction, users can come back to this dialog box to modify them.

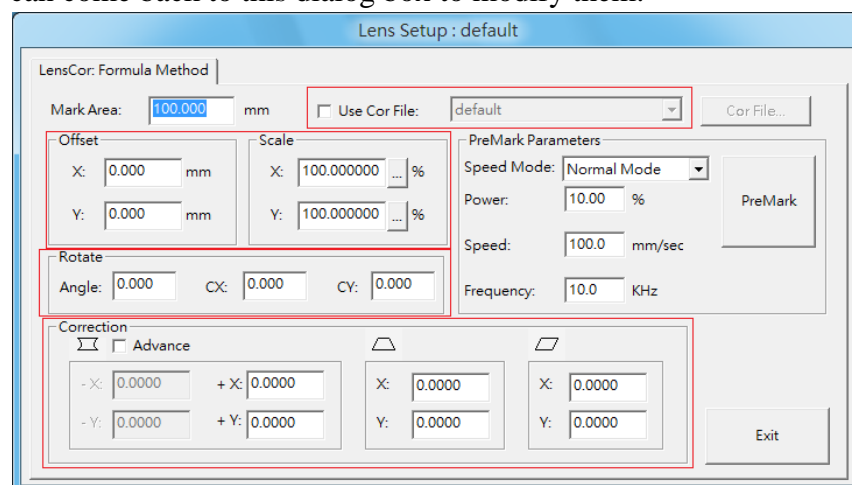


Fig. 1.1.40

● New/Edit Correction File

MM3D 3.2

If it's the first time entering the "Cor File..." function after creating a new lens, users will need to select one correction method from Scale Method and Grid Method, see Fig. 1.1.41. Please note that each lens can only choose one method.

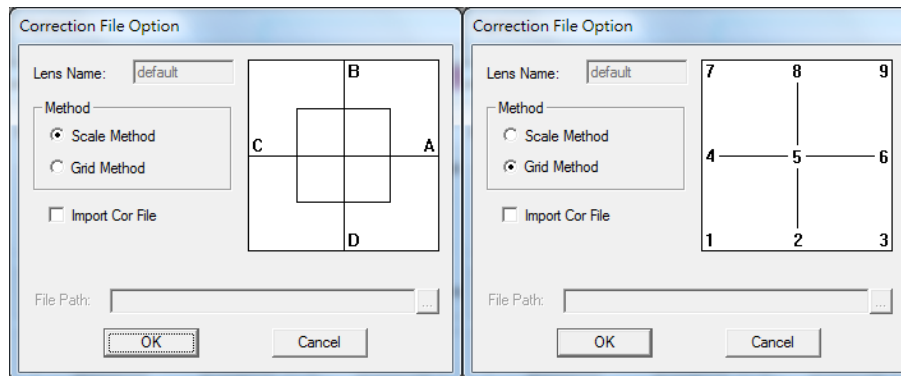


Fig. 1.1.41

Method Select Scale Method or Grid Method. Please refer to the following description.

Import Cor File Import an existing correction file and do advanced correction. There are three usable file types: COR, CTB, and GCD.

File Path The path of the imported correction files.

- **Scale Method**

The traditional lens correction method is using linear way to correct the distortion. However, some of distortions are not completely linear. In this situation, users can use the Scale Method to divide the lens into several areas and adjust each area by different percentage, see Fig.1.1.42.

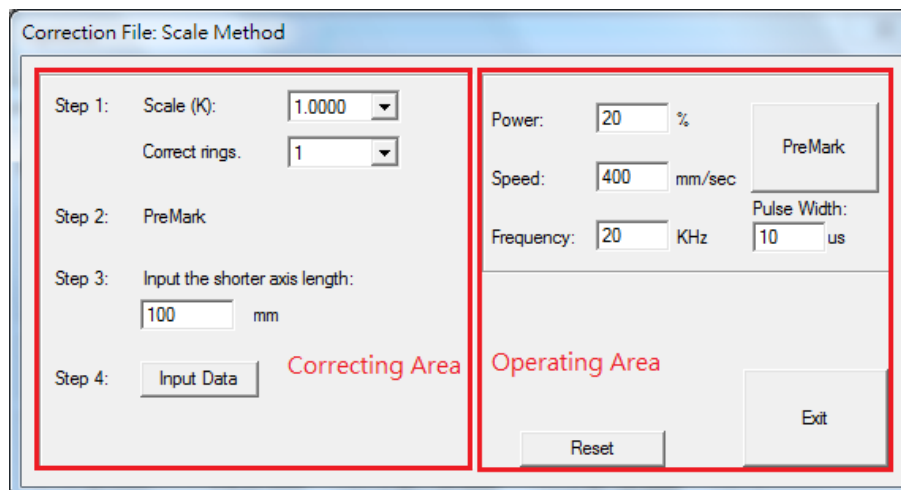


Fig. 1.1.42

The left side of Scale Method window is correcting area for users to enter values to get a correction file. The right side is operating area; users can measure the result according to settings of left side or reset the settings of correcting area.

Operating Area

On the top of this area is the Premark parameters (refer to p.32)

Reset

The purpose of this function is to reset the setting of correcting area, or import a correction file to do correction, see Fig.1.1.43.

MM3D 3.2

Import Cor File

Import the correction file provided by the manufacturers for correcting area. The value of correcting area will be reset if press “OK” without clicking “Import Cor File”.

File Path

The path of correction file.

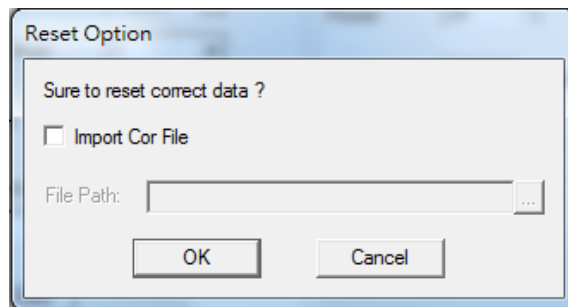


Fig. 1.1.43

Correcting Step

- Step 1** Select a Scale (K) value which is close to the voltage ratio of lens and driver. Then select correct rings from the list. The more correct rings users select the better accuracy they will get.
- Step 2** Click the “PreMark” button to execute marking.
- Step 3** Measure the axis length and then enter the value in the field. (Since the value of X-axis and Y-axis may be different, please enter the shorter one.) If the real value is 109.11mm, it will be better to enter 110mm.
- Step 4** Click the “Input Data” button for next step, see Fig.1.1.44.

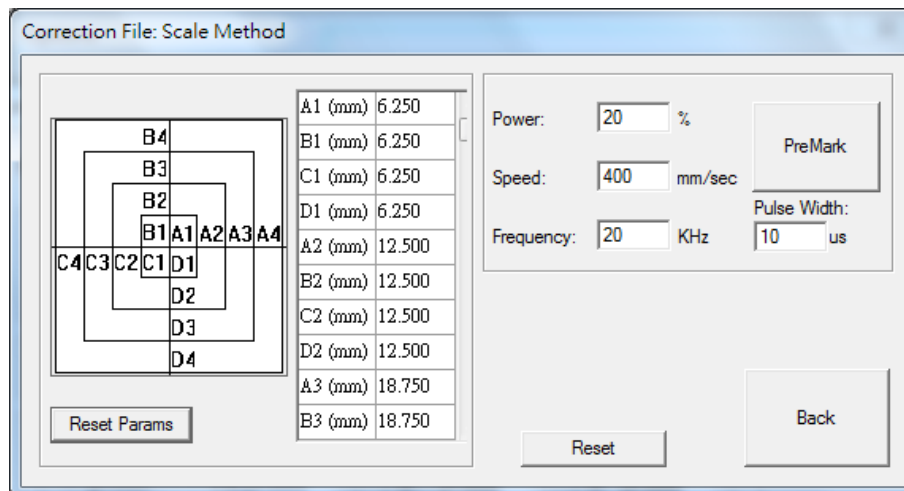


Fig. 1.1.44

- Step 5** Click the “PreMark” button to see the mark result
- Step 6** Edit the values of A, B, C, and D in the fields separately and then click the “PreMark” button again to see the mark result. If necessary, repeat these steps until achieving the goal. Click “Back” button and then “Exit” button to save the file and exit.

Reset Params Reset all correction data as the default values.

MM3D 3.2

● Grid Method

Instead of using a formula, this method measures the real position of correct dots directly. More correct dots will get more accurate result, see Fig 1.1.45.

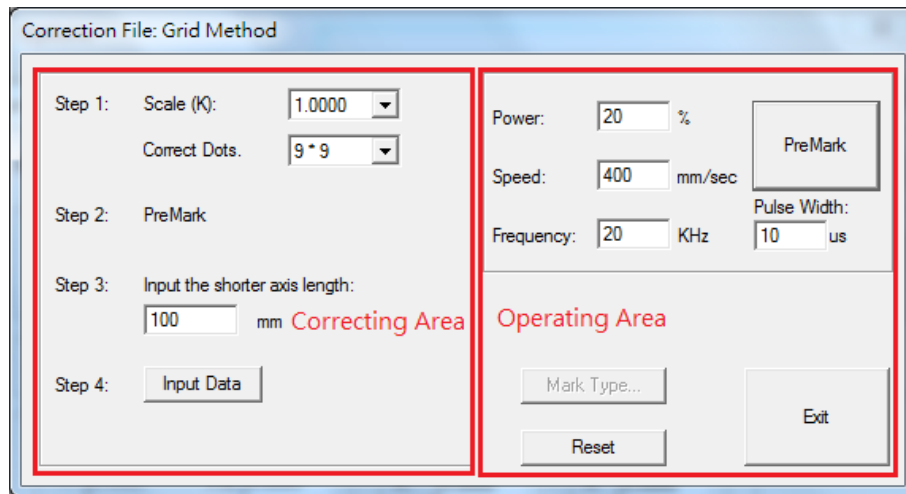


Fig. 1.1.45

Operating Area

On the top of this area is the Premark parameters (refer to p.32)

Mark Type

To use the function, users must click “Input Data” at “Correcting Area” first, see Fig.1.1.46.

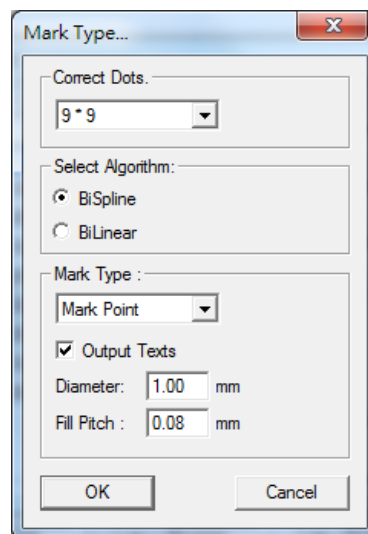


Fig. 1.1.46

Correct Dots

Select correct dots from the list. More correct dots will get more accurate result.

Algorithm

Select “BiSpline” or “BiLinear” algorithm.

Mark Line

The laser will mark grid line when choosing “Mark Line”.

Mark Point

The laser will mark grid point when choosing “Mark Point”. Users can also set the diameter and fill pitch of the grid point from the field below.

Output Texts

MM3D 3.2

If checked the “Output Texts” checkbox, the representing numbers will appear next to the grid point or line, see Fig.1.1.47.

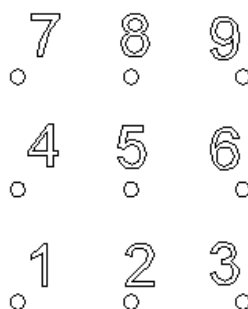


Fig. 11.47

Reset

Please refer to page 35.

Correcting Step

- Step 1** Select the scale (K) value which is close to the voltage ratio of lens and driver output from the drop down menu. Then select the correct dots. More correct dots will get more accurate result.
- Step 2** Click the “PreMark” button to execute marking.
- Step 3** Measure the axis length and then enter the value in the field. (Since the value of X-axis and Y-axis may be different, please enter the shorter one.) If the real value is 109.11mm, it will be better to enter 110mm.
- Step 4** Click the “Input Data” button for next step, see Fig.1.1.48.

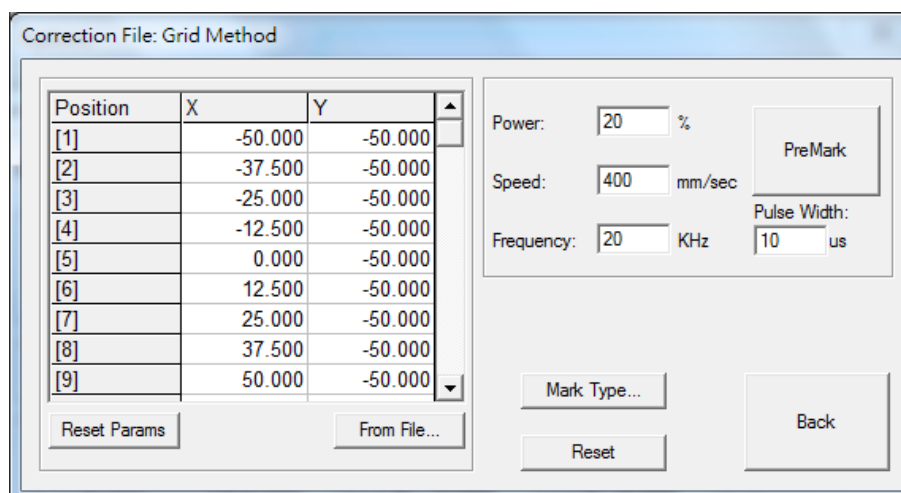


Fig. 1.1.48

- Step 5** Click the “PreMark” button to see the mark result. Select from the drop down menu to set correct dots. More correct dots will get better accuracy.
- Step 6** Edit the positions of X and Y in the fields separately and then click the “PreMark” button again to see the mark result. If necessary, repeat these steps until achieving the goal. Click “Back” button and then “Exit” button to save the file and exit.

Reset Params. Reset all correction data as the default values.

MM3D 3.2

From File...

Users can create a *.txt file as a correction file and using this function to import that file as the coordinates of X and Y, see Fig.1.1.49.

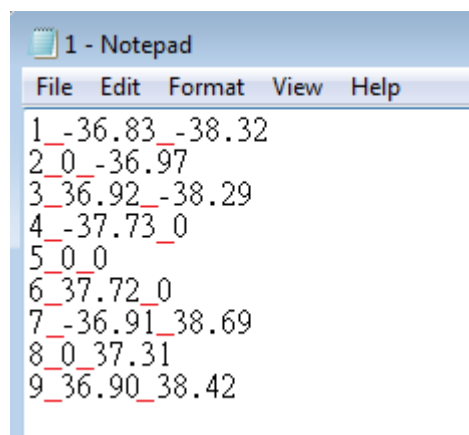


Fig. 1.1.49

MM3D 3.2

Focal Lens Correction

Both of Grid and Scale methods support focal lens correction. The focal lens correction function of grid method maybe optional. The purpose of correcting focal lens is marking on any point within the space on the focal plane. The real operation when correct lens is correcting z axis when $Z = 0$.

If using the scanner without coming with a f-theta lens, before making scale or grid method correction, user should complete focal lens correction first.

The screen is as following figure 1.1.50 :

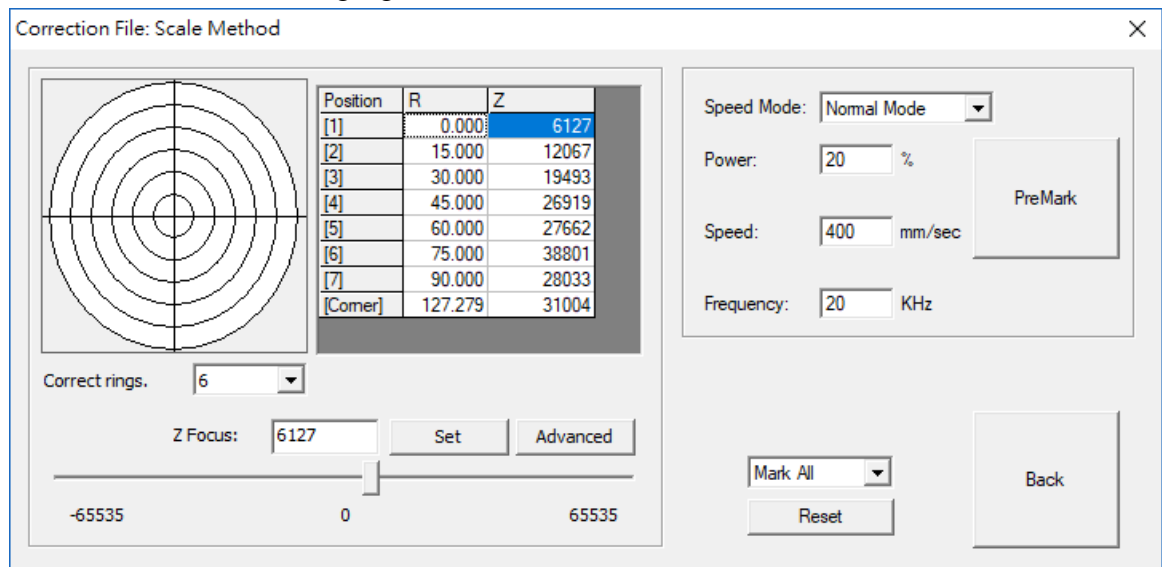


Fig.1.1.50

Correct rings The rings are more, any point on the XY plane has less chance to defocusing.

Position [1] The center cross line.

[Corner] The frame.

[Others] The concentric circles.

R Concentric circle radius. Generated automatically after choosing rings.

Z Premark at that Z value can get the clearest result. Z value typically are different at different positions. The correct value has to be determined by real marking. It could be negative or positive.

Z Focus Input a Z value. Press Set button to set the value.

Set Set Z Focus value into the list above.

Advanced Open 3D param advance dialog.

Slider Move slider to set value. User has to choose a position first.

MM3D 3.2

1.1.7.2.2 Focal Axis Config

Users can enable focal axis for 3D marking application. See fig. 1.1.51



Fig. 1.1.51

Enable 3D mode Allow user use 3D marking.

Enable 3D correction mode Allow user tune 3D marking detail option.

1.1.7.2.3 Scan Head Config

Users can set the home position of scan head, enable multi-head, and activate sky writing from here, see Fig.1.1.52.

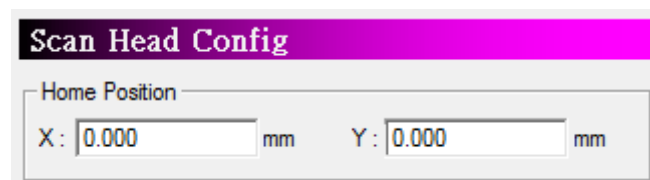


Fig. 1.1.52

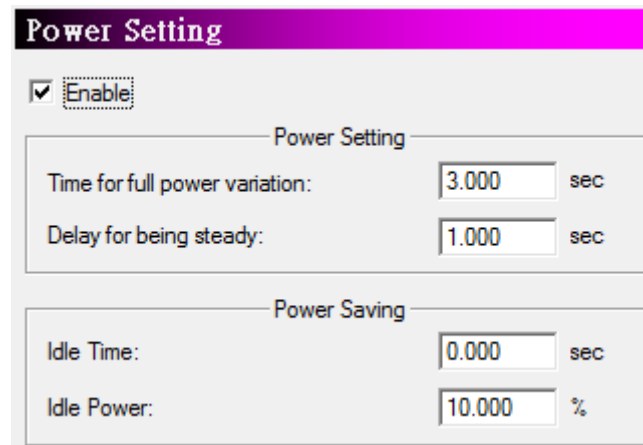
Home Position Set original points position in X and Y direction.

MM3D 3.2

1.1.7.3 Laser Setting

1.1.7.3.1 Power Setting

Enable/disable the power settings, see Fig 1.1.53



Power Setting	
<input checked="" type="checkbox"/> Enable	
Power Setting	
Time for full power variation:	3.000 sec
Delay for being steady:	1.000 sec
Power Saving	
Idle Time:	0.000 sec
Idle Power:	10.000 %

Fig. 1.1.53

Power Setting

Time for full power variation

Time period from zero and full power

Delay for being steady

The time it takes for the power to become steady when the power is full.

Power Saving

Idle Time

The system will enter to Power Saving Mode after this setting time when the system is idle.

Idle Power

Set the power under Power Saving mode.

MM3D 3.2

1.1.7.3.2 Dot Mode

Enable this function when requiring a special dot features on the marking object, see Fig.1.1.54. For example, mark a line with dot feature, like Fig.1.1.55. The main purpose of this function is to reach the dot effect through extending the distance and laser staying time of each dot.

Step Distance

Distance between each dot.

Step Delay

Laser staying time on each dot.

Repeat

Set the repeat times for each dot.

Time Interval

The time interval between each dot on one spot.

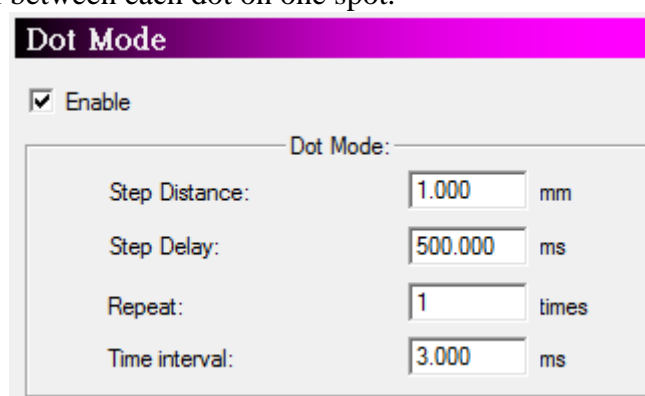


Fig. 1.1.54

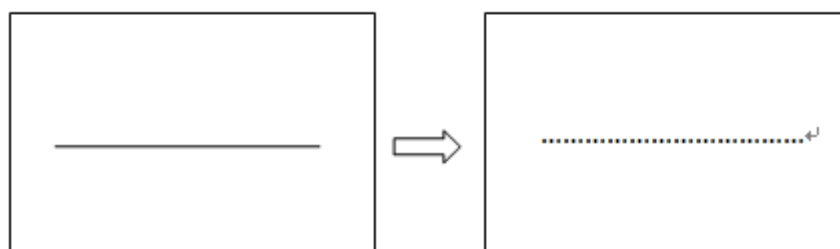


Fig. 1.1.55

MM3D 3.2

1.1.7.3.3 Power Meter

Check Enable will active “Basic Setting”, “Validation”, “Regulation”, “Auto Mode” setting page. Refer to fig.1.1.56.

Fig. 1.1.56

Basic Setting

Lead Time

The duration before starting measuring to wait laser power steady.

Repeat

Repeating measurement times after lead time to prevent instability of power.

Position X 、 Y

Scanner position during power measurement.

Driver name

Choose a suitable driver for current power meter.

Power validation. Refer to fig.1.1.57.

Fig. 1.1.57

Validation

Power Upper Limit

Power measurement exceed upper limit will get warning message or regulation.

Power Lower Limit

Power measurement exceed lower limit will get warning message or regulation.

Power regulation. Refer to fig. 1.1.58.

MM3D 3.2

Basic Setting | Validation | Regulation | Auto Mode

Max steps: 1

Max correction: 0.000 A

Interval: 0.000 %

Fig. 1.1.58

Regulation

Max steps

Max regulation steps setting. Exceed steps and still not reaches target power will get warning message.

Max correction

Max regulation range.

Interval

The power compensate value of each time. If it is too large, may cause compensate failure. If it is too small, may cause compensate invalid.

Auto Mode. Refer to fig.1.1.59.

Basic Setting | Validation | Regulation | Auto Mode

Pull: ----- Output: -----

Push: -----

Trigger

☐ System Start Action: Validation

☐ Job Load ☐ Exit When Trigger End

☐ Piece Count: 1

Current Piece: 0

Fig. 1.1.59

Auto Mode

Pull

Power meter in position signal when pull back.
High Active.

Push

Power meter in position signal when push out. High Active.

Output

Power meter position signal. High: Push. Low: Pull.

Trigger

System Start

Check this option will active power validation or regulation when system is started.

Action

Select between regulation and validation when triggered.

Job Load

Check this option will active power validation or regulation when open any document.

Exit When Trigger End

Check this option to turn off power meter function automatically when validation or regulation is done.

Piece Count\ Current Piece

Check this option will active power validation or regulation during marking progress.

MM3D 3.2

1.1.7.3.4 Laser Config

Allow users to do some laser related settings, see Fig.1.1.60.

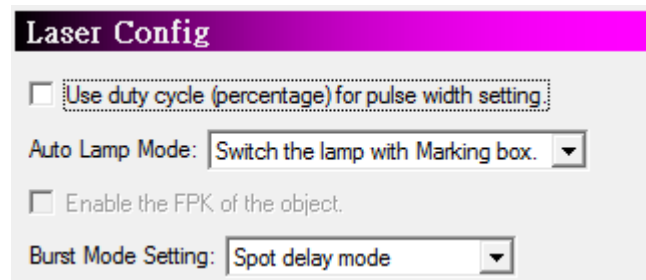


Fig. 1.1.60

Use duty cycle (percentage) for pulse width setting

Use the percentage of (pulse/oscillogram) to set the pulse width instead of setting the continuous time of pulse directly.

Auto Lamp Mode

The lamp can be selected to switch with the marking dialogue box or the marking system.

Enable the FPK of the object

Allow using different FPK for each object when marking.

Burst Mode Setting

When the marking object is vertex, image or barcode, users can select the spot marking mode.

Spot delay mode

This is the default setting. Spot delay means the time laser takes to mark a dot. Users can set the “Spot Delay” time in the ‘Mark Parameter’ page of the Property Table while select this mode, see Fig.1.1.61.

Laser shot mode

This option controls the amount of laser shot on each dot. Users can set the “Laser Shot” count in the “Mark Parameter” page of the Property Table while select this mode, see Fig.1.1.62.

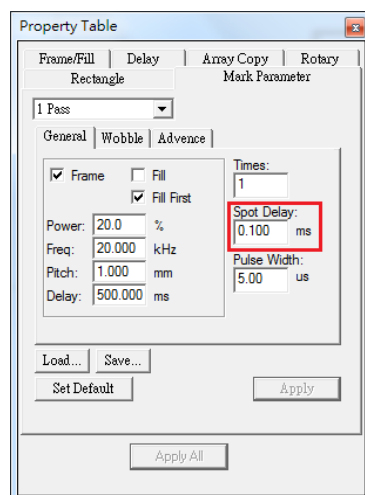


Fig. 1.1.61

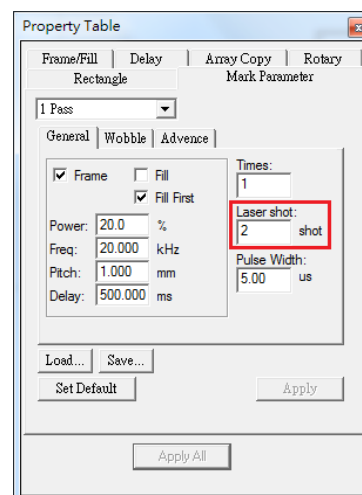


Fig. 1.1.62

MM3D 3.2

1.1.7.4 Deep Engraving

1.1.7.4.1 Deep Engraving Setting

Allow user select which part move to control Z altitude. Refer to fig.1.1.63.

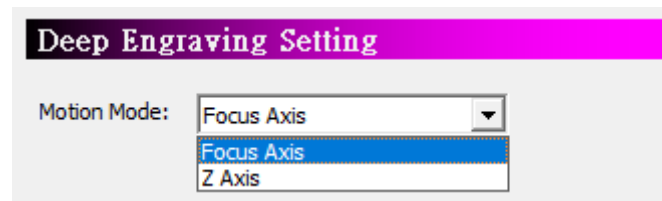


Fig. 1.1.63

Motion Mode Select a method between focus axis and Z axis table move.

1.1.7.5 Edit

Set the edit function of the system, such as display the ruler and grid or not. The checked options will be the default value. See Fig.1.1.64.

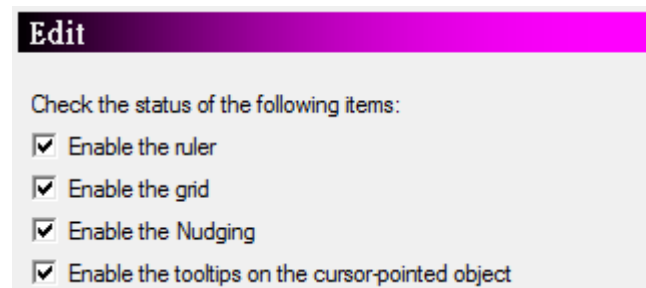


Fig. 1.1.64

1.1.7.5.1 Ruler

Enable/disable the ruler to appear on the work area, see Fig.1.1.65. Use ruler can help user measure the actual size of the object.

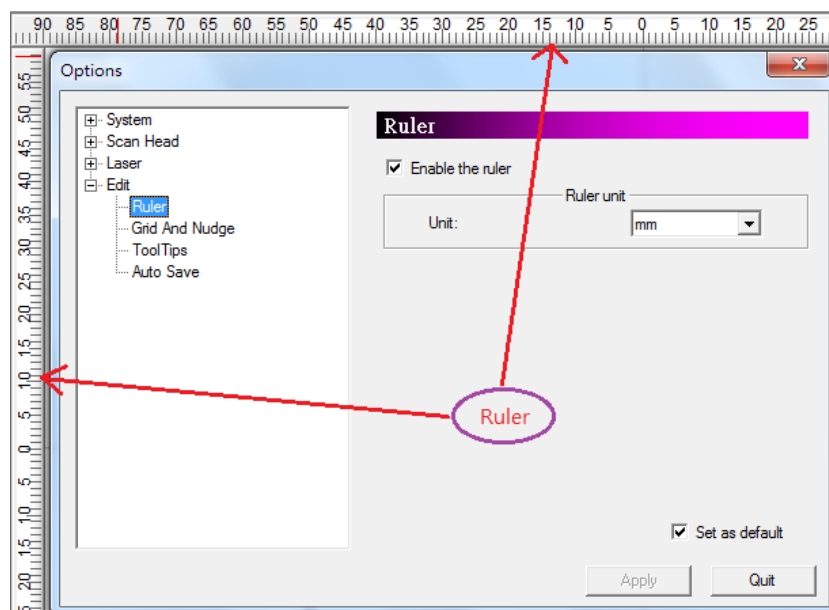


Fig. 1.1.65

Ruler Unit: mm or inch

MM3D 3.2

1.1.7.5.2 Grid and Nudge

Enable/disable the grid and nudging, see Fig.1.1.66. Grid is used to help users measure the actual size of the object. Enable nudge, users can adjust the object's position through direction key according to setting nudge measure.

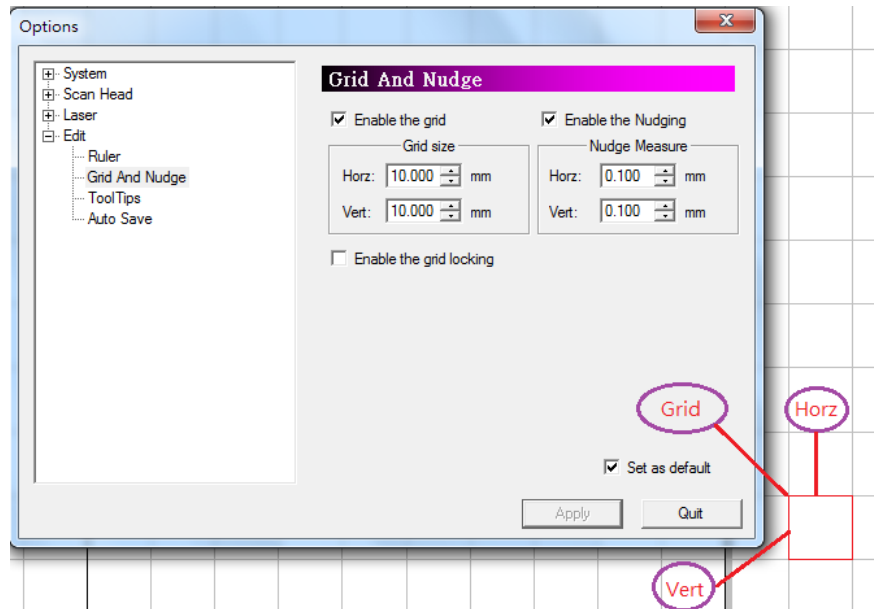


Fig. 1.1.66

Grid Size / Nudge Measure

Horz Horizontal width

Vert Vertical width

Enable the grid locking

Enable/disable the grid locking function. Enable this function allows users to adjust the size and position of selected object more accurate. The system will automatically lock a grid if the mouse pointer is close to that grid when users create or move an object.

MM3D 3.2

1.1.7.5.3 ToolTips

Settings about tips of objects, see Fig.1.1.67.

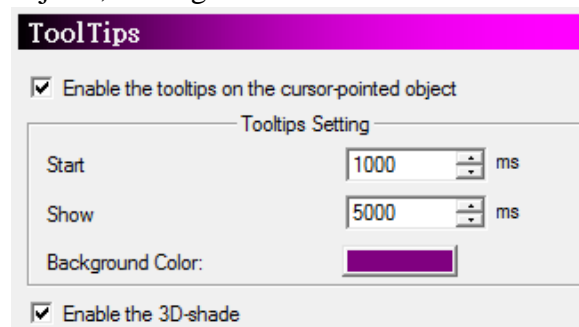


Fig. 1.1.67

Enable the ToolTips on the cursor-pointed object

ToolTips shows the info of the selected objects, see Fig.1.1.68.

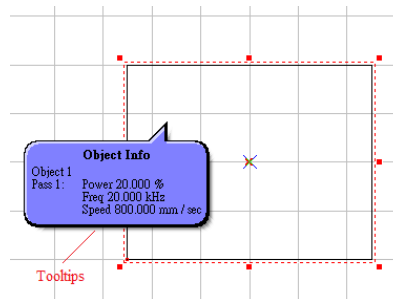


Fig.1.1.68

ToolTips Setting

Start Span Span for ToolTips to appear.

Show Span ToolTips continues time.

Background Color Background color of ToolTips.

Enable the 3D-shade Enable/disable the 3D-shade.

1.1.7.5.4 Save Config

Enable auto save document every certain duration of time passed. Refer to fig.1.1.69.

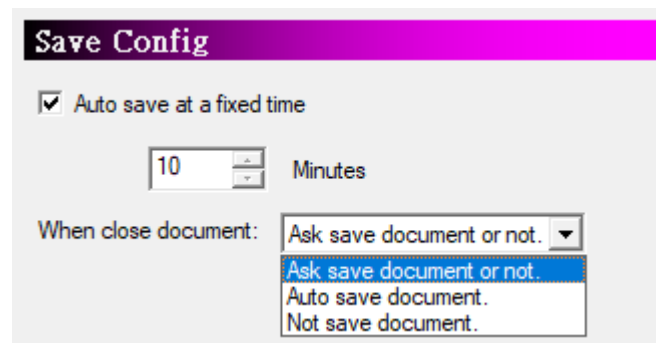


Fig.1.1.69

Auto save at a fixed time

Auto save document every certain duration of time is passed

When close document

Before a document is closed, system will ask user to save file, auto save without asking, or close without saving.

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1.1.8 Import

This function allows user to import an image file that was not originally created by MM3D, such as *.bpm or *.dxf. The system will automatically convert that file into a format supported by MM3D after using import function, see Fig.1.1.70. If the import object is a group or combine object, users can use “Ungroup” or “Break” function to break that object into several individual objects, see Fig.1.1.71.

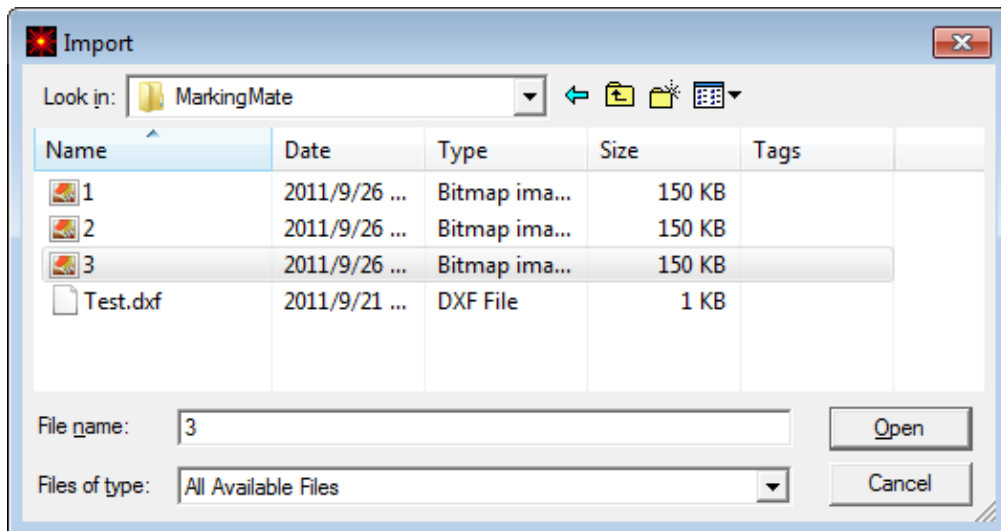



Fig. 1.1.70

Method:

- Click “File” from Menu Bar and select “Import” function.
- Click the  button from the Toolbar
- Press the [Ctrl+I] key from keyboard.

Look in

File name

Files of type

Select the directory users want to import from.

Type or select the file name to import.

MM3D allows users to import various file types such as:

DWG/DXF/PLT/CNC/GBR/DST/AI/BMP/EMF/PNG/PCX/CMP/FPX/PLT/CAL/ICO/JPG/PS/EPS/CLP/WMF/TIF/CUR/PSD/TGA.

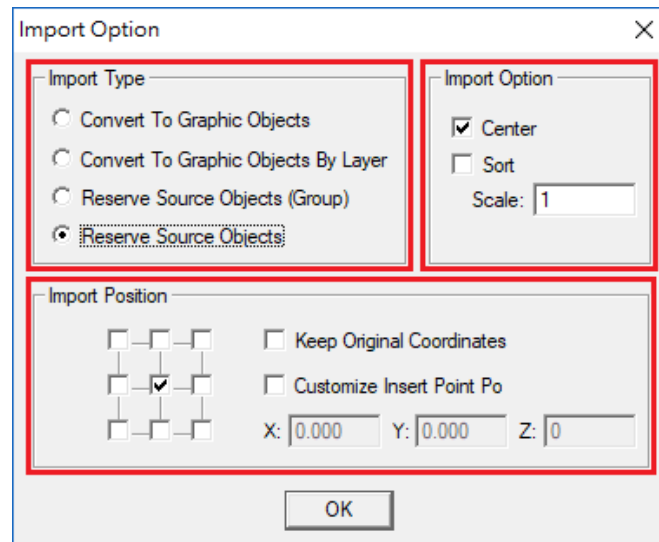


Fig. 1.1.71

Import Type	When import “*.DXF” file, these options are usable.
Convert to Graphic Obj	Convert all objects in DXF into one Graphic object.
Convert to Graphic Obj By	Convert all objects under one layer into one Graphic object.
Reserve Source Obj	Keep all objects type from DXF.
Reserve Source Obj(Group)	Keep all objects type from DXF and combine all objects into one group.
Import Option	
Center	Put imported objects at center.
Sort	Automatically sort imported objects to improve marking efficiency.
Scale	Change imported objects size as scale ratio.
Import Position	Import objects at relative 3 by 3 grid.
Keep Original Coordinates	Import objects at the original coordinates.
Customize Insert Point Po	User define import position.

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1.1.9 Export DXF

This allows users to transfer the current document into .dxf file format for AutoCAD or other applications which can use this type of file.

Click “File” from Menu Bar and select “Export DXF” function, a dialogue box as Fig.1.1.72 will appear.

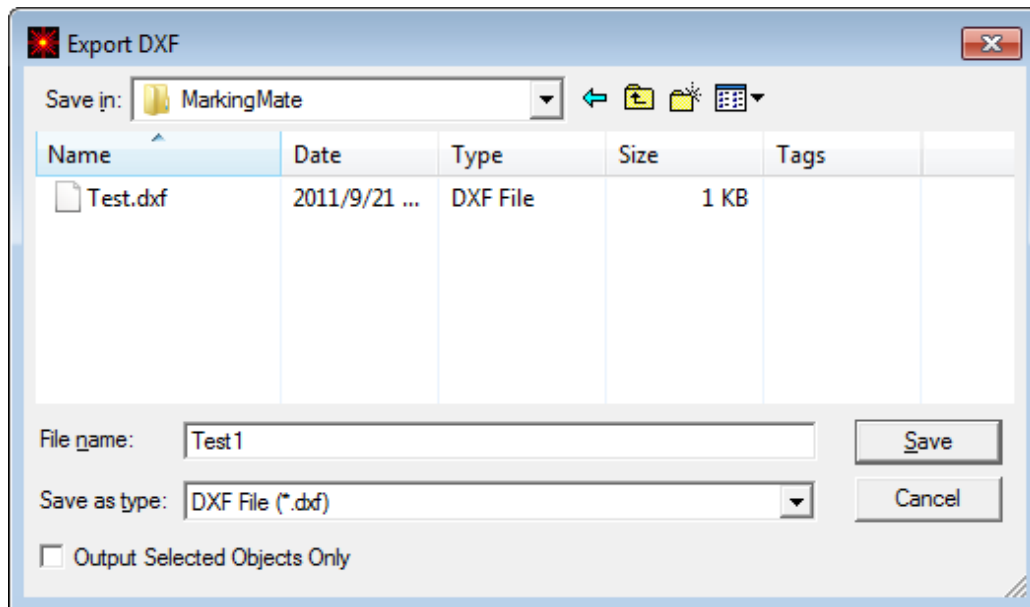


Fig. 1.1.72

File Name

Input file name or select from the list.

Save as type

DXF File (*.dxf)

Output Selected Objects only

Choose to output the selected object only or not.

1.1.10 Select TWAIN Device

Select a supported scanner, see Fig.1.1.73.

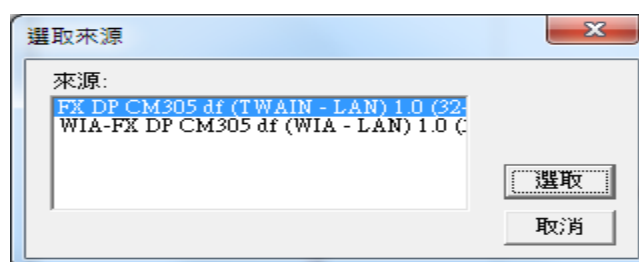


Fig.1.1.73

1.1.11 TWAIN Acquire

Use this function to set image parameters such as size and resolution, the interface is provided from the scanner’s manufacturer.

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1.1.12 Configuration Import/Export

Use this function to back-up or restore current configuration, such as application configuration, object default setting, driver configuration, lens setting, machine check configuration and lens correction file.

Method:

Export:

1. Click on “File”→“Configuration Import/Export” to bring out dialog seen as fig. 1.1.74.
2. Check on any option then choose a folder by clicking on “...” button or filling the editor with path folder directly. After that click on the “**Export**” button. Please notice that “*.len (Lens cor. file)” is used at version 2.4., thus this option is for import only.

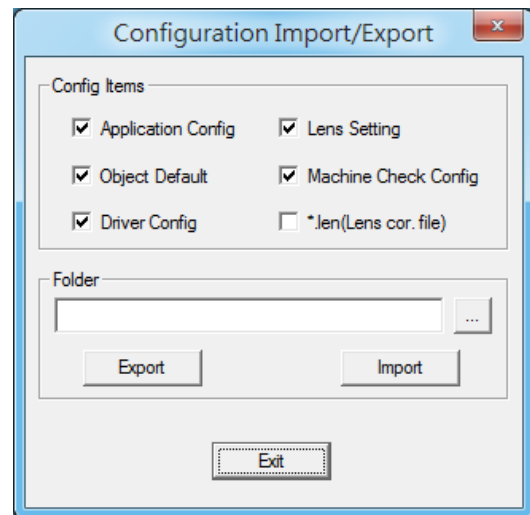


Fig. 1.1.74

Import:

1. Click on “File”→“Configuration Import/Export” to bring out dialog seen as fig. 1.1.75.
2. Check on any option then choose a folder by clicking on “...” button or filling the editor with path folder directly. After that click on the “**Import**” button.
3. If file is already existed, will pop-up a dialog to confirm to replace, skip, or rename the file. See fig. 1.1.70.

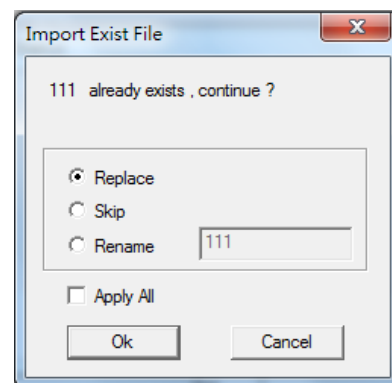


Fig. 1.1.75

4. After import is completed, click on “**Yes**” when asking to restart software.

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1.1.13 Change Language

This function allows user to change the system to different language version. There are now five language versions for user to select: English, Simplified Chinese, German, Japanese, Turkish, and Traditional Chinese, see Fig.1.1.76.



Fig. 1.1.76

1.1.14 Print

Print the current document, see Fig.1.1.77.

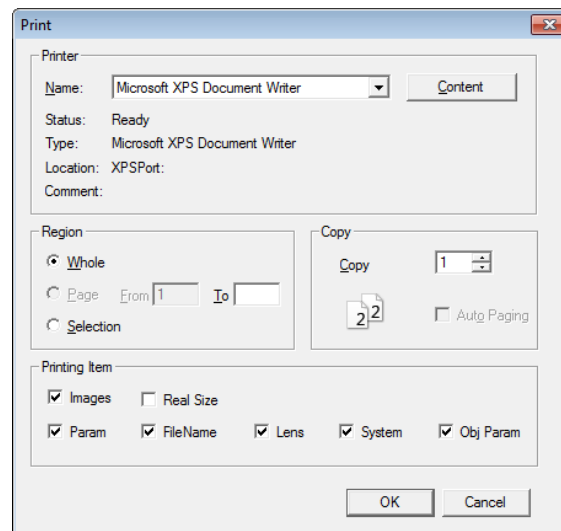


Fig. 1.1.77

Method:

Click “File” from Menu Bar and select “Print” function or press the [Ctrl+P] key from keyboard

Printer

Name

Select the printer

Content

Further setting for printer. The settings are different from the OS and the manufacture of the printer.

Region

Select the region user want to print

Whole

Print all of the data in the work area

Page

Print the selected page(s).

Selection

Print the current used page

Copy

Select the number of copies user want to print

Printing Item

Select the items users want to print (image, real size, parameter, file name, lens, system, or object parameter)

MM3D 3.2

1.1.15 Preview

Preview the current document before printing it. Fig.1.1.78 is the function of preview.

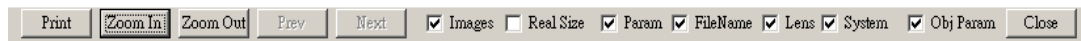


Fig. 1.1.78

Print – Go directly to the Print menu and start printing

Zoom In – Magnify the current image.

Zoom Out – Minify the current image.

Prev/Next – Allow user to view the document more convenient.

Images, Param, File Name, Lens, System, Obj Param – Select the parameters users want to display while printing.

Close – Return to the edit menu

1.1.16 Printer setting

Further setting about the printer, see Fig.1.1.79.

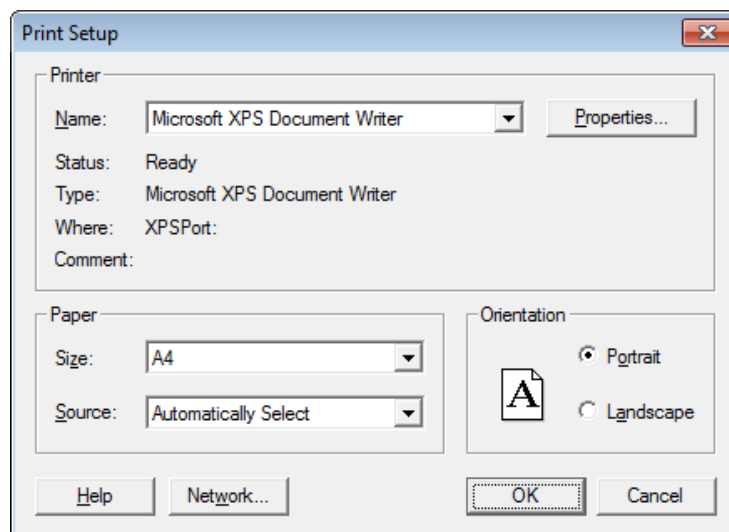


Fig. 1.1.79

Printer

Select the printer

Paper

Select the paper source

Direction

Select horizontal or vertical print

Content

Detail printer setting

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1.1.17 MRU File

It will show “MRU File” if it’s the user’s to run software, see Fig.1.1.80. Otherwise, it will display the previous used files (maximum 4 files), see Fig.1.1.81.

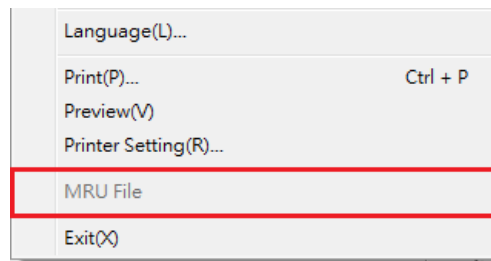


Fig. 1.1.80

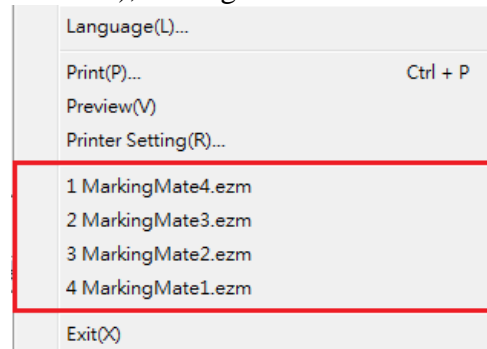


Fig. 1.1.81

1.1.18 Exit

Exit software system.

Method:

Click “File” from Menu Bar and select “Exit” function.

Click the upper right button, see Fig.1.1.82.

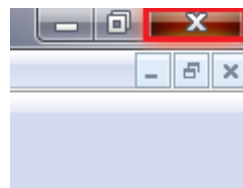



Fig. 1.1.82

Click the upper left icon  to exit the system, see Fig.1.1.83.

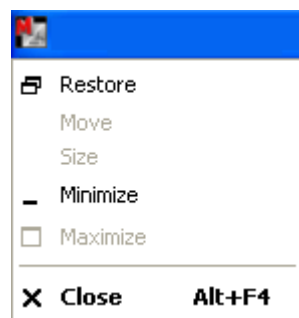


Fig. 1.1.83

Press the [Alt + F4] key from keyboard.

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1.2 Edit Menu

“Edit” menu offers the following functions:

Redo	Cancel the “Undo” action
Undo	Cancel the latest edition
Cut	Remove selected data and store it in the clipboard for another use
Copy	Duplicate selected data and store it in the clipboard for another use
Paste	Attach data from the clipboard to an assigned document
Delete	Delete and remove the selected data
Select All	Select all objects, including objects which are not located in working area.
Select Invert	Select the objects which are un-selected, including objects which are not located in working area and cancel the selected ones.
Replace...	Substitute the selected object by importing assigned object.
Combine	Combine two or more objects into one. This function allows several objects to share the same property settings
Break	Break on object into several objects.
Group	Combine two or more objects into one group.
UnGroup	Do the inversion of Group function
Set Circle Object Radius	Modify circle that radius same as original radius to modified radius .
Move to New Layer	System will create a new layer and move the selected object to that new layer.
Sort	Sort the connected parts of the selected object
Reverse	Set the object’s start point as end point and the end point become the start point.
Mirror Horz	Invert an image on its horizontal axis. Left will become right and vice-versa
Mirror Vert	Invert an image on its vertical axis. Up will become down and vice-versa
Move to Center	Move the object to the center of working area.
Baseline	Align selected text along a designated path
Split	Do the inversion of baseline function
Trans-Curve	Transfer an object in to a curve line.
Nudge	Set the nudge measure of an object when using the direction key of keyboard to move that object.

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Jump Cross	Make the intersects of two objects turn into two objects without crossing
Welding	Make the selected objects do vector combination.
Contour	This function will create an outline from a selected bitmap image
Transfer to Image	Transfer the selected objects into an image
Align	Adjust the selected objects' position according to the assigned alignment.
Distribute	Adjust the selected objects' position according to the assigned distribution.

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1.2.1 Redo

Cancel the “Undo” action. If this function was grayed, it means it is disable to use. The maximum times of “Redo” are 20.

Method:


- Click “Edit” from Menu Bar and select “Redo” function.
- Click  button from Standard Bar.
- Press [Ctrl + Y] from keyboard.

1.2.2 Undo

Back to the previous edit action. If this function was grayed, it means it is disable to use.

The maximum times of “Undo” are 20.


Method:

- Click “Edit” from Menu Bar and select “Undo” function.
- Click  button from Standard Bar.
- Press [Ctrl + Z] from keyboard.

1.2.3 Cut

Remove selected data and store it in the clipboard for another use. If no data or object is selected, this function will be disabled.


Method:

- Click “Edit” from Menu Bar and select “Cut” function.
- Click  button from Standard Bar.
- Press [Ctrl + X] from keyboard.

1.2.4 Copy

Duplicate selected data and store it in the clipboard for another use. If no data or object being selected, this function will be disabled.

Method:


- Click “Edit” from Menu Bar and select “Copy” function.
- Click  button from Standard Bar.
- Press [Ctrl + C] from keyboard.

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1.2.5 Paste

Attach data from the clipboard to the current document. If there is nothing stored in clipboard, this function will be disabled.

Method:

- Click “Edit” from Menu Bar and select “Paste” function.
- Click  button from Standard Bar.
- Press [Ctrl+V] from keyboard.

1.2.6 Delete

Delete the selected data, and the data will not be stored in the clipboard.

Method:

- Click “Edit” from Menu Bar and select “Delete” function.
- Press [Del] from keyboard.

1.2.7 Select All

Select all objects, including objects which are not located in working area.

Method

- Click “Edit” from Menu Bar and select “Select All” function.
- Press [Ctrl+A] from keyboard.

1.2.8 Select Invert

Select the objects which are un-selected, including objects which are not located in working area and cancel the selected ones.


Method

- Click “Edit” from “Menu Bar” and select “Select Invert” function.

1.2.9 Replace

Substitute the selected object by importing assigned object.

Method


- Click “Edit” from Menu Bar and select “Replace...” function.
- Click  button from Standard Bar.

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1.2.10 Combine

Combine two or more objects into one. This function will allow several objects to share the same property settings. Under the fill situation, the odd number overlapping parts of objects will be filled in color, while the even numbers parts will not, see Fig.1.2.01.

Method:

- Click “Edit” from Menu Bar and select “Combine” function.
- Click  button from Standard Bar.
- Press [Ctrl + K] from keyboard.

Example:

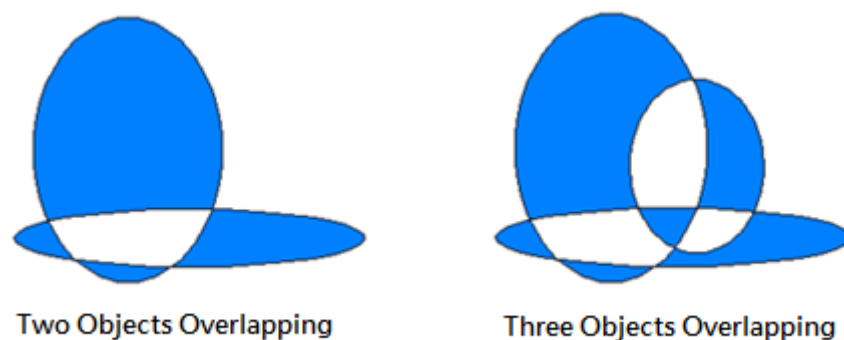



Fig. 1.2.01

1.2.11 Break

Divide a combined object into several individual objects.


Method:

- Click “Edit” from Menu Bar and select “Break” function.
- Click  button from Standard Bar.
- Press [Ctrl + B] from keyboard.

1.2.12 Group

Classify two or more objects into one group. This function will allow several objects to move together while allowing their individual property settings to remain intact. Notice: the maximum amount of group’s layer is 15.

Method:


- Click “Edit” from Menu Bar and select “Group” function.
- Click  button from Standard Bar.
- Press the [Ctrl + M] from keyboard.

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1.2.13 UnGroup

Cancel the group effect of an object.

Method:

- Click “Edit” from Menu Bar and select “UnGroup” function.
- Click  button from Standard Bar.
- Press the [Ctrl+Q] from keyboard.

1.2.14 Move to New Layer

System will create a new layer and move the selected object to that new layer.

Method

- Click “Edit” from Menu Bar and select “Move to New Layer” function.

1.2.15 Sort

Sort the segments or objects which are not arranged in order, see Fig.1.2.02 and Fig.1.2.03. Please note that the objects users want to sort must be combined first. The arrow in the image is the start point of the object.

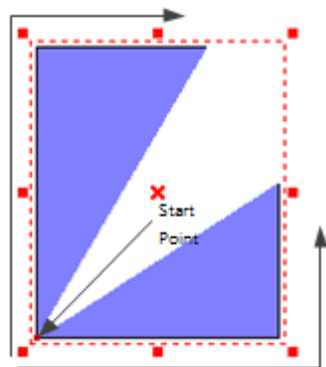


Fig. 1.2.02

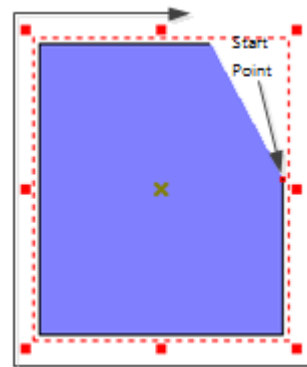



Fig. 1.2.03

Method:

- Click “Edit” from Menu Bar and select “Sort” function.
- Click  button from Standard Bar.

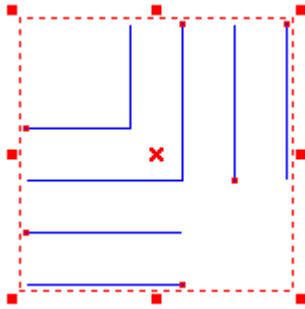
MM3D 3.2

1.2.16 Reverse

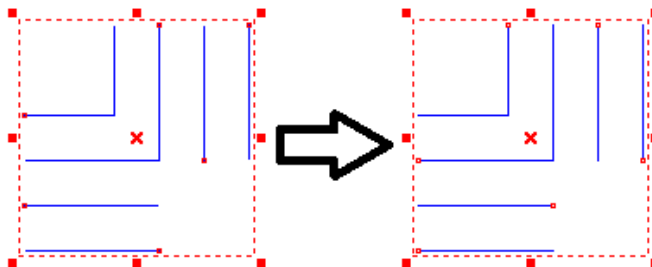
Set the object's start point as end point and the end point become the start point.

Method:

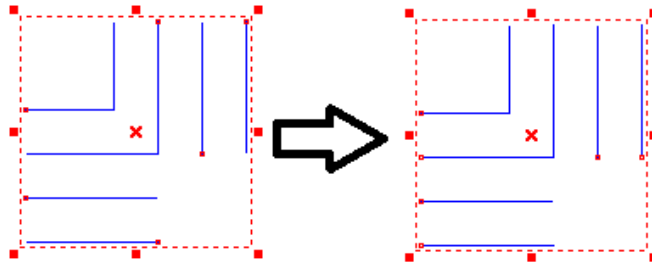
Click "Edit" from Menu Bar and select "Reverse" function. Each function shown as following graphs:



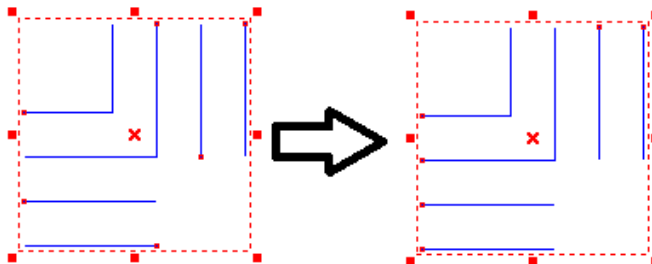
All Reverse



X Coord. start point greater than end point. When same X Coord., Y Coord. start point greater than end point.

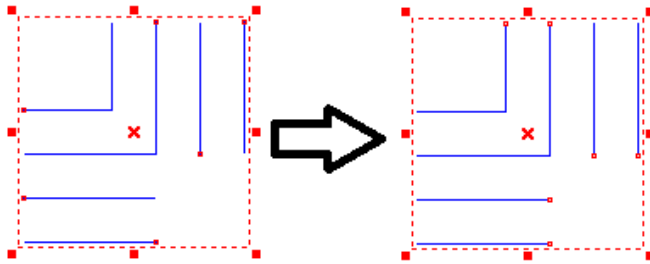


X Coord. start point greater than end point. When same x Corrd., Y Coord. start point lesser than end point.

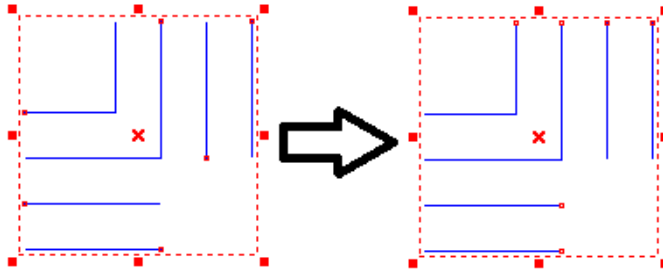


X Coord. start point lesser than end point. When same X Corrd., Y Coord. start point greater than end point.

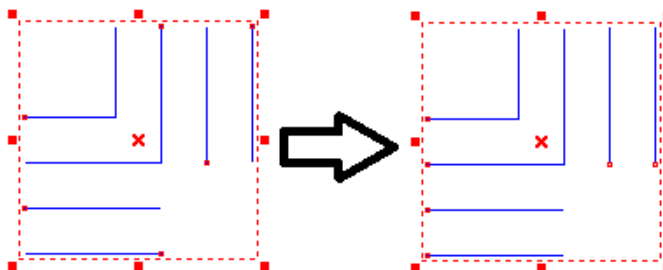
MM3D 3.2



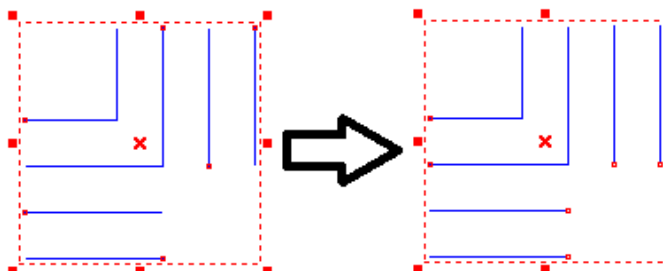
X Coord. start point lesser than end point. When same X Coord., Y Coord. start point lesser than end point.



Y Coord. start point greater than end point. When same Y Coord., X Coord. start point greater than end point.

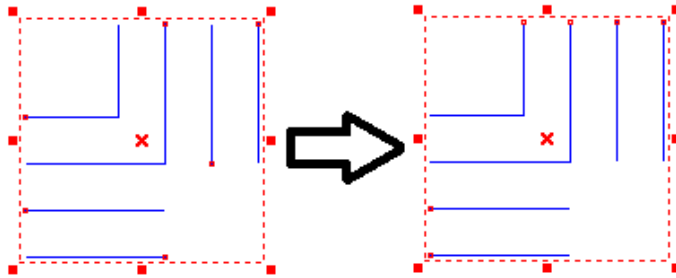


Y Coord. start point greater than end point. When same Y Coord., X Coord. start point lesser than end point.

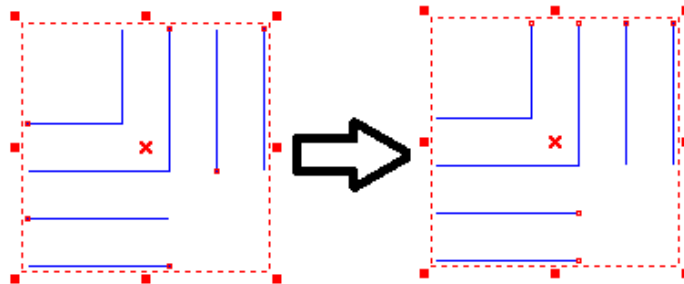


Y Coord. start point lesser than end point. When same Y Coord., X Coord. start point greater than end point.

MM3D 3.2




Y Coord. start point lesser than end point. When same Y Coord., X Coord. start point lesser than end point.



1.2.17 Mirror Horizontal

Invert an object on its horizontal axis. Left will become right and vice-versa, see Fig.1.2.04.

Method:

- Click “Edit” from Menu Bar and select “Mirror Horizontal” function.
- Click  button from Standard Bar.
- Press [Ctrl+H] from keyboard.

Example:

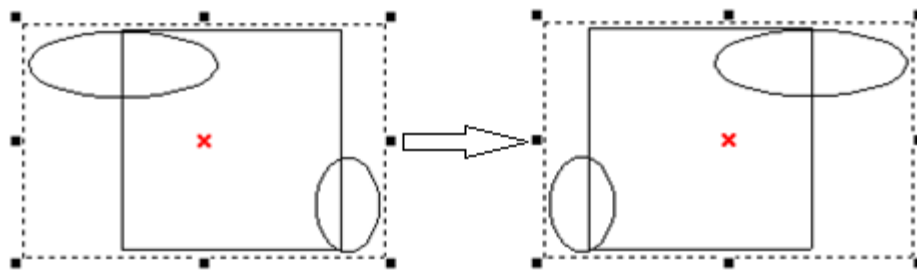



Fig. 1.2.04

1.2.18 Mirror Vertical

Invert an image on its vertical axis. Up will become down and vice-versa, see Fig.1.2.05.

Method:

- Click “Edit” from Menu Bar and select “Mirror Vertical” function.
- Click the  button from Standard Bar.
- Press [Ctrl+L] from keyboard.

MM3D 3.2

Example:

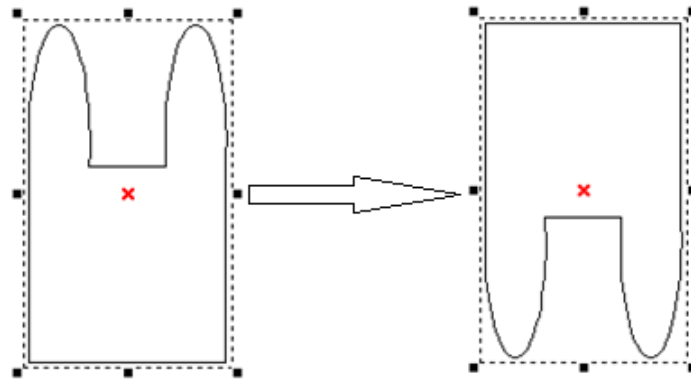



Fig. 1.2.05

1.2.19 Move to Center


Move the selected object(s) to the center of working area.

Method:

- Click “Edit” from Menu Bar and select “Move to Center” function.
- Click the  button from Standard Bar or Modify Bar.
- Press [F8] from keyboard.

MM3D 3.2

1.2.20 Baseline

Align selected text along with a designate path. First select the text, then click “Edit –Baseline” from Menu Bar, the mouse pointer will become as , and then select the path such as line, arc, or curve, see Fig.1.2.06.

Method:

- Click “Edit” from Menu Bar and select “Baseline” function.
- Press the [Ctrl+E] key from keyboard.

Example:

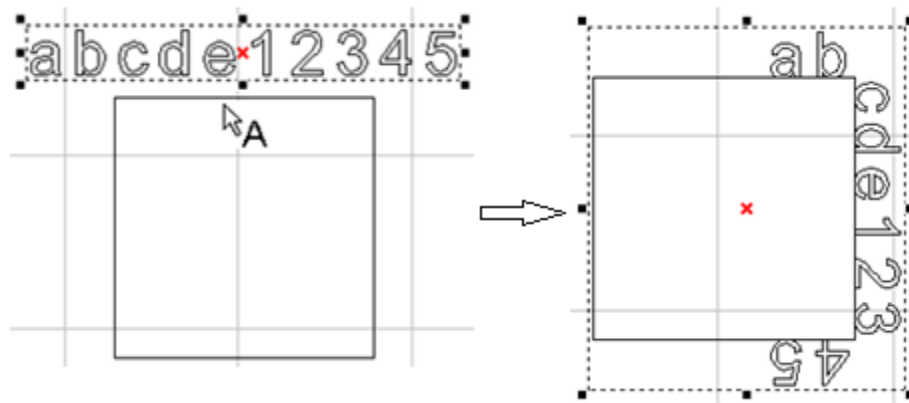


Fig. 1.2.06

1.2.21 Split

Cancel the baseline function, see Fig.1.2.07.

Method:

- Click “Edit” from Menu Bar and select “Split” function.
- Press [Ctrl+D] from keyboard.

Example:

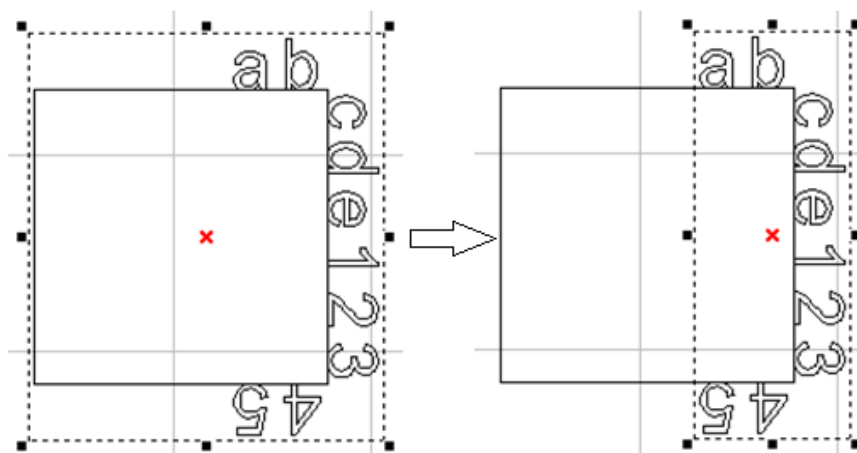


Fig. 1.2.07

MM3D 3.2

1.2.22 Trans-Curve

Transfer a curved line into a series of individual lines. Allow these single lines to be manipulated individually such as using “Edit Vertex” function to change the object’s shape, see Fig1.2.08 to Fig.1.2.10.

- * Only curve objects are able to use “Add Vertex” and “Edit Vertex” functions.
- * This function can only be used on non-image objects.

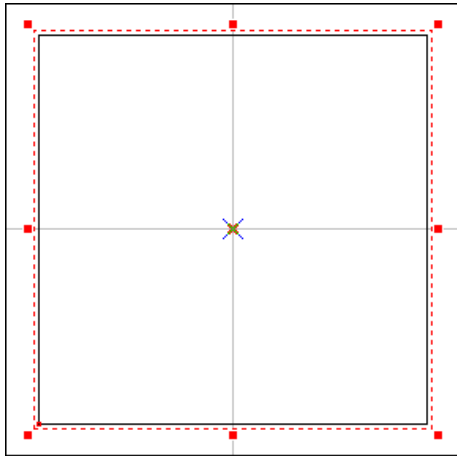


Fig. 1.2.08 Turn the Rectangle into

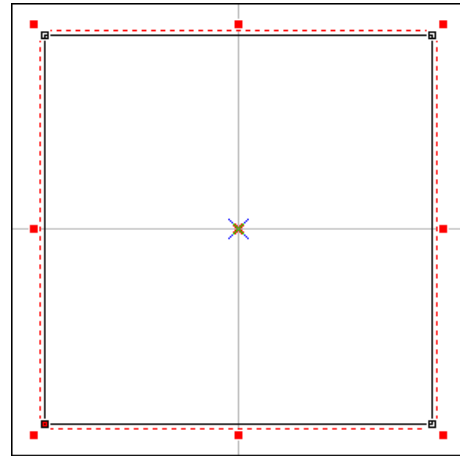


Fig. 1.2.09 Edit Vertex (White Square is

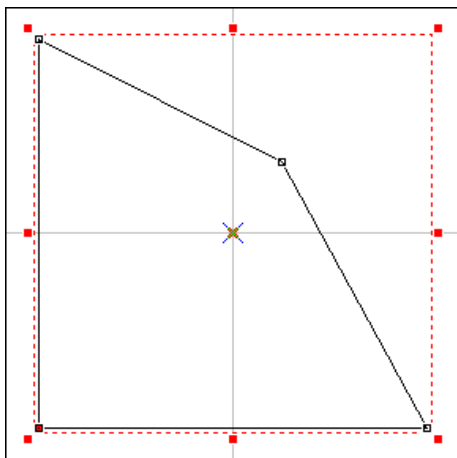



Fig. 1.2.10 Change the Shape by Drag

Method:

- Click “Edit” from Menu Bar and select “Trans-curve” function.
- Click  button from Obj Property Bar.
- Press [Ctrl+U] from keyboard.

MM3D 3.2

1.2.23Nudge

Set the nudge measure of an object when using the direction key of keyboard to move that object, see Fig.1.2.11.

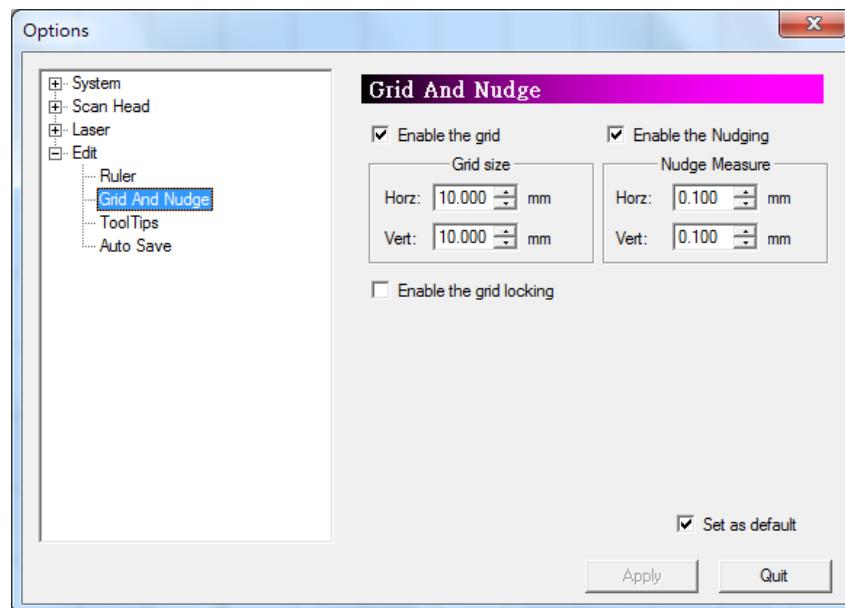


Fig. 1.2.11

Method:

- Click “Edit” from Menu Bar and select “Nudge” function.

1.2.24 Jump Cross

Make two figures with the line intersecting turn to be no crossing. The cross size is best to be set as between 0.008mm and 0.1mm, see Fig.1.2.12 and Fig.1.2.13.

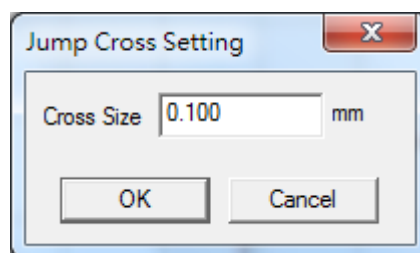


Fig. 1.2.12

Method:

- Click “Edit” from Menu Bar and select “Jump Cross” function. Enter the value of cross size in the dialog box and click “OK” button.

MM3D 3.2

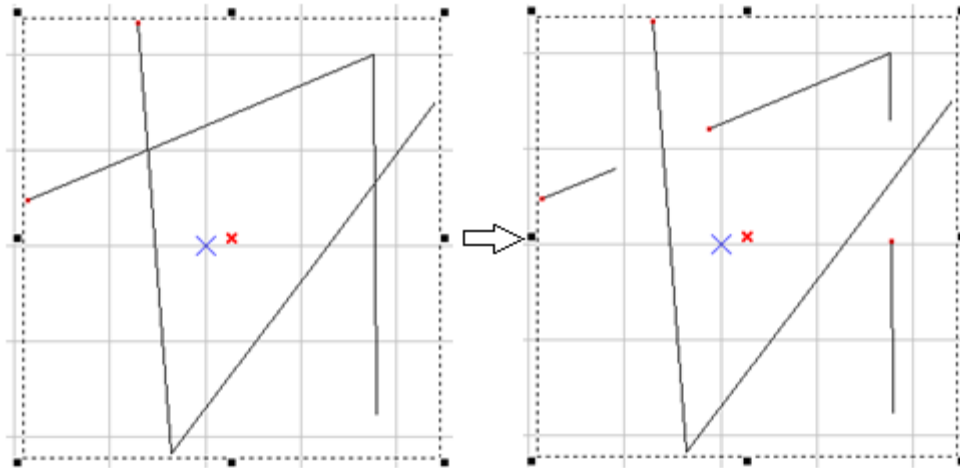



Fig. 1.2.13

1.2.25 Welding

Combine two or more objects and eliminate the overlapping lines, see Fig.1.2.14.

* This function is only work for the none-text and none-image objects. If users want to use this function for texts, they have to break the text into several segments first.

Method:

- Click “Edit” from Menu Bar and select “Welding” function.
- Click  button from Obj Property Bar.
- Press [Ctrl+G] from keyboard.

Example:

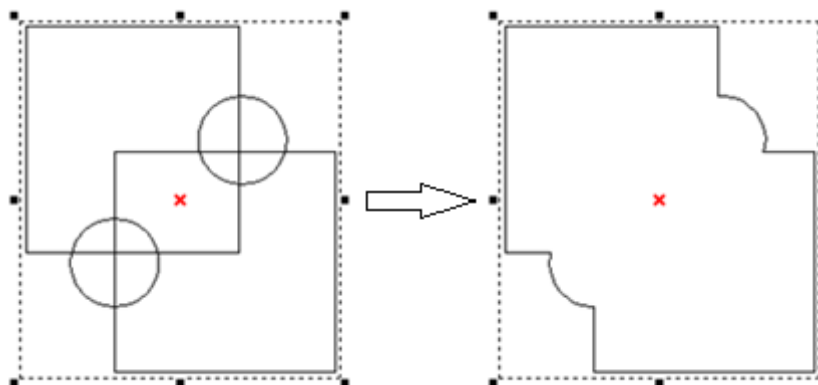


Fig. 1.2.14

MM3D 3.2

1.2.26 Contour

This function can derive the frame of a selected bitmap image. Before executing this function, users have to set the contour filter first, see Fig.1.2.15.

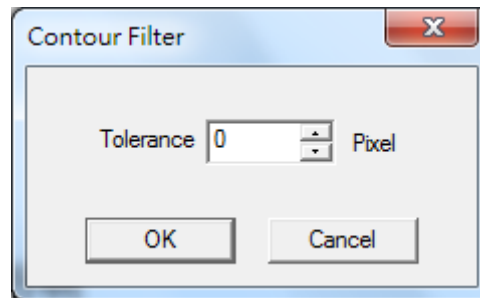


Fig. 1.2.15

Users have to input the tolerance value (maximum is 0) to get the correct figure. And then the image will become an ordinary figure. Users will see a lot of segments on the screen. They have to use “break” function if they want to use these segments, see Fig.1.2.16.

Method:

- Click “Edit” from Menu Bar and select “Contour” function.
- Press [Ctrl + W] from keyboard.

Example:

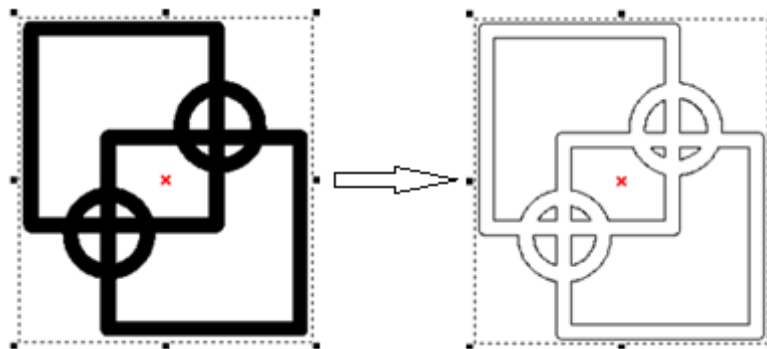


Fig. 1.2.16

MM3D 3.2

1.2.27 Transfer to Image

Transfer the selected objects into an image. The dialogue box show as Fig.1.2.17 can change the resolution, color, and dithering mode.

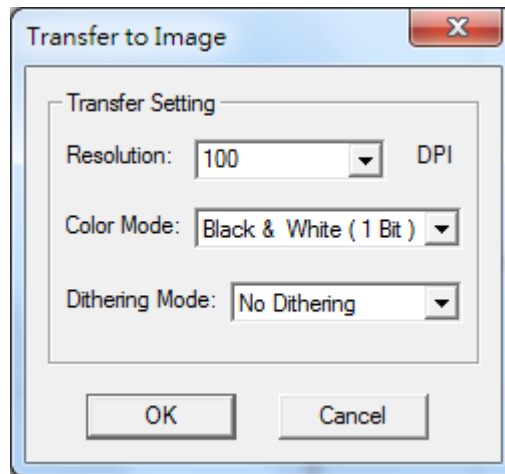


Fig. 1.2.17

Method:

- Click “Edit” from Menu Bar and select “Trans to Image” function.
- Press [Ctrl+T] from keyboard.

1.2.28 Align

Use this function to align the selected objects, see Fig.1.2.18.

Left – align to the left

Middle – align to the middle

Right – align to the right

Top – align to the top

Center – align to the center

Bottom – align to the bottom

Align to:

Last Select Object – align to the last selected object

Paper Edge – align to the paper edge

Paper Center – align to the paper center

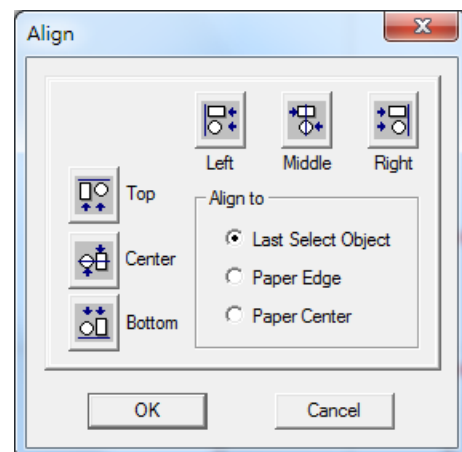



Fig. 1.2.18

Method:

- Click “Edit” from Menu Bar and select “Align” function.
- Click  button from Obj Property Bar.


MM3D 3.2

1.2.29 Distribute

Adjust the selected objects' position according to the assigned distribution, see Fig.1.2.19.

- Left** – adjust the distance between the left-edge of each object
Middle – adjust the distance between the middle of each object
Distance – adjust the distance between the space of each object
Right – adjust the distance between the right-edge of each object
Top – adjust the distance between the top of each object
Center – adjust the distance between the center of each object
Distance – adjust the distance between the space of each object
Bottom – adjust the distance between the bottom of each object
Total Area - The distribute area is according to a selected area, paper area, or an adjustable border area.

Method:

- Click “Edit” from Menu Bar and select “Distribute” function.
- Click  button from Obj Property Bar.

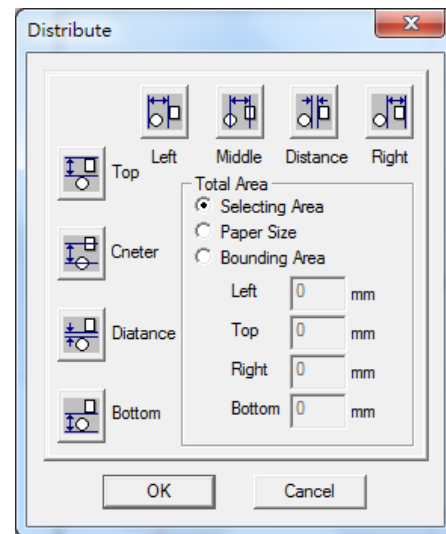


Fig. 1.2.19

1.2.30 Mold Out Line

Get out line from a mold.

MM3D 3.2

1.3 Draw Menu

“Draw” menu offers the following functions:


Vertex	Draw a vertex.
Line	Draw a straight line.
Arc	Draw an arc.
Circle	Draw a circle or oval.
Rectangle	Draw a square or rectangle.
Curve	Draw a curve.
Curve Brush	Draw a freehand line using the mouse.
Text	Insert a text object.
Arc Text	Insert an arc-text object.
Rectangle Text	Insert a rectangle text object.
1D Barcode	Create a 1D barcode.
2D Barcode	Create a 2D barcode.
Matrix	Create a matrix object.
Spiral	Draw a spiral object.
Control Object	Insert control objects.

MM3D 3.2

1.3.1 Vertex

Insert a vertex object in the Working Area.

Method:

- Click “Draw” from Menu Bar and select “Vertex” function.
- Click  button from Draw Tool Bar.


Marking Way:

There are two ways for vertex marking. One is “Spot Delay” mode and the other is “Laser Shot” mode. Please refer to P.29 1.1.6.8 Burst Mode Setting.

1.3.2 Line

To draw a line, first click the “Line” function. The next step is to select a start point and click the left button of mouse, and then move the mouse to the end point and click the left button again. Click left button at third point to draw another line or click right button to end this function. Or press “C” to make the line become a close path and end function.

Method:

- Click “Draw” from Menu Bar and select “Line” function.
- Click  button from Draw Tool Bar.


MM3D 3.2

1.3.3 Arc

1.3.3.1 SME

Press the left button of mouse to set the start point of arc, the move the mouse to the second point and press left button again. And then move to the third point and click the button to set the end point. Users can press the right button of mouse to end this function or press “C” to make the curve become a close path and end the function.


Method:

1. Click “Draw” from Menu Bar and select “Arc” function.
2. Click  button from Draw Tool Bar.

1.3.3.2 SEM

Press the left button of mouse to set the start point of arc, the move the mouse to the end point and press left button again. And then move to the middle point and click the button to set the end point. Users can press the right button of mouse to end this function or press “C” to make the curve become a close path and end the function.

Method:


1. Click “Draw” from Menu Bar and select “Arc” function.
2. Click  button from Draw Tool Bar.

MM3D 3.2

1.3.4 Circle

Create circles or ovals. Select a start point on the working area. Press the left mouse button and move the mouse to decide the size and shape and then click the left button again to finish drawing. Press the right button to stop this function. Press “Ctrl” when drawing will get a circle.

Method:

- Click “Draw” from Menu Bar and select “Circle” function.
- Click  button from Draw Tool Bar.

Marking Way:

No Fill
Marking starts from
0 degree following
levorotarydirection,
see Fig.1.3.01.

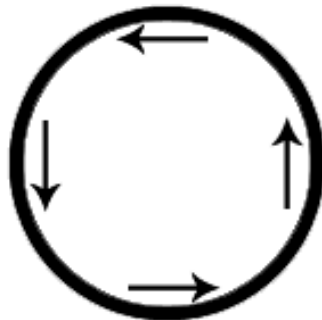


Fig. 1.3.01

Fill
Marking starts from
left to right internal
and then marks
external frame, see
Fig.1.3.02.

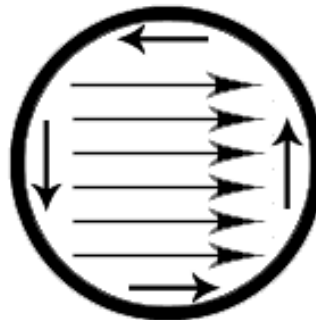



Fig. 1.3.02

1.3.5 Rectangle

Create squares and rectangles. Select a start point on the working area. Press the left mouse button and move the mouse to decide the size and shape and then click the left button again to finish drawing. Press the right button to stop this function. Press “Ctrl” when drawing will get a square.

Method:

- Click “Draw” from Menu Bar and select “Rectangle” function.
- Click  button from Draw Tool Bar.

Marking Way:

MM3D 3.2

No Fill

Marking starts from upper left side following clockwise direction, see Fig.1.3.03.

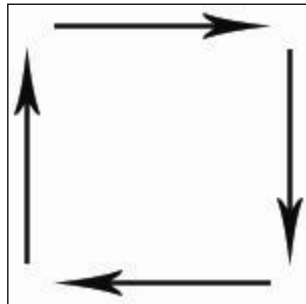


Fig. 1.3.03

Fill

Marking starts from left to right internal and then marks external frame, see Fig.1.3.04.

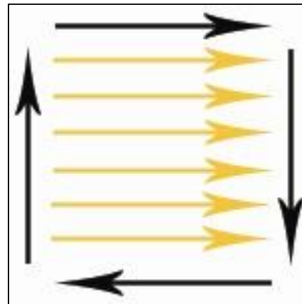



Fig. 1.3.04

1.3.6 Curve

Select the start point of the curve, holding the mouse left button and decide the direction of tangent line of that point. Then move to another point and decide the direction of tangent line again and complete a curve. Users can continue drawing the curve through moving the mouse; press “C” to make that curve become a closed path curve or press the right button to end this function.


Method:

- Click “Draw” from Menu Bar and select “Curve” function.
- Click  button from Draw Tool Bar.

1.3.7 Curve Brush

Holding the left button of mouse and moving the mouse. A curve will display on the working area according to the move path of mouse. Release the left button to complete drawing and press right button to end this function.

Method:

- Click “Draw” from Menu Bar and select “Curve Brush” function.
- Click  button from Draw Tool Bar.

MM3D 3.2

1.3.8 Text

Select this function. Decide the position of the text and a dialog box will be displayed, see the red area in Fig.1.3.05. Input the content of the text. Press “Enter” to do line feed or click right button of mouse to end this function.

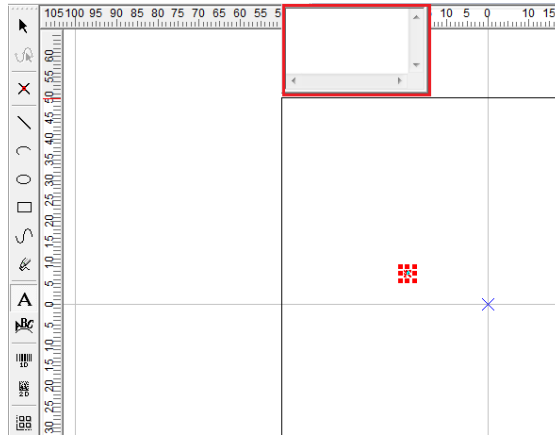



Fig. 1.3.05

Method:

- Click “Draw” from Menu Bar and select “Text” function.
- Click  button from Draw Tool Bar.

Marking Way:

If a text object has several characters, the laser will mark the characters one by one. If users need to mark the whole text at the same time, then the text must be transferred to a curve.

1.3.9 Arc Text

Using this function, the system will show a window like Fig.1.3.06. Input the content and click “OK” to end this function.

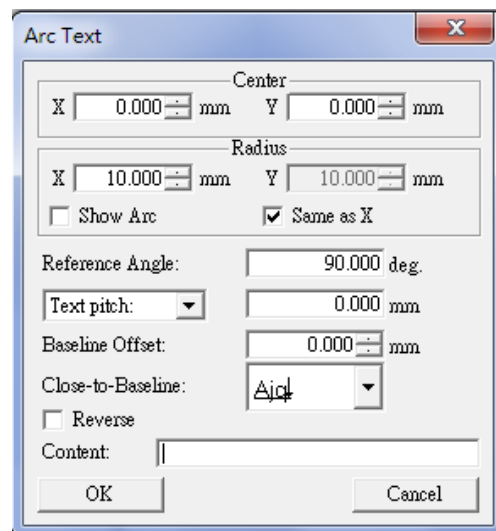



Fig. 1.3.06

Method:

- Click “Draw” from Menu Bar and select “Arc Text” function.
- Click  button from Draw Tool Bar.

MM3D 3.2

1.3.10 Rectangle Text

Users can input the text within a specified rectangle, see Fig.1.3.07. The font size of text will be changed according to the amount of characters.

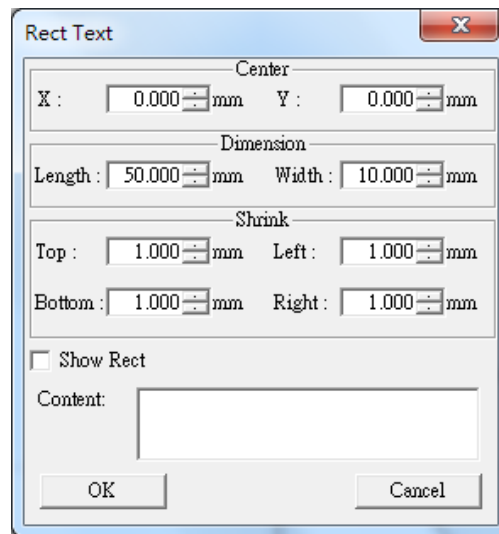



Fig. 1.3.07

Method:

- Click “Draw” from Menu Bar and select “Rectangle Text” function.
- Click  button from Draw Tool Bar.

1.3.11 1D Barcode

Select this function and a dialog box will open for user to choose code type and enter code data, see Fig.1.3.08. Click “OK” when finish entering all information to close this dialog box and insert the 1D Barcode on working area.

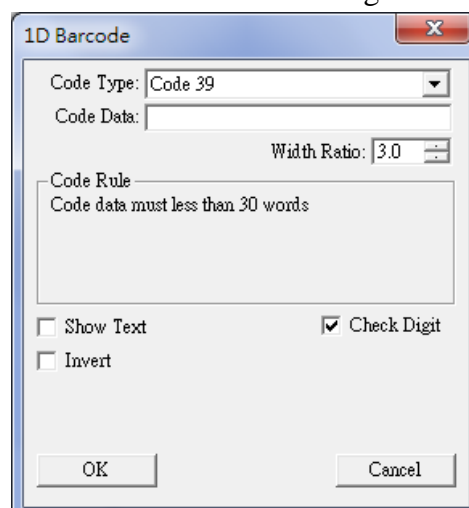



Fig. 1.3.08

Method:

- Click “Draw” from Menu Bar and select “1D Barcode” function.
- Click  button from Draw Tool Bar.

MM3D 3.2

1.3.12 2D Barcode

Select this function and a dialog box will open for user to choose code type and enter code data, see Fig.1.3.09. Click “OK” when finish entering all information to close this dialog box and insert the 1D Barcode on working area.

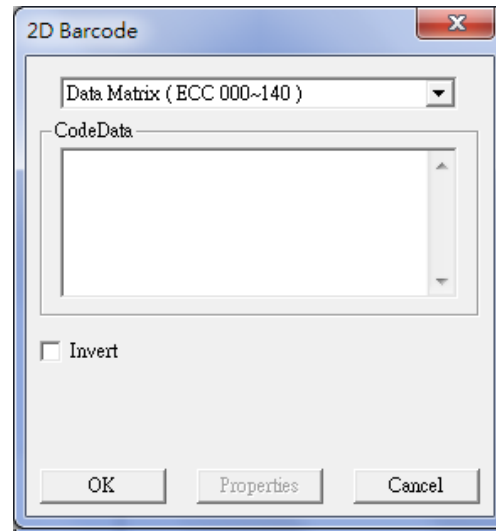



Fig. 1.3.09


Method:

- Click “Draw” from Menu Bar and select “2D Barcode” function.
- Click  button from Draw Tool Bar.

1.3.13 Spiral

Create Spiral. Select a center point on the working area. Click the left mouse button to draw a spiral

Method:

- Click “Draw” from Menu Bar and select “Spiral” function.
- Click  button from Draw Tool Bar.

1.3.14 Control Object

There are nine control objects: Digital In, Digital Out, Do Pause, Delay Time, Motion, Set Position, Loop, Ring and Homing.

Select one function and insert it and the function will display on object browser. The marking order will follow the objects’ order under layer. ([Refer CH3.4](#))

Method:

1. Click “Draw” from Menu Bar and select “Control Object” function.
2. Click function users want to use from Control Object Tool Bar.

MM3D 3.2

1.4 Image Menu

“Image” menu offers the following functions:

Effects	Modify the image effects Posterize Mosaic Average Median Sharpen Add Noise Emboss Edge Enhance Oilify
Spatial Filters	Use different filters Gradient Laplacian Sobel Prewitt Shift & Difference Line Segment

MM3D 3.2

1.4.1 Effects

1.4.1.1 Posterize

Click “Image – Effects - Posterize”

This function allows user to adjust the color levels for an image, refer to the following examples.

Fig.1.4.01 is the original image:



Fig. 1.4.01

When Levels per color plane is 2, see Fig.1.4.02.

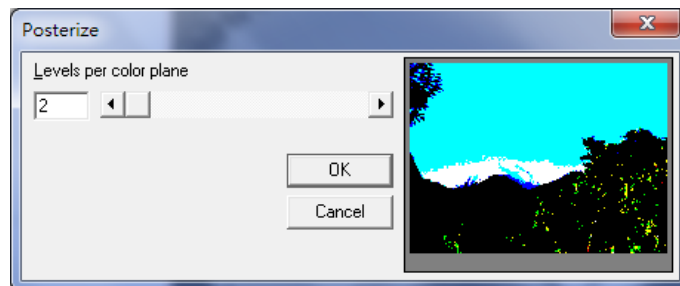


Fig. 1.4.02

When Levels per color plane is 20, see Fig.1.4.03.

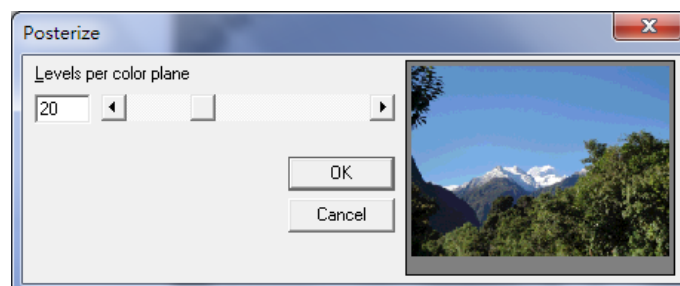


Fig. 1.4.03

When Levels per color plane is 64, see Fig.1.4.04.

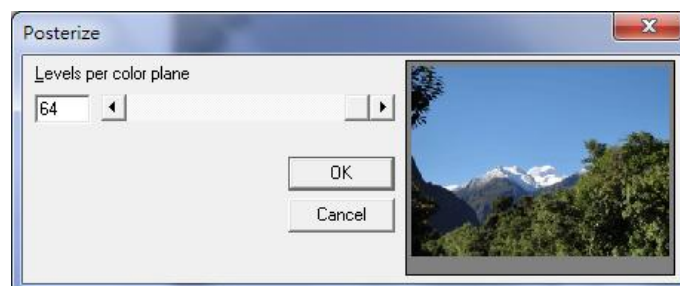


Fig. 1.4.04

MM3D 3.2

1.4.1.2 Mosaic

This function will cause a blurred by magnifying the pixel size of the image, refer to the following examples.

Fig.1.4.05 is the original image:



Fig. 1.4.05

When Tile size
is 2, see
Fig.1.4.06.

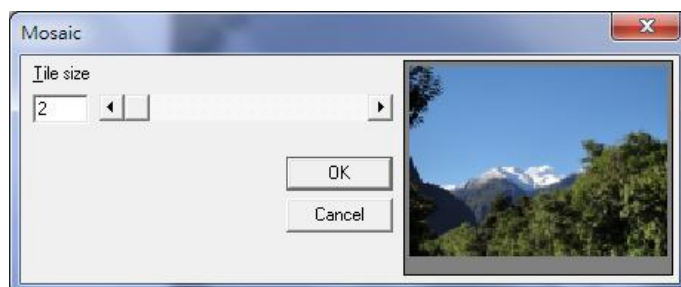


Fig. 1.4.06

When Tile size
is 20, see
Fig.1.4.07.

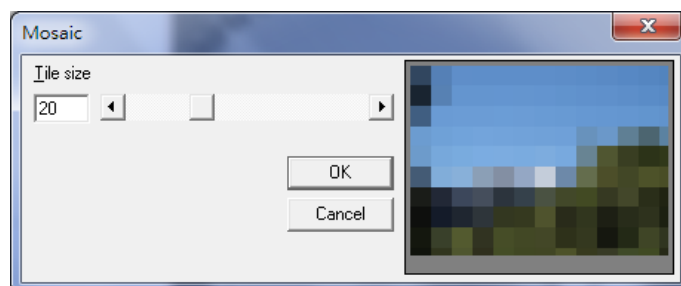


Fig. 1.4.07

When Tile size
is 64, see
Fig.1.4.08.

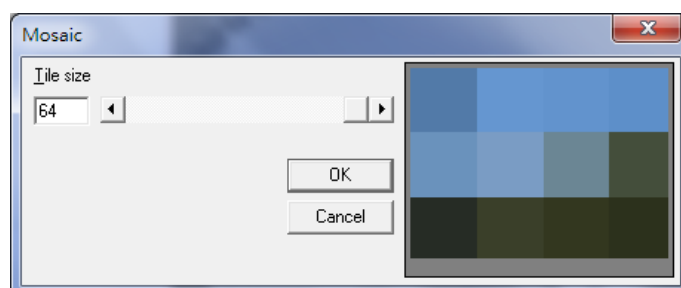


Fig. 1.4.08

MM3D 3.2

1.4.1.3 Average

Click “Image – Effects - Average”

This function will cause a blurred by adjusting the average sample size of the image, refer to the following examples.

Fig.1.4.09 is the original image:



Fig. 1.4.09

When Sample size is 3, see Fig.1.4.10.

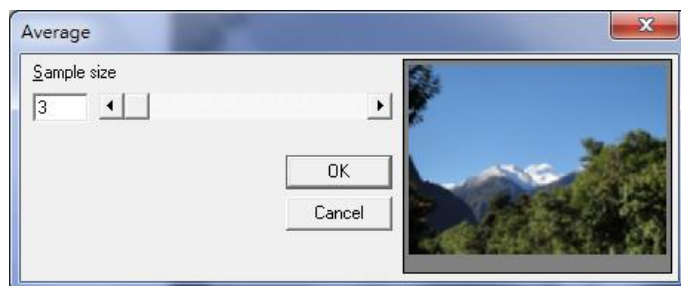


Fig. 1.4.10

When Sample size is 7, see Fig.1.4.11.

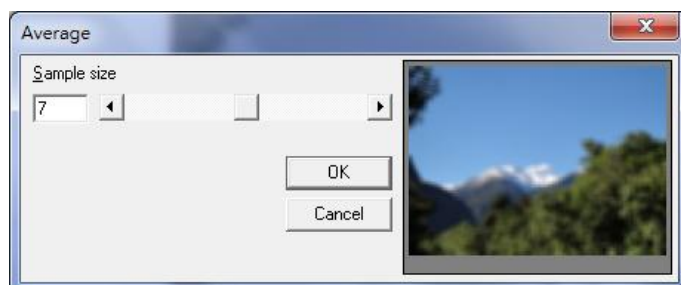


Fig. 1.4.11

When Sample size is 11, see Fig.1.4.12.

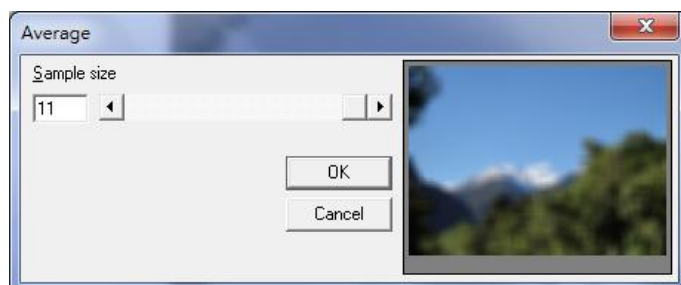


Fig. 1.4.12

MM3D 3.2

1.4.1.4 Median

Click “Image – Effects - Median”

Adjust the sample size of image to cause the median effect and make the image become blurred, refer to the following examples.

Fig.1.4.13 is the original image:



Fig. 1.4.13

When Sample size is 3, see Fig.1.4.14.

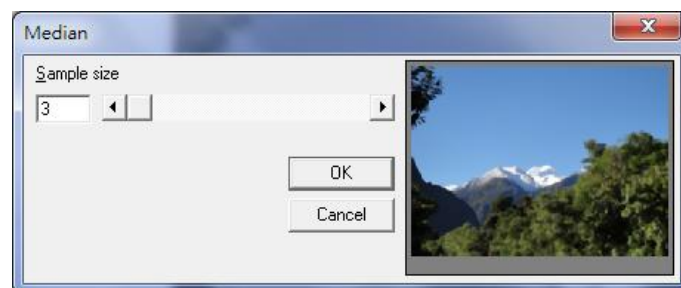


Fig. 1.4.14

When Sample size is 7, see Fig.1.4.15.

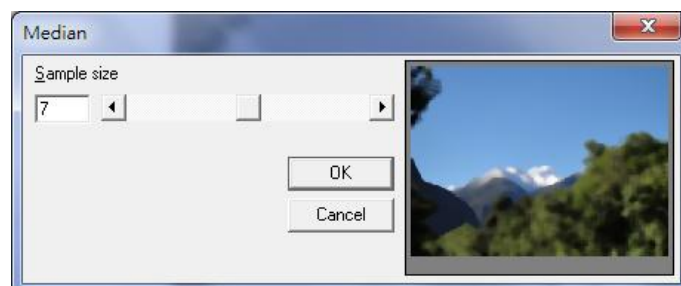


Fig. 1.4.15

When Sample size is 11, see Fig.1.4.16.

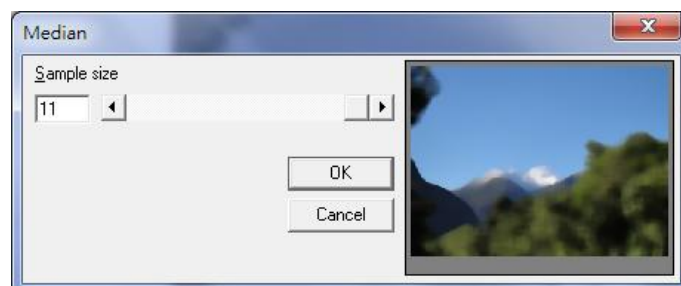


Fig. 1.4.16

MM3D 3.2

1.4.1.5 Sharpen

Click “Image – Effects - Sharpen”

Adjust to percentage of image to increase the resolution and emphasize the contrast, refer to the following examples.

Fig.1.4.17 is the original image:



Fig. 1.4.17

When
Percentage is 0,
see Fig.1.4.18.

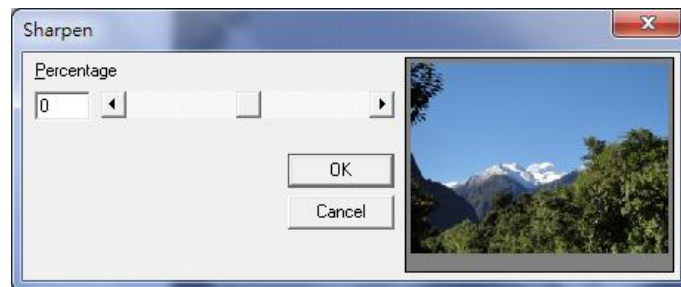


Fig. 1.4.18

When Percentage
is -100, see
Fig.1.4.19.

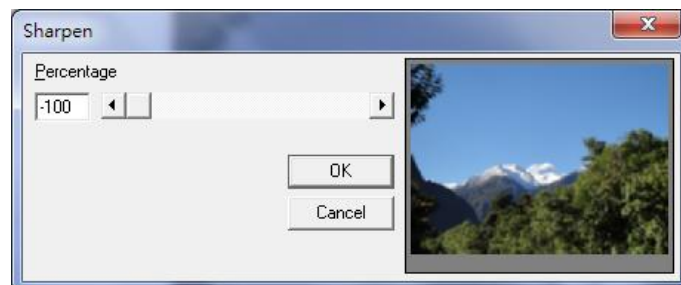


Fig. 1.4.19

When Percentage
is 100, see
Fig.1.4.20.

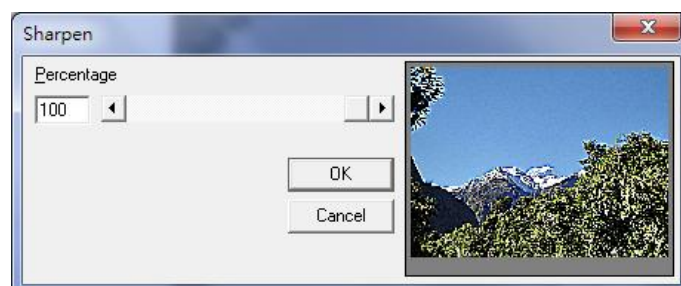


Fig. 1.4.20

MM3D 3.2

1.4.1.6 Add Noise

Click “Image – Effects – Add Noise”

Add white noise to the image according to the noise level and channel. There are four types of channel to choose: Master, Red, Green and Blue, refer to the following examples.

Fig.1.4.21 is the original image:



Fig. 1.4.21

When Noise Level is 50 and Level is Master, see Fig.1.4.22.

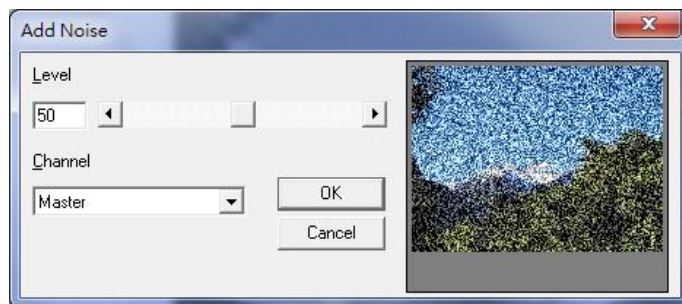


Fig. 1.4.22

When Noise Level is 50 and Level is Red, see Fig.1.4.23.

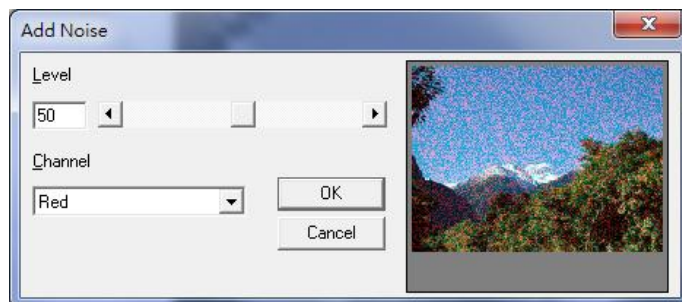


Fig. 1.4.23

When Noise Level is 50 and Level is Green, see Fig.1.4.24.

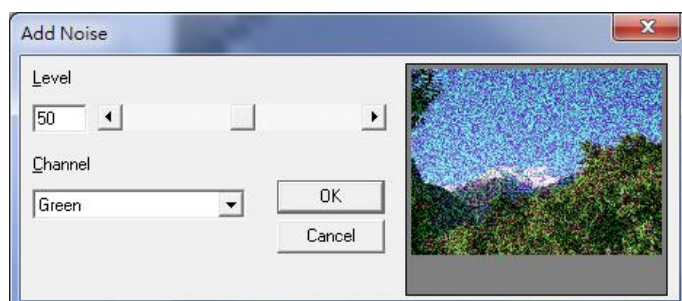


Fig. 1.4.24

MM3D 3.2

When Noise Level is 50 and Level is Blue, see Fig.1.4.25.

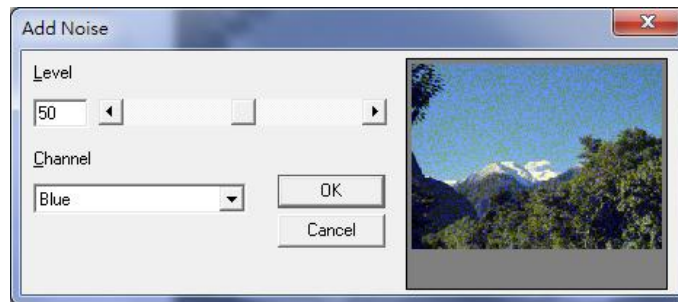


Fig. 1.4.25

1.4.1.7 Emboss

Click “Image – Effects - Emboss”

Create an embossed effect for the image by adjusting the direction and depth, refer to the following examples.

Fig.1.4.26 is the original image:



Fig. 1.4.26

Choose the direction as North and the Depth as 50, see Fig.1.4.27.

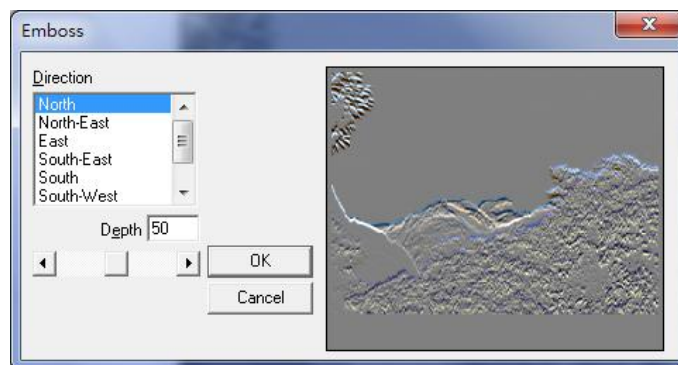


Fig. 1.4.27

Choose the direction as South-West and the Depth as 75, see Fig.1.4.28.

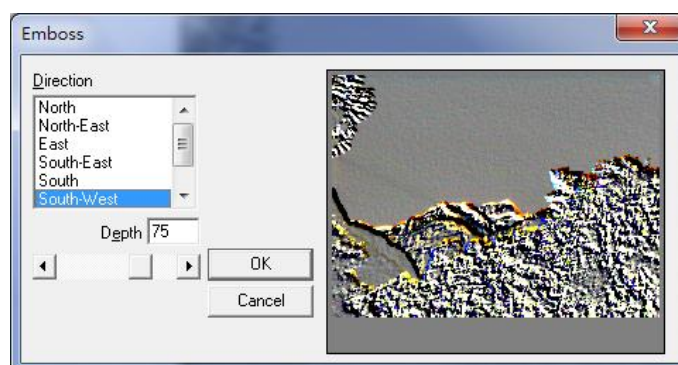


Fig. 1.4.28

MM3D 3.2

1.4.1.8 Edge Enhance

Click “Image –Effects – Edge Enhance”

Enhance the edge of image, refer to the following examples.



Fig.1.4.29 Original



Fig.1.4.30 Edge-Enhance

1.4.1.9 Oilify

Click “Image – Effects - Oilify”

Adjust the sample size to create an oil painting effect for the image, refer to the following examples.

Fig.1.4.31 is the original image:

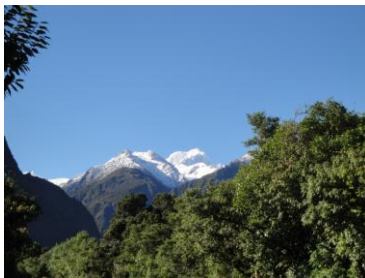


Fig. 1.4.31

When Sample size is 3, see Fig.1.4.32.

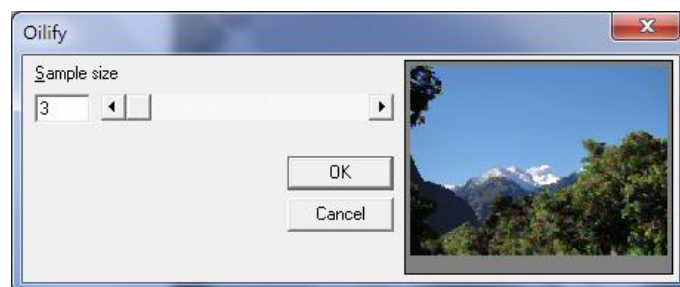


Fig. 1.4.32

When Sample size is 7, see Fig.1.4.33.

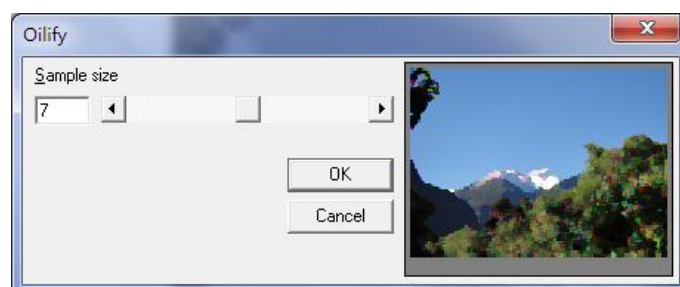


Fig. 1.4.33

MM3D 3.2

When Sample size is 11, see Fig.1.4.34.

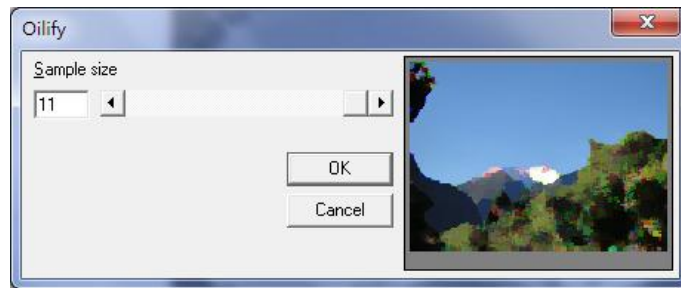


Fig. 1.4.34

MM3D 3.2

1.4.2 Special Filters

1.4.2.1 Gradient

Click “Image – Special Filters - Gradient”

Adjust the Filter Value according to the direction, refer to the following examples.

Fig.1.4.35 is the original image:



Fig. 1.4.35

Direction: North,
see Fig.1.4.36.

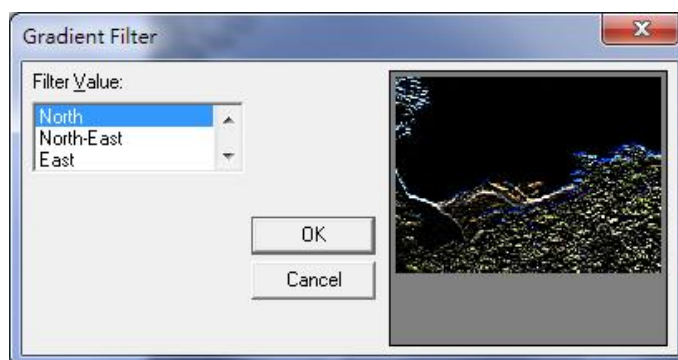


Fig. 1.4.36

Direction:
South-East, see
Fig.1.4.37.

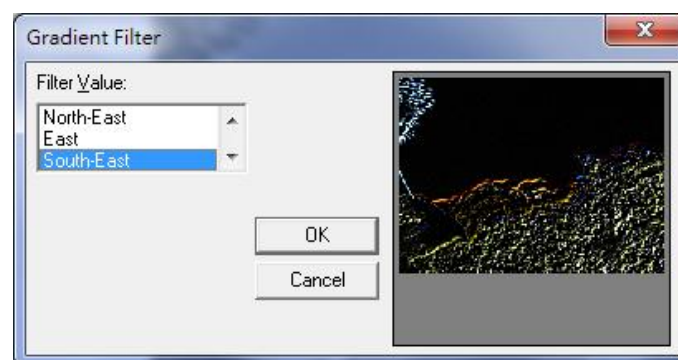


Fig. 1.4.37

MM3D 3.2

1.4.2.2 Laplacian

Click “Image – Special Filters - Laplacian”

Select Filter from Filter Value list to adjust the image, refer to the following examples.

Fig.1.4.38 is the original image:



Fig. 1.4.38

When select
Filter 1, see
Fig.1.4.39.

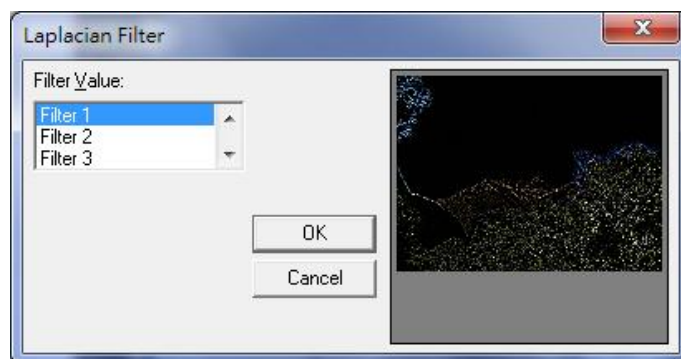


Fig. 1.4.39

When select
Filter 2, see
Fig.1.4.40.

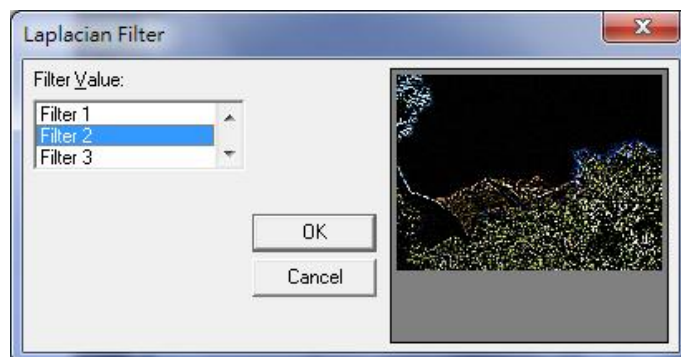


Fig. 1.4.40

When select
Diagonal, see
Fig.1.4.41.

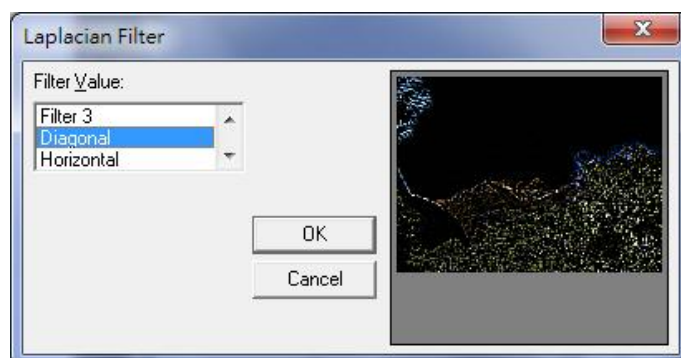


Fig. 1.4.41

MM3D 3.2

1.4.2.3 Sobel

Click “Image – Special Filters - Sobel”

Adjust the image by selecting the Filter Value to get Sobel effect, refer to the following examples.

Fig.1.4.42 is the original image:



Fig. 1.4.42

When the
value is
Horizontal,
see
Fig.1.4.43.

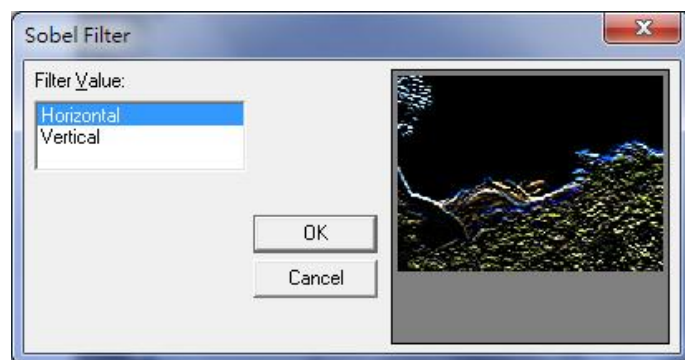


Fig. 1.4.43

When the
value is
Vertical, see
Fig.1.4.44.

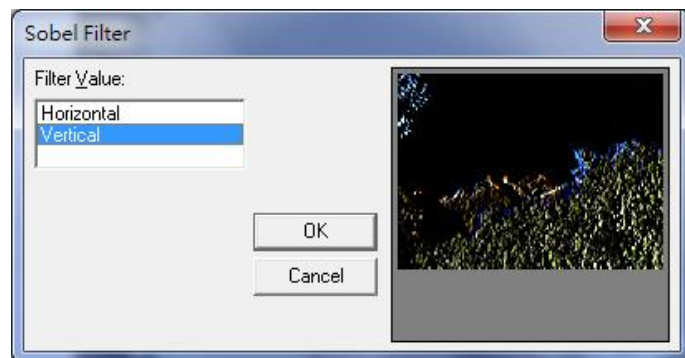


Fig. 1.4.44

MM3D 3.2

1.4.2.4 Prewitt

Click “Image – Special Filters - Prewitt”

Adjust the image by selecting the Filter Value to get Prewitt effect, refer to the following examples.

Fig.1.4.45 is the original image:



Fig. 1.4.45

When the value is Horizontal, see Fig.1.4.46.

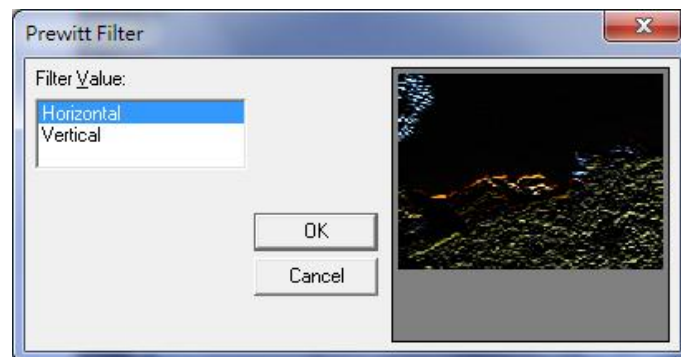


Fig. 1.4.46

When the value is Vertical, see Fig.1.4.47.

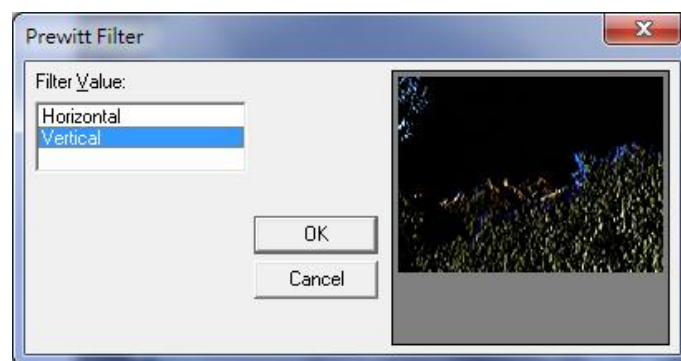


Fig. 1.4.47

MM3D 3.2

1.4.2.5 Shift Difference

Click “Image – Special Filters – Shift Difference”

Adjust the image effect by selecting the Filter Value, refer to the following examples.
Fig.1.4.48 is the original image:

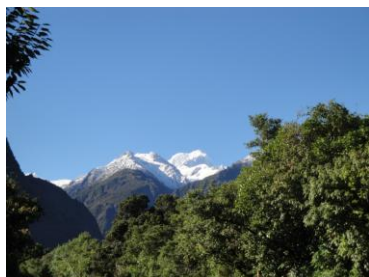


Fig. 1.4.48

When the
value is
Diagonal, see
Fig.1.4.49.

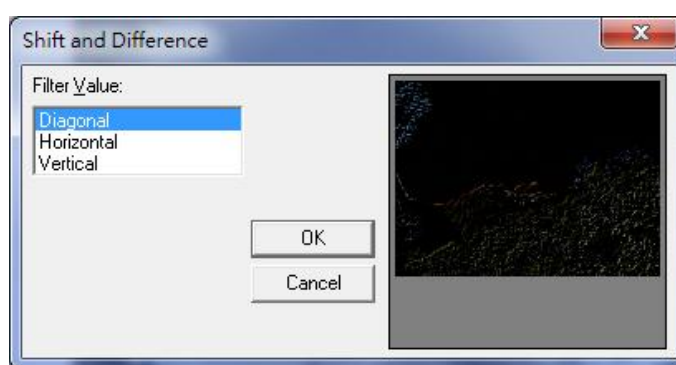


Fig. 1.4.49

When the
value is
Horizontal,
see
Fig.1.4.50.

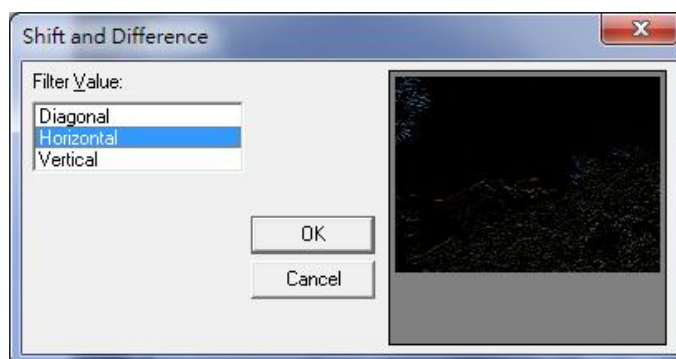


Fig. 1.4.50

When the
value is
Vertical, see
Fig.1.4.51.

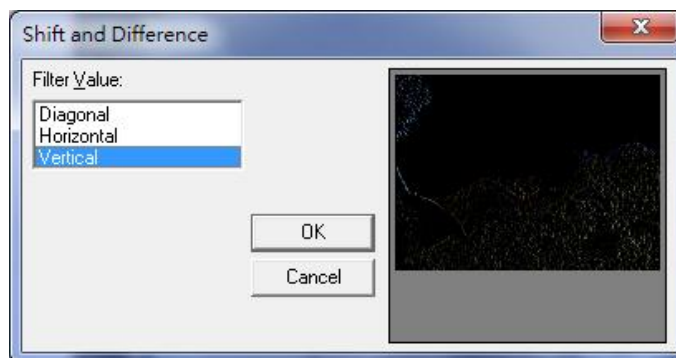


Fig. 1.4.51

MM3D 3.2

1.4.2.6 Line Segment

Click “Image – Special Filters – Line Segment”

Adjust the image effect by selecting the Filter Value, refer to the following examples.
Fig.1.4.52 is the original image:



Fig. 1.4.52

When the
value is
Horizontal,
see
Fig.1.4.53.

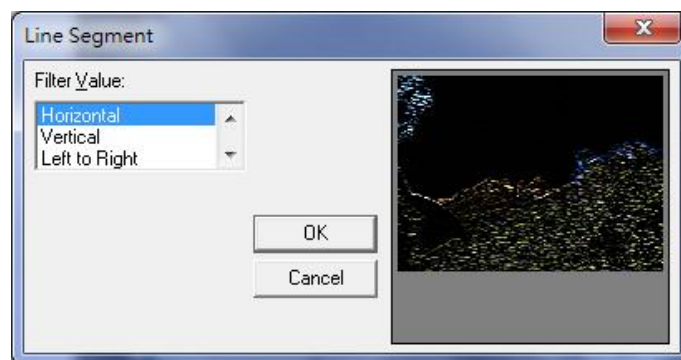


Fig. 1.4.53

When the
value is
Vertical, see
Fig.1.4.54.

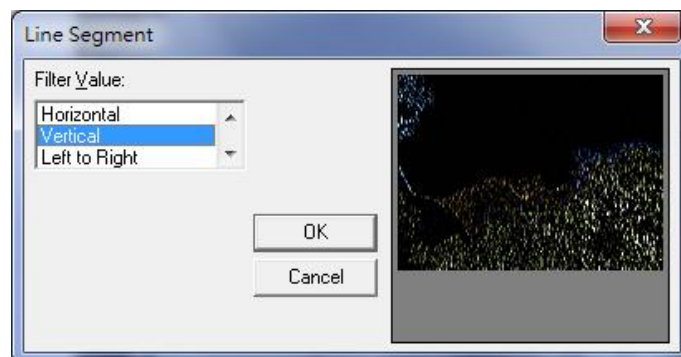


Fig. 1.4.54

When the
value is Left
to Right, see
Fig.1.4.55.

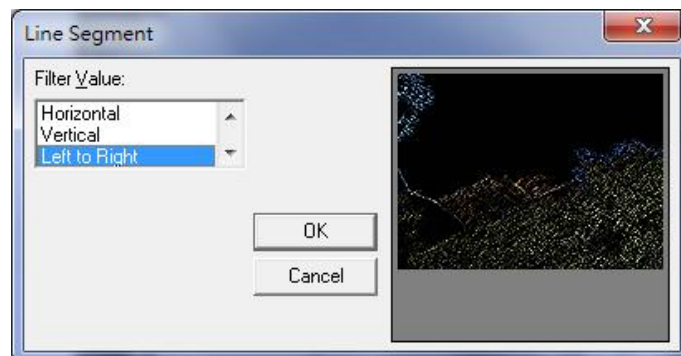


Fig. 1.4.55

MM3D 3.2

1.5 Color Menu

“**Color**” menu offers the following functions:

- **Gray Scale**
- **Color Resolution**
- **Brightness**
- **Contrast**
- **Hue**
- **Saturation**
- **Gamma**
- **Intensity**
- **Histogram**
- **Invert**
- **Solarize**

MM3D 3.2

1.5.1 Gray Scale

Click “Color – Gray Scale”

Transform a colored image into an 8-bit grayscale image, refer to Fig.1.5.01 and 1.5.02.



Fig. 1.5.01 Original



Fig. 1.5.02 Gray Scale

1.5.2 Color Resolution

Click “Color – Color Resolution”

Change the image resolution by adjusting the Bits Per Pixel and the Color Order or Dither Method and Palette (Dither Method and Palette must be under 8-bit mode), refer to the following examples.
Fig.1.5.03 is the original image:



Fig. 1.5.03

Fig.1.5.04
Bits Per Pixel: 16-bit
Color Order:
Blue-Green-Red

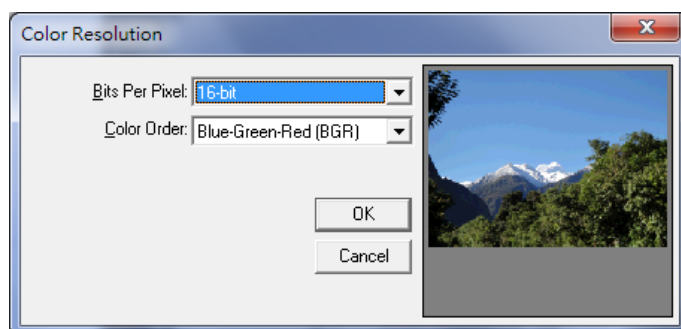


Fig. 1.5.04

MM3D 3.2

Fig.1.5.05
Bits Per Pixel: 16-bit
Color Order:
Red-Green-Blue

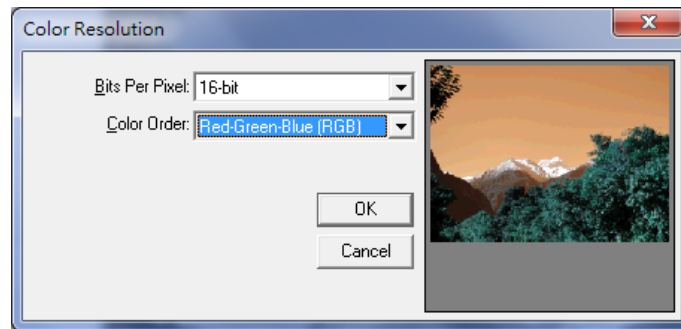


Fig. 1.5.05

Fig.1.5.06
Bits Per Pixel: 8-bit
Dither Method: None
Palette: Fixed Palette

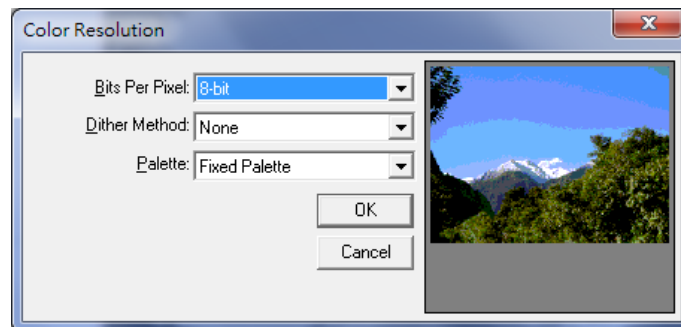


Fig. 1.5.06

Fig.1.5.07
Bits Per Pixel: 8-bit
Dither Method: Ordered
Palette: Netscape Fixed Palette

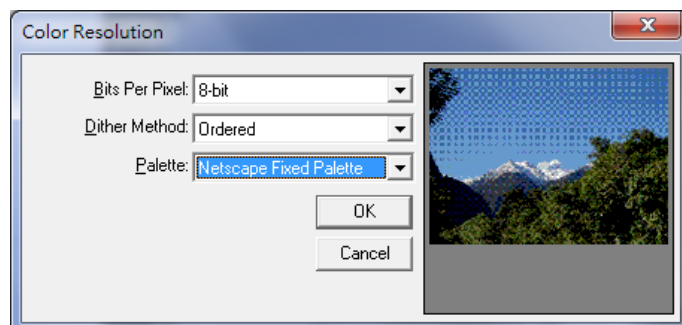


Fig. 1.5.07

MM3D 3.2

1.5.3 Brightness

Click “Color - Brightness”

Change the brightness of image by adjusting the Percentage, refer to the following examples.

Fig.1.5.08 is the original image:



Fig. 1.5.08

When
Percentage is 0,
see Fig.1.5.09.

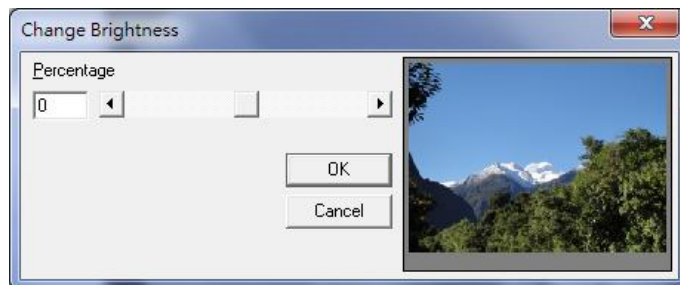


Fig. 1.5.09

When
Percentage is
-30, see
Fig.1.5.10.

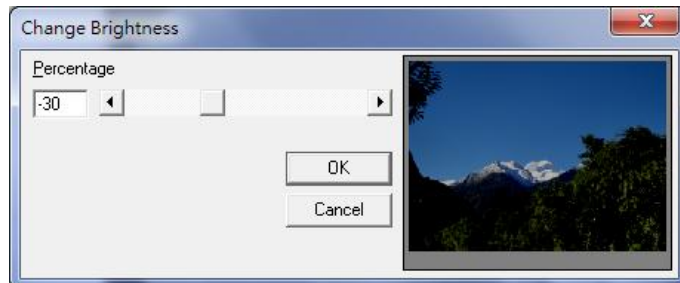


Fig. 1.5.10

When
Percentage is
30, see
Fig.1.5.11.

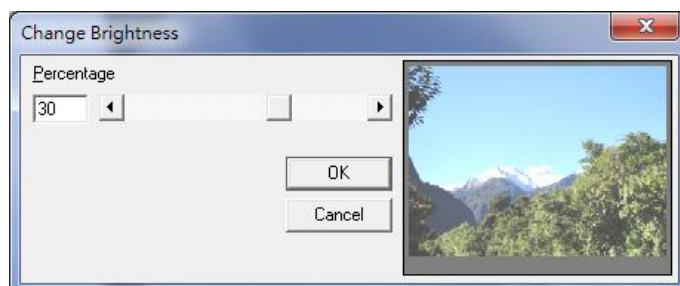


Fig. 1.5.11

MM3D 3.2

1.5.4 Contrast

Click “Color - Contrast”

Change the contrast of image by adjusting the Percentage, refer to the following examples.

Fig.1.5.12 is the original image:



Fig. 1.5.12

When
Percentage is 0,
see Fig.1.5.13.

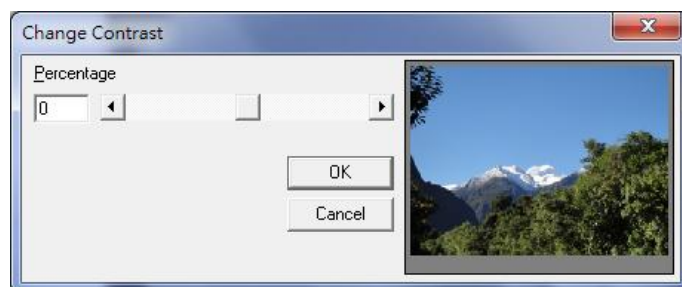


Fig. 1.5.13

When
Percentage is
-100, see
Fig.1.5.14.

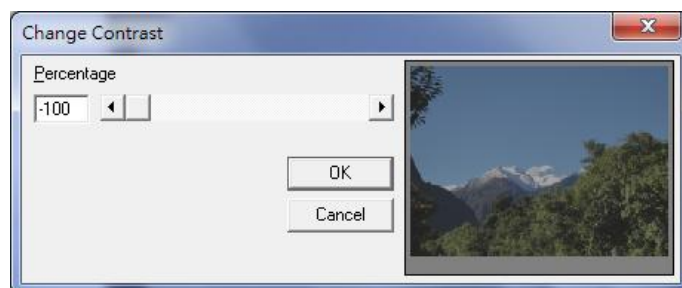


Fig. 1.5.14

When
Percentage is
100, see
Fig.1.5.15.

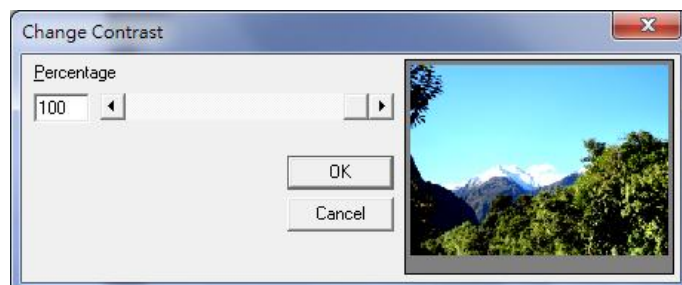


Fig. 1.5.15

MM3D 3.2

1.5.5 Hue

Click “Color - Hue”

Adjusting the degrees to change the hue of image, refer to the following examples.
Fig.1.5.16 is the original image:



Fig. 1.5.16

When Angle (degrees) is 0, see Fig.1.5.17.

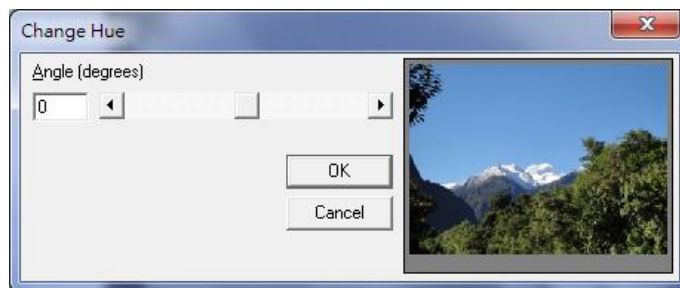


Fig. 1.5.17

When Angle (degrees) is -280, see Fig.1.5.18.

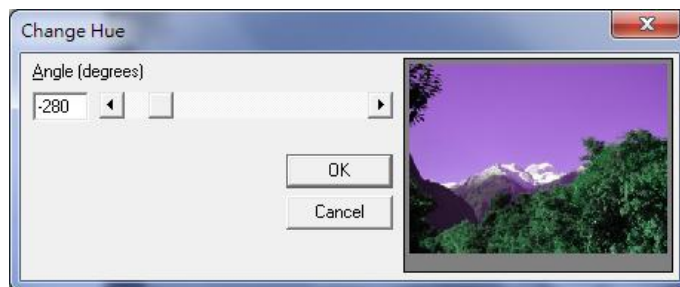


Fig. 1.5.18

When Angle (degrees) is 280, see Fig.1.5.19.

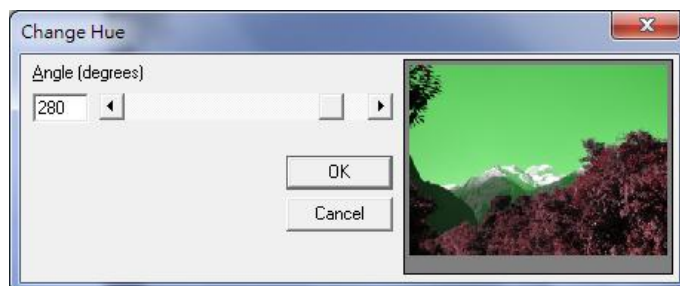


Fig. 1.5.19

MM3D 3.2

1.5.6 Saturation

Click “Color - Saturation”

Change the contrast of image by adjusting the Percentage, refer to the following examples.

Fig.1.5.20 is the original image:



Fig. 1.5.20

When
Percentage is 0,
see Fig.1.5.21.

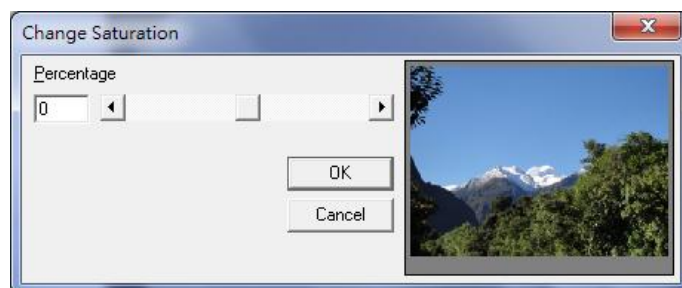


Fig. 1.5.21

When Percentage
is -100, see
Fig.1.5.22.

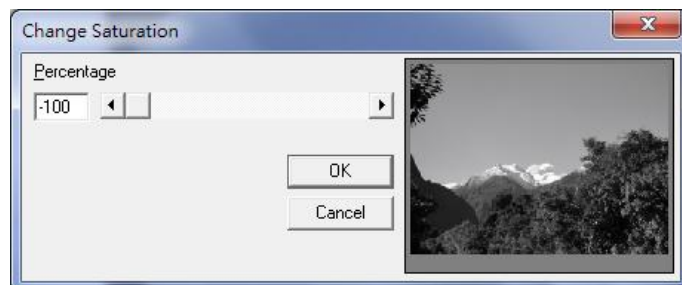


Fig. 1.5.22

When
Percentage is
100, see
Fig.1.5.23.

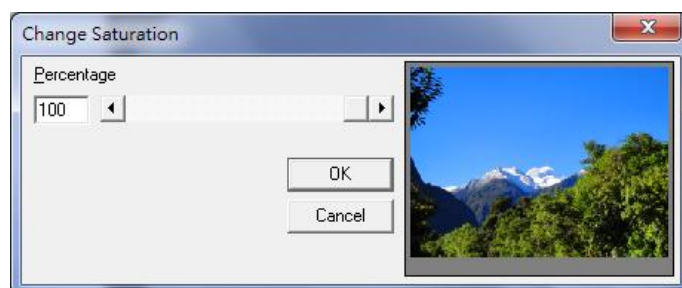


Fig. 1.5.23

MM3D 3.2

1.5.7 Gamma

Click “Color – Gamma”

Change the image color by adjusting the Gamma value, refer to the following examples.

Fig.1.5.24 is the original image:



Fig. 1.5.24

When Gamma Value is 1.00, see Fig.1.5.25.

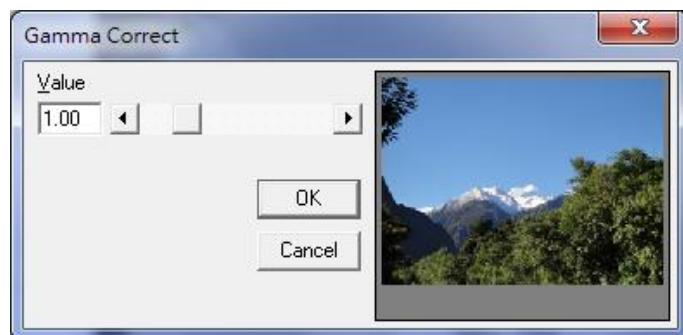


Fig. 1.5.25

When Gamma Value is 0.30, see Fig.1.5.26.

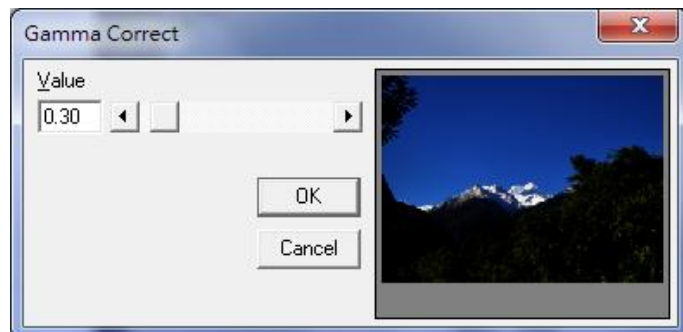


Fig. 1.5.26

When Gamma Value is 4.99, see Fig.1.5.27.

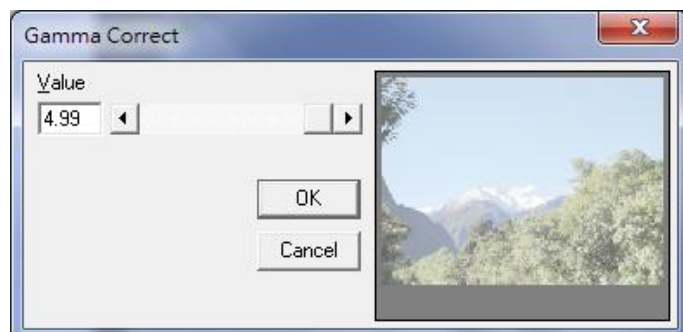


Fig. 1.5.27

MM3D 3.2

1.5.8 Intensity

Click “Color - Intensity”

1.5.8.1 Detect

Adjust image intensity according to the Low and High value, refer to the following examples.

Fig.1.5.28 is the original image:



Fig. 1.5.28

When Low Value is
43, High Value is
186, see Fig.1.5.29.

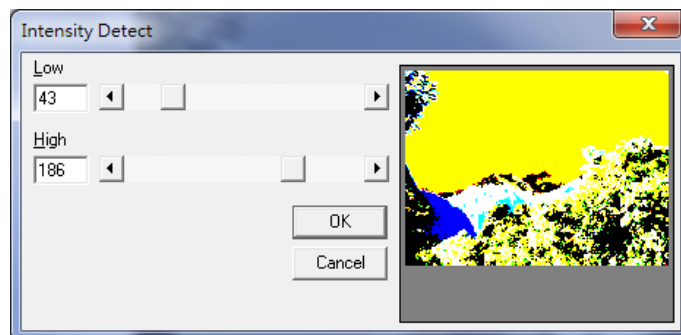


Fig. 1.5.29

When Low Value is
130, High Value is
150, see Fig.1.5.30.

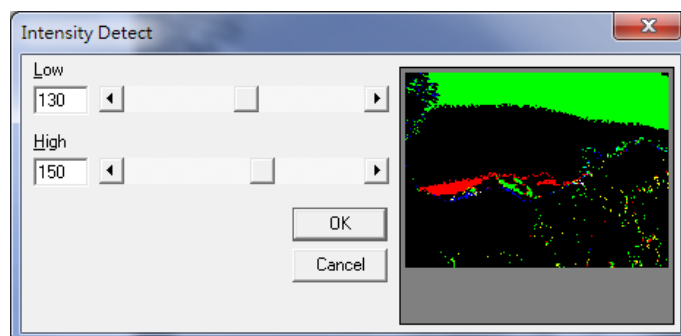


Fig. 1.5.30

1.5.8.2 Stretch

Change the image intensity according to the previous settings.

MM3D 3.2

1.5.9 Histogram

Click “Color - Histogram”

1.5.9.1 Equalize

Equalize the image automatically, refer to Fig.1.5.31 and 1.5.32.



Fig. 1.5.31 Original



Fig. 1.5.32 After

MM3D 3.2

1.5.9.2 Contrast

Change the image contrast by adjusting the percentage.

Fig.1.5.33 is the original image:



Fig. 1.5.33

When Percentage
is 0, see Fig.1.5.34.

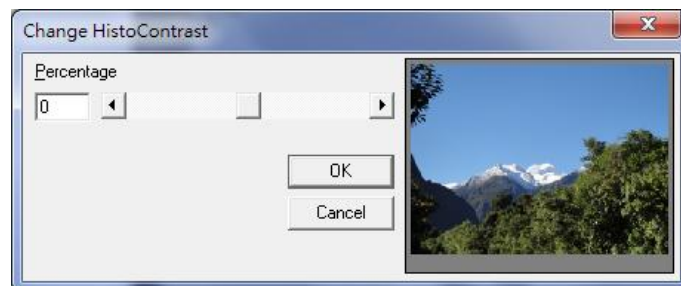


Fig. 1.5.34

When Percentage
is -100, see
Fig.1.5.35.

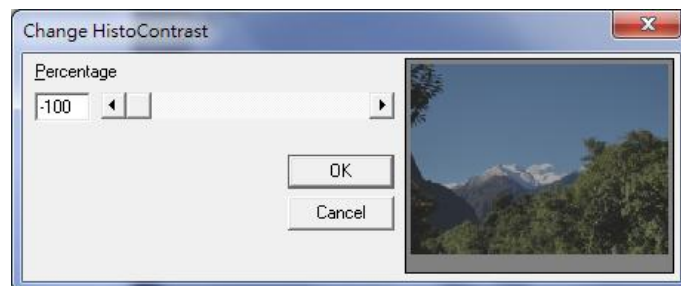


Fig. 1.5.35

When Percentage
is 100, see
Fig.1.5.36.

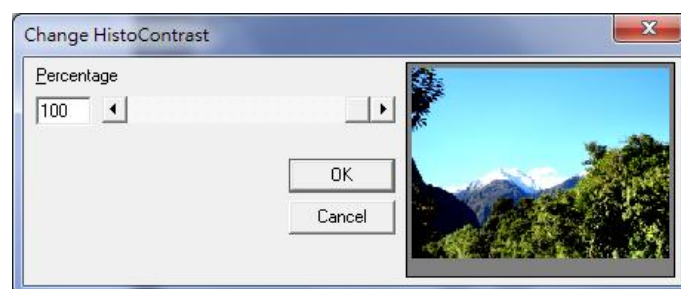


Fig. 1.5.36

MM3D 3.2

1.5.10 Invert

Click “Color - Invert”

Invert the color of the image, refer to Fig.1.5.37 and 1.5.38.



Fig. 1.5.37

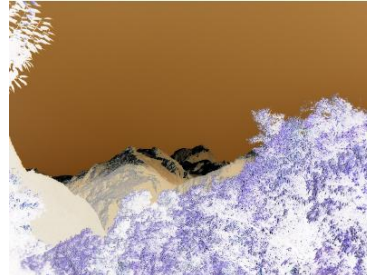


Fig. 1.5.38

MM3D 3.2

1.5.11 Solarize

Click “Color - Solarize”

Create an exposure effect for the image by adjusting threshold value.

Fig.1.5.39 is the original image:



Fig. 1.5.39

When Threshold is 30, see Fig.1.5.40.

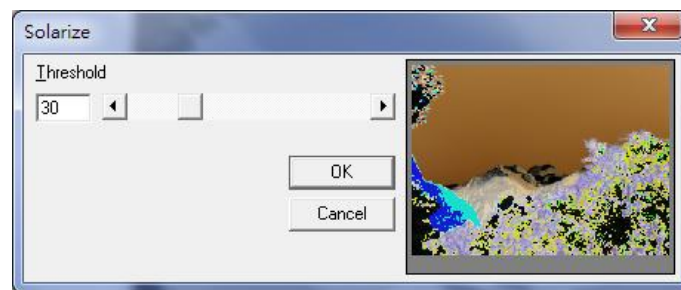


Fig. 1.5.40

When Threshold is 80, see Fig.1.5.41.

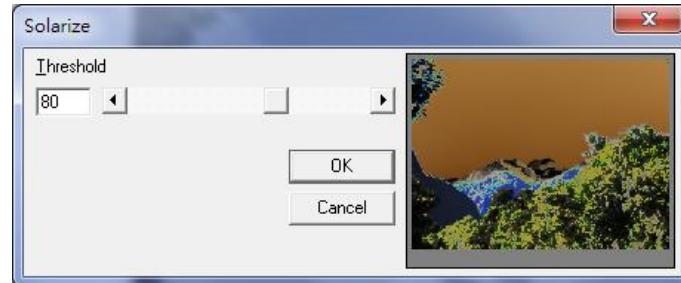


Fig. 1.5.41

When Threshold is 128, see Fig.1.5.42.

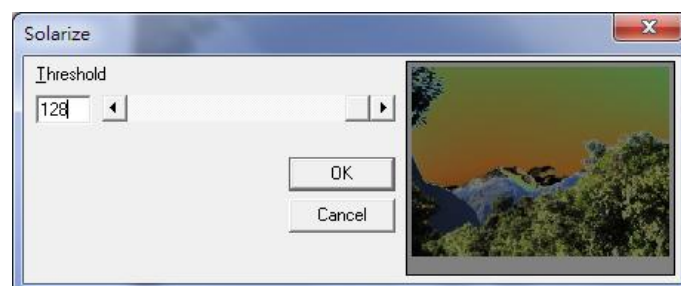


Fig. 1.5.42

MM3D 3.2

1.6 Execute Menu

“Execute” menu offers the following function:

Marking	Set the marking related parameters and execute marking.
Estimated Time of Process	Estimate elapsed time during marking.
Align Test	Allow users to examine the mark position is correct or not.
Preview	Using align light to preview the marking path.
Mark Sample(s)	Mark the selected objects once as a sample for user to adjust the parameters.
User Level	User Level is divided into Operator, Programmer, and Administrator to separate user’s authorities.
Mark Parameter List	Allow users to name, save, and load the marking parameters.
Auto Text Manager	Activate the auto text manager for users to edit auto text object.
Rotary Marking	Provide common used rotary marking functions.
Laser Setting	Some types of laser provided specified parameters setting to pursue better marking quality.

MM3D 3.2

1.6.1 Marking

Mark the selected objects and adjust the marking related settings, see Fig.1.6.01.

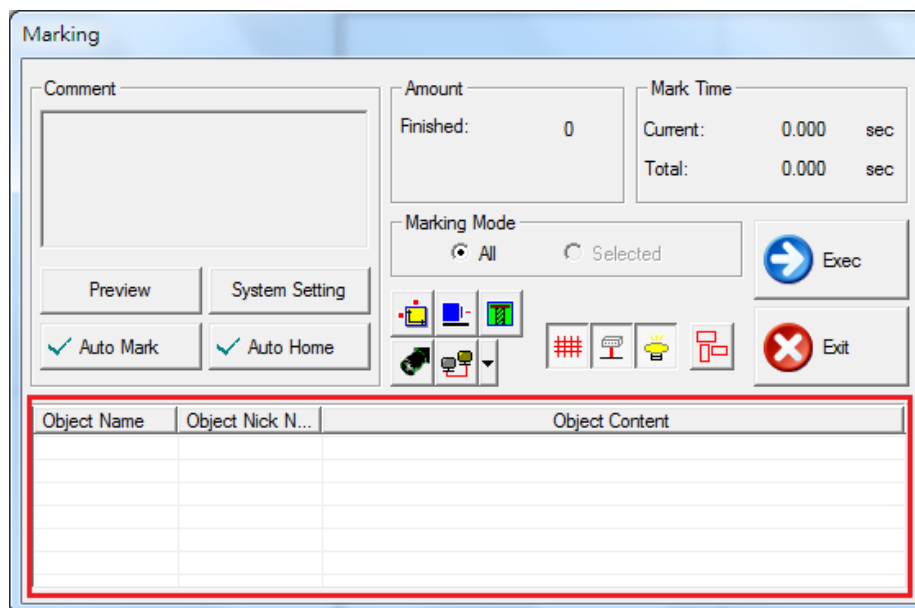


Fig. 1.6.01

Comment: Display the notation of the marking file. It shows the function and the notes of that file.

Preview: Preview marking. ([Refer to 1.6.4](#))

System Setting: Set the marking related parameters, see Fig.1.6.02. Some parameters are the same as parameters of System Property Table ([Refer to 3.1.3](#)), in this case, the followings only introduce the different parameters (red flames of Fig.1.6.02).

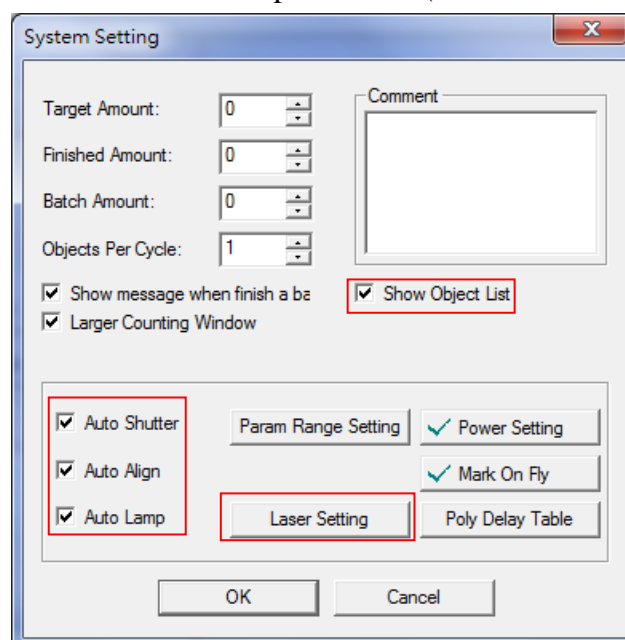


Fig. 1.6.02

Show Object List: Enable this function, all object's names and contents will be displayed in the red frame of "Marking" dialogue like Fig.1.6.01 shows.

Auto Shutter/Auto Align/Auto Lamp: Enable to allow system to do the auto setting of these three functions. (Default is checked.)

MM3D 3.2

Param Range Setting

Set Max mark speed, power range and frequency range.

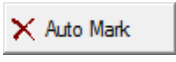
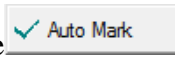
Set Mark Info

Customizable mark info title: Object Name, Object Nickname, Auto-Text, Type, Start Value, and Mark Content.

Laser Setting:

Set the parameters of some specific laser controllers, such as SPI laser. This button will display only when choosing the laser which support this function. As to how to set the parameters, please refer to the laser's manual.

Auto Mark: Click this button and a dialog box will appear like Fig. 1.6.03. Check the “Enable” box to allow users to mark continuously. If enable this function, then the

figure  will become .

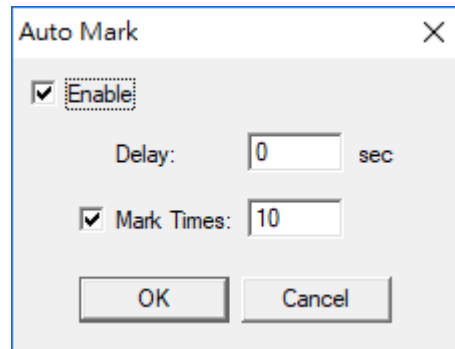


Fig. 1.6.03

Delay: The waiting time between each marking.

Mark Times: Repeat marking counts. Reach counts will stop marking.

Auto Home: Click this button and a dialog box will appear like Fig. 1.6.04. Check the “Enable” box to allow users to select the axis which is using and set “C” value. C means that the selected axis will do home automatically after marking specific times. Take C=3 for example, the system will do home at the beginning of marking and then after 3 times of marking, the system will do home again. If enable this function, then

the figure  will become .

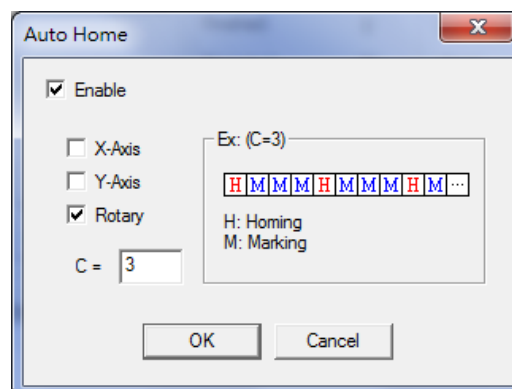


Fig. 1.6.04

MM3D 3.2

Amount

Finished: Display the completed marking amount.

Expected: Display the expected marking amount. (This will be display only when setting the Target Amount value in “System Setting,” see Fig.1.6.02)

Total: Display the completed marking amount since MM3D installed.

Mark Time

Current: The spending time of current marking.

Total – The total spend time of marking.

Marking Mode

All: Mark all the objects (default).

Selected: Only mark the selected objects.



XY-Table Control Panel (please refer to section 1.7.14.1)



Rotary Control Panel (please refer to section 1.7.14.2)



Z Axis Control Panel (please refer to section 1.7.14.3)



CCD Panel (please refer to CCD Panel user manual.)



Enable Automation Process: Click this button, the “Exec” button cannot be clicked and the marking can only be controlled by external signal. Click the arrow button will and a dialogue box of Automation option will be displayed (refer to section 1.1.6.12).



Shutter ON/OFF: Control the on/off of the shutter (default is on).



Align ON/OFF: Control the on/off of the align (default is on).



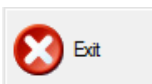
Lamp ON/OFF: Control the on/off of the lamp (default is on).



Preview: Preview the marking route.



Start marking. Press “Esc” to stop or “Space” to pause.



Stop marking or exit marking dialog box.

MM3D 3.2

1.6.2 Estimate process time

Estimate the time elapsed during processing.

1.6.3 Align Test

Set the parameters for align light, see Fig.1.6.08.

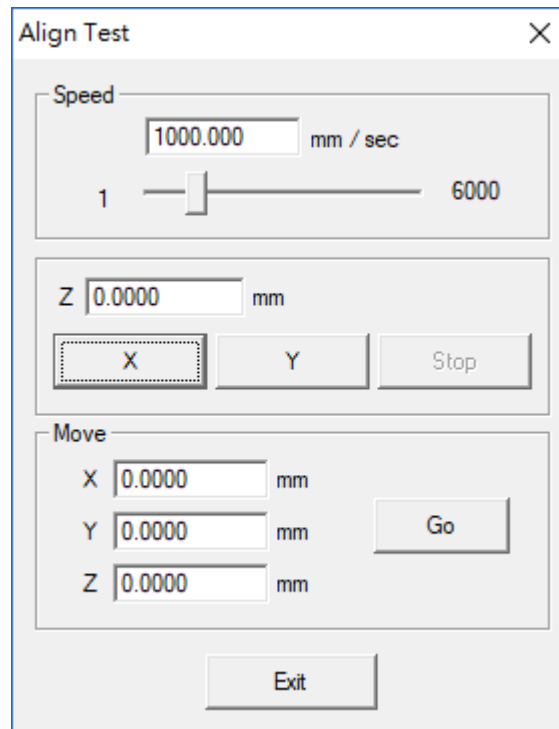


Fig. 1.6.05

Speed

Adjust the speed of the align light. Modify it by key in the value or move the scrollbar directly. The maximum speed is 6000 mm/sec.

Z: Input Z position. Co-work with X and Y button.

X: Click "X" button, the align light will shift toward the X direction.

Y: Click "Y" button, the align light will shift toward the Y direction.

Stop: Click "Stop" button and the align light will stop.

Move

X: Set the shift distance of X direction (unit: mm).

Y: Set the shift distance of Y direction (unit: mm).


Z: Set the shift distance of Z direction (unit: mm).

Go: Click the button and the align light will adjust the X/Y position according to the X/Y value.

MM3D 3.2

1.6.4 Preview

This function is used to position the marking object. The interface shows as Fig.1.6.06. It uses align light instead of laser to display marking route on work piece. Users can adjust the position of work piece to fit the marking area through this function. To exit

preview, click  on the upper right of the interface.

Speed: Moving speed of align light.

Position: Click the four arrows around the control lever in Fig.1.6.05 to move the align light, and the moving distance depends on X or Y value which is set at “Unit.”

Preview Mode

Bounding: The preview only shows the marking frame.

Full Path: The preview shows the whole marking path.

Selected Only: Preview the selected object only.

Mark On Fly: Preview the marking position under “Mark On Fly” mode.

Preview: Start preview.

Mark Sample: Execute marking directly.

Mark Time: Spent time of mark sample.

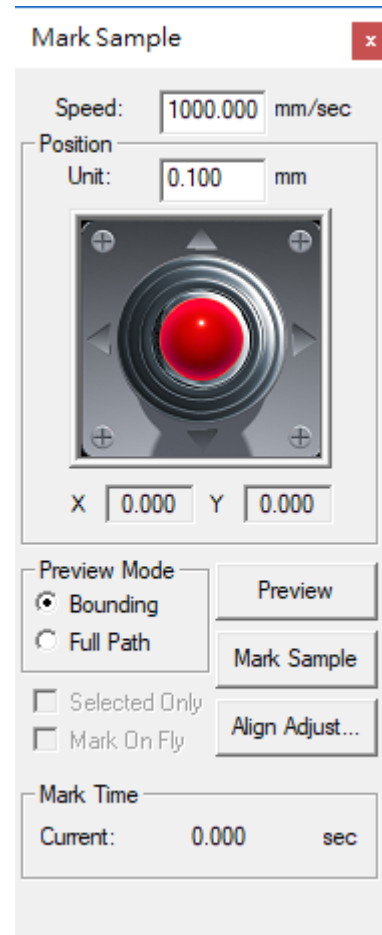


Fig. 1.6.06

Align Adjust

If the position of laser does not match with align light, users can use this function to adjust the offset, scale, and rotate angle of the align light, see Fig.1.6.07.

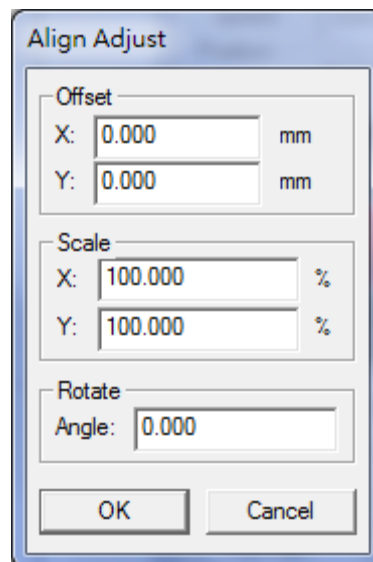


Fig. 1.6.07

Offset: Adjust the align light's offset of X or Y direction.

Scale: Adjust the align light's scale of X or Y.

Rotate: Adjust the angle of align light.

MM3D 3.2

1.6.5 Mark Sample(s)

Select this function and enter the preview mode to do “Mark Sample.”

1.6.6 User Level

Users are allowed to execute different functions according to their authorities, see Fig.1.6.08.

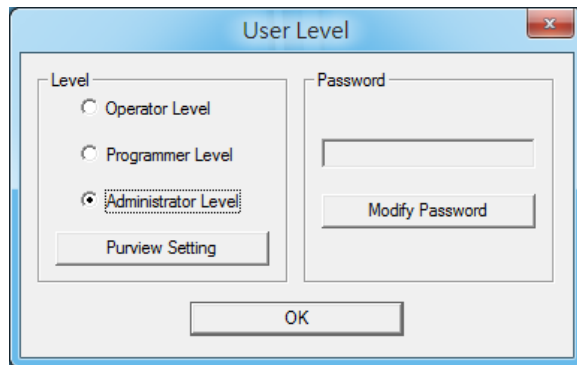


Fig. 1.6.08

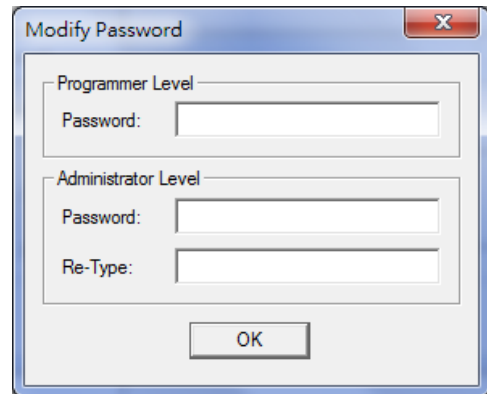


Fig. 1.6.09

Operator: Operator level users can only read and output files.

Programmer: Programmer level users are allowed to draw and edit objects and use some limited functions without system parameter settings.

Administrator: Administrator level users are able to use all the functions and modify their passwords to manage the system, see Fig.1.6.09.

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1.6.7 Mark Parameter List

This list shows all the marking parameters users set themselves. Users can name, sort, and save these parameters for future use, see Fig.1.6.10.

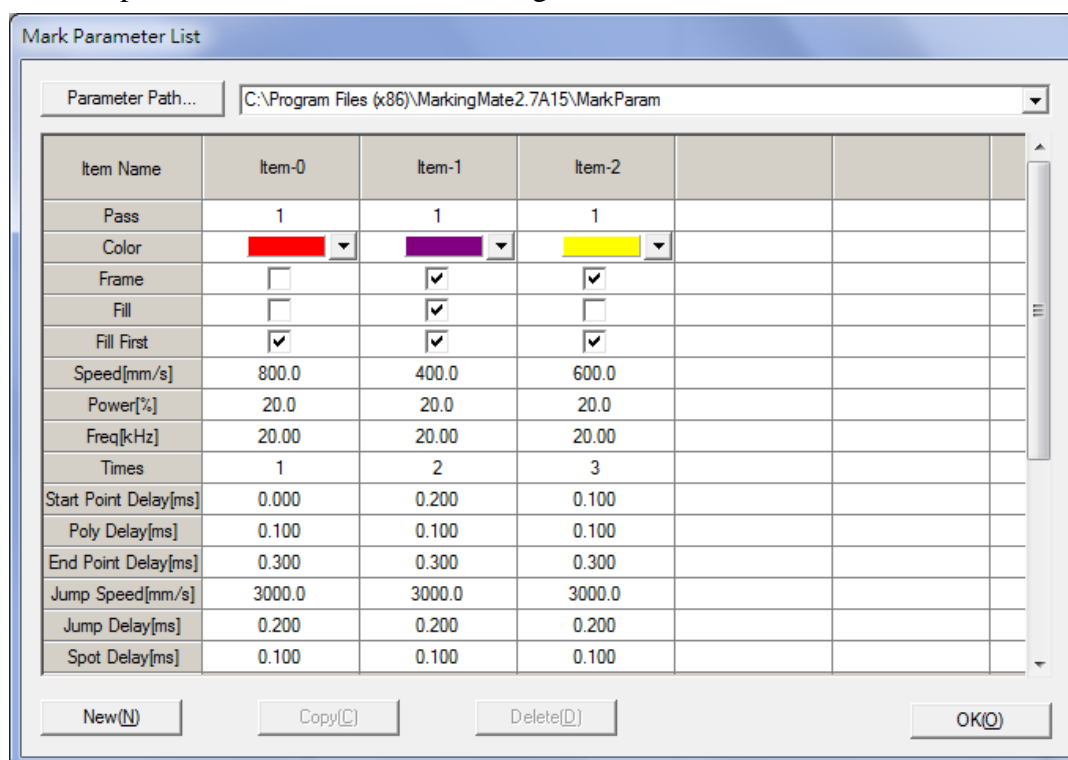


Fig. 1.6.10

Parameter Path	The saving folder of the parameter list.
Item Name	The name of the item.
Pass	The marking passes of Mark Parameter Table.
Color	Set the frame and fill color.
Frame	Decide to mark frame or not.
Fill	Decide to fill or not when marking.
Fill First	Decide to fill first or not when marking.
Speed [mm/s]	Marking speed.
Power [%]	Marking power (maximum 100).
Freq [KHz]	Marking frequency.
Times	Repeat marking times.
Start Point Delay [ms]	The time difference between start laser order and laser hit time.
Poly Delay[ms]	This value will affect the quality of joins.
End Point Delay [ms]	This value will affect the quality of end point.
Mark Delay[ms]	This value will affect the quality of end point. Mark Delay must equal or larger than End Point Delay.
Jump Speed [mm/s]	The speed of laser.
Jump Delay [ms]	When laser move to the assigned position, it will shoot after this delay time.
Spot Delay [ms]	The spending time for laser to mark one spot or pixel.
Laser Shot	The amount of laser shots for marking a dot (only when choose

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	“Laser Shot Mode” in “Burst Mode Setting”).
FPK Width	Set the width of FPK.
Pulse Width [μs]	Set the width of pulse (only for YAG).
Waveform No.	There are 64 waveforms for users to choose(only for SPI).
CW Mode	Mark using continuous wave mode (only for SPI).
Wobble	Mark by spiral type and make the line segment become thicker.
Wobble Thick (W)	The diameter of the circle for wobble.
Wobble Overlap	Frequency of wobble. When the speed becomes quicker and the frequency become higher, the line segment will be denser.
Wob Mode	Enable Wobble function
Wob Rect Width	The width of the rectangle for wobble.
Wob Rect Length	The length of the rectangle for wobble.
Step Distance	The distance between each dot (under Dot Mode).
Step Delay	The staying time for laser on each dot (under Dot Mode).
Fill Pitch	The distance between fill lines.
Internal freq	The frequency of laser when marking fill lines.
Fill times	Times of fill lines.
Fill Angle Start	Initial fill line angle.
Fill Angle Step	Next time fill line angle difference to last times.
New	Create a new item.
Copy	Copy the selected item as a new item.
Delete	Delete the selected item.
OK	Save the data.

Application: How to use the created mark parameters?

- i. Select an object.
- ii. Go to the Mark Parameter of the Property Table and then click “Load...” button to enter the Mark Parameter List.
- iii. Select the mark parameter user need and click “Apply” button, and the object will be marked as the mark parameter setting.

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1.6.8 Auto Text Manager

This is used to activate the Auto Text Manager for auto text setting, see Fig.1.6.11. For more details, please refer to **Practical Functions Chapter 11 – Auto Text.**

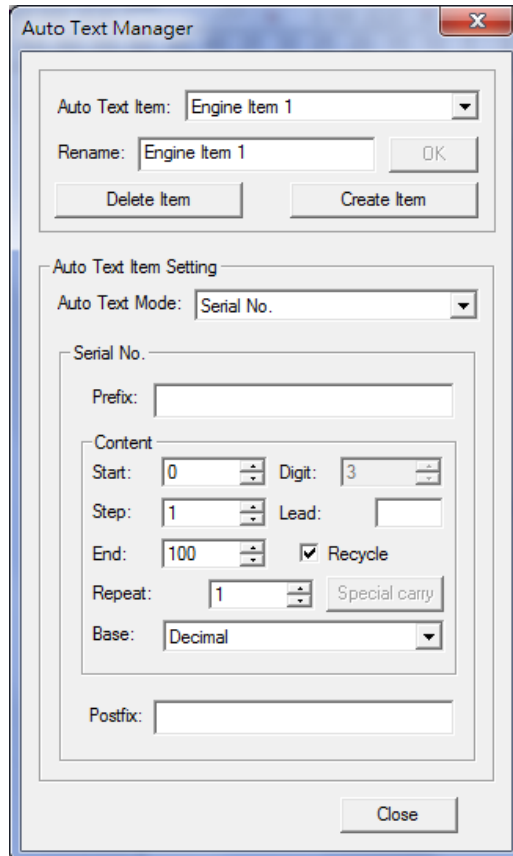


Fig. 1.6.11

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1.6.9 Rotary Marking

The system provides three common used rotary marking functions for users to select, see Fig.1.6.12. Moreover, it also allows users to set the motor. If users click “Setting>>,” then the “Rotary Control Panel” will display as Fig.1.6.13. Please refer to **Practical Functions — Rotary Library** for more details.

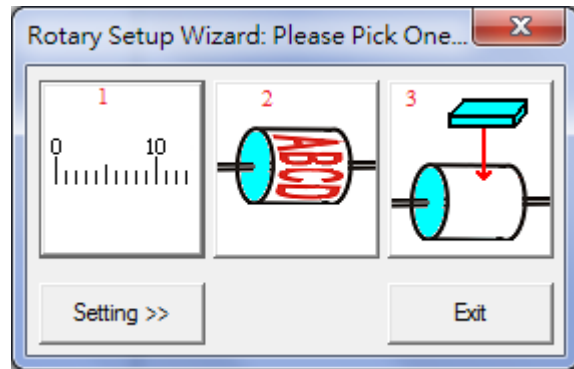


Fig. 1.6.12

1. Calibration Marking
2. Ring Text Marking
3. Cylinder Marking
4. Rotary Control Panel

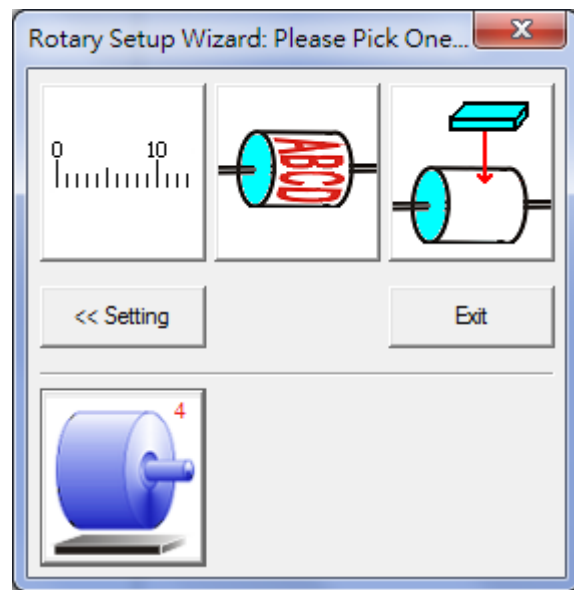


Fig. 1.6.13

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1.7 View Menu

“View” menu offers the following functions:

Standard Bar	Enable/disable Standard Bar
Zoom Bar	Enable/disable Zoom Bar
Draw Bar	Enable/disable Draw Bar
Layer Bar	Enable/disable Layer Bar
Object Browser	Enable/disable Object Browser
Modify Bar	Enable/disable Modify Bar
Dimension Bar	Enable/disable Dimension Bar
Obj Property Bar	Enable/disable Object Property Bar
Mark Sample Bar	Enable/disable Mark Sample Bar
Manual Split Bar	Enable/disable Manual Split Bar
Data Wizard	Enable/disable Data Wizard
Make Font Bar	Enable/disable Make Font Bar
Text Property Bar	Enable/disable Text Property Bar
Vector Box	Enable/disable Vector Box
Control Tool	Enable/disable Control Tool
Mark Panel	Enable/disable Mark Panel
Status Bar	Enable/disable Status Bar
Desktop Mode	Enter Desktop Mode or not
Composing	Composing Settings
Show Order	Show the mark order
Tooltips	Enable/disable Tooltips
Tooltips Setting	Go to the Tooltips setting page of Options
Ruler	Enable/disable Ruler
Ruler Setting	Go to the ruler setting page of Options
Grid	Enable/disable Grid
Grid Lock	Enable/disable Grid Locking
Grid Parameter	Grid Parameter setting
Zoom In	Enlarge a specific area
Zoom Out	Shrink a specific area

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Zoom Previous	Go back to the previous view
Zoom All	Show the whole Working Area

Tool Bars allow users to execute some specific functions more quickly. Users can activate the tool bar they need at View Menu and the image of that tool bar, for example, Standard Bar, will become  Standard Bar(T). Users can also place the tool bar to any position by dragging it.

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1.7.1 Standard Bar

The Standard Bar provides some basic functions for users to edit the file, see Fig.1.7.01.

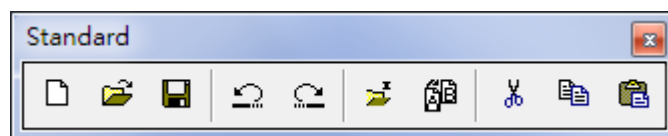












Fig. 1.7.01

New		Create a new document.
Open		Load files.
Save		Save the current document using the existing file name.
Undo		Back to the previous action.
Redo		Cancel the Undo action.
Import		Import a graphic file and convert it into the marking format.
Replace		Replace the selected object by a new one.
Cut		Remove selected data and store it in the clipboard for another use.
Copy		Duplicate selected data and store it in the clipboard for another use.
Paste		Attach data from the clipboard to an assigned document.

1.7.2 Zoom Bar

View the objects by zooming them, see Fig.1.7.02.

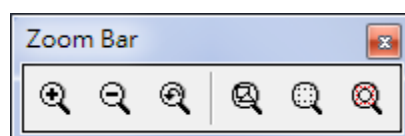








Fig. 1.7.02

Zoom in		Enlarge a specific area.
Zoom out		Shrink a specific area.
Zoom previous		Go back to the previous view.
Zoom all		Show the whole Work Area.
Zoom extend		Show all objects.
Zoom Selected Objects		Zoom the selected objects to fit the whole editing area.

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1.7.3 Drawing Bar

The Drawing Bar provides the drawing functions, see Fig.1.7.03.

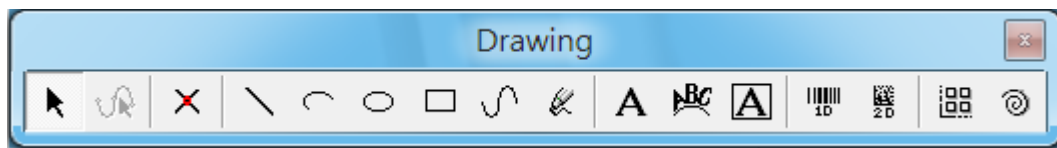


Fig. 1.7.03

Selection		Select objects.
Edit Vertex		Edit the vertexes of curve objects.
Vertex		Draw a dot.
Line		Draw a line.
Arc		Draw an arc.
Circle		Draw a circle or oval.
Rectangle		Draw a square or rectangle.
Curve		Draw a curve.
Curve Brush		Draw a freehand line using the mouse.
Text		Insert a text object.
Arc Text		Insert an arc text object.
Rect Text		Insert a rect text object.
1D Barcode		Create a 1D barcode.
2D Barcode		Create a 2D barcode.
Spiral		Draw a spiral object
Deep Carving		Create a deep carving object. (Need license supports)

MM3D 3.2

1.7.4 Layer Bar

The Layer Bar allows users to edit the layers, see Fig.1.7.04.

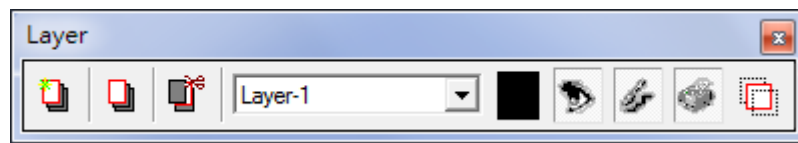










Fig. 1.7.04

Layer Manager		The layer page of Property Table will show up for editing.
New Layer		Create a new layer.
Delete the Active Layer		Delete the selected layer.
Current Layer		Select the layer.
Layer Color		Set the layer color.
View Layer		Enable or disable to view the selected layer.
Edit Layer		Enable or disable to edit the selected layer.
Output Layer		Enable or disable to output the selected layer.
Show the Selected Layer		Show the selected layer only.

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1.7.5 Object Browser

The Object Browser allows users to edit the parameters of layer, see Fig.1.7.05. Object Browser can not only view the whole layers and objects but can also change the order or rename the layer and object.

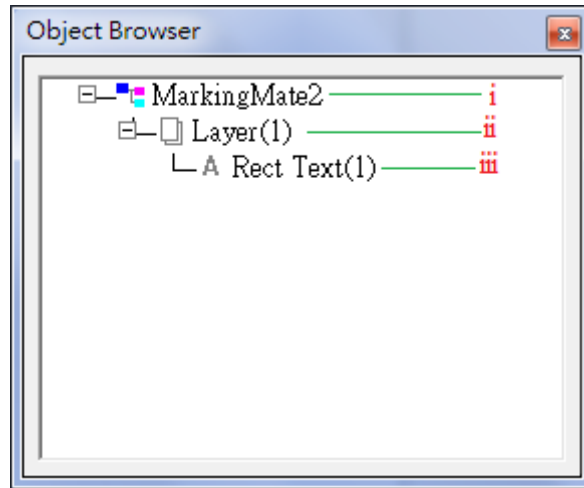


Fig. 1.7.05

- i. **Select the file:** When click the file, like **MM3D1**, all the layers and objects will also be selected and users can edit the parameters of System-Related Property Table.
- ii. **Select the layer:** When click the layer, all the objects under this layer will also be selected and users can edit the layer's parameters at Layer Page of Property Table.
- iii. **Select the object:** Users can edit the object's parameters when clicking the object's name.

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1.7.6 Modify Bar

The Modify Bar is for users to modify the object's parameters such as length and width, see Fig.1.7.06. Please notice that “Enter” must be pressed after input the value so that the modification will be effective.

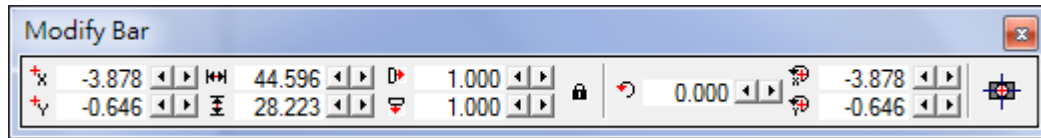













Fig. 1.7.06

X of Center		The X-axis value of the object's center.
Y of Center		The Y-axis value of the object's center.
Length		The length of the selected object.
Width		The width of the selected object.
X of Scale		The scale of the selected object's length.
Y of Scale		The scale of the selected object's width.
Lock to Same Ratio		Enable this function, the length and width will be adjusted with the same ratio at the same time.
Angle of Rotating		The rotary angle of the selected object.
X of Rotating Center		Set the X-axis value of rotating center.
Y of Rotating Center		Set the Y-axis value of rotating center.
Move to the Center		Move the object to the center of working area.

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1.7.7 Dimension Bar

The Dimension Bar allows users to set the object's datum point, shift the object or change the object's dimension and shape, see Fig.1.7.07.

Move 

Set the absolute or relative position.

Rotate 

Set the rotary angle and rotary center position.

Aslope 

Set the aslope angle

Scale 

Set the scale of the object

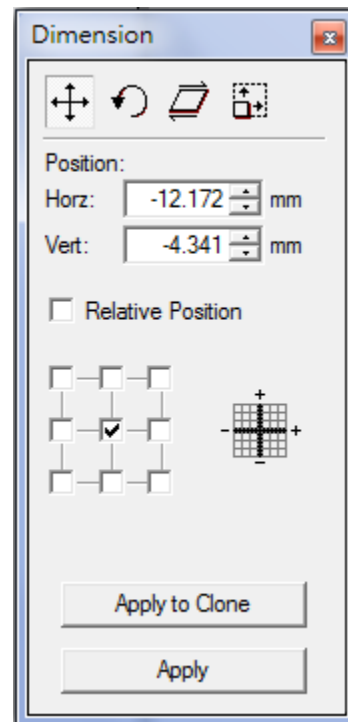


Fig. 1.7,07

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1.7.8 Object Property Bar












The followings are the introductions of Object Property Bar.

1.7.8.1 Page Tool Bar

The Page Tool Bar will be shown on screen when there is no object been selected, see Fig.1.7.08.



Fig. 1.7.08

Origin X		The X-axis value of start point of working area.
Origin Y		The Y-axis value of start point of working area.
Page Length		The length of working area.
Page Width		The width of working area.
Change the Unit		The unit of the ruler (mm or inch).
Trim X		Edit the trimming base of X.
Trim Y		Edit the trimming base of Y.
Grid X		Edit the X grid line.
Grid Y		Edit the Y grid line.
Open the Options Dialogue		Click this button to enter the Options page.
Show or Hide the Property Table		Click this button to show or hide the Property Table.

MM3D 3.2

1.7.8.2 General Tool Bar

The General Tool Bar will be shown on screen when select a non-text object, see Fig.1.7.09.

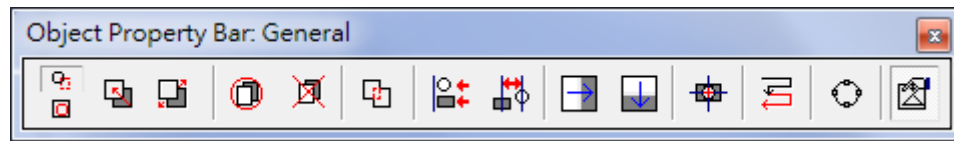


Fig. 1.7.09

General Selection		The selected object is in general situation.
Transparent Selection		The selected object is been grouped.
Combine		Combine two or more objects into one. This function allows several objects to share the same property settings.
Break		Divide a combined object into several individual objects.
Group		Classify two or more objects into one group. This function allowseach object to have its own property settings.
UnGroup		Cancel the group effect of an object.
Welding		Combine two or more objects and eliminate the overlapping lines.
Alignment		Align the selected objects to the assigned position.
Distribute		Distribute the selected objects (at least 2) based on the assigned setting.
Mirror Horizontally		Invert an object on its horizontal axis.
Mirror Vertically		Invert an image on its vertical axis.
Move to the Center		Move the selected object to the center of working area.
Sort		Combine the objects which vertex are not connect to each other first, and then using this function to sort these confused objects
Transfer to Curve		Transfer anun-curved object into a curve.
Show or Hide the Property Table		Click this button to show or hide the Property Table.

1.7.9 Mark Sample Bar

Open the Mark Preview function ([Refer to 1.6.5](#)).

MM3D 3.2

1.7.10 Data Wizard

Using this function to adjust the selected object(s), see Fig.1.7.10 and 1.7.11.

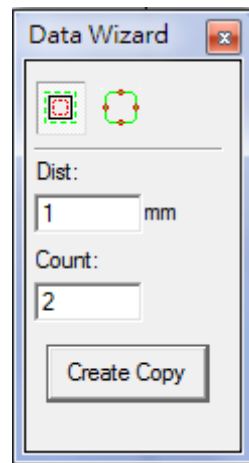


Fig. 1.7.10

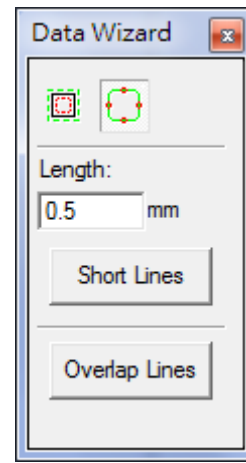



Fig. 1.7.11

Beam Compensation 	Create (a) shrink or dilate object(s) from a closed path object according to the dist and count, see Fig.1.7.12.
Dist	The shrink or dilate distance (+value: shrink; -value: dilate).
Count	The amount of new created object(s)
Create Copy	Create new objects.

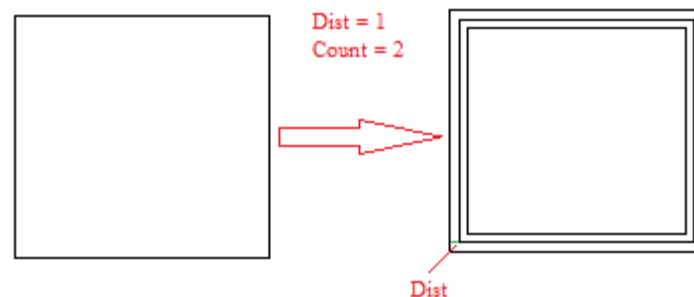



Fig. 1.7.12

Data Reduction 	Optimize the selected objects by eliminating the short or overlapping lines.
Length	Set the length of short lines user wants to eliminate.
Short Lines	Eliminate the set short lines.
Overlap Lines	Eliminate the overlapping lines.

MM3D 3.2

1.7.11 Make Font Bar

Allow users to create a new font type, see Fig.1.7.13.

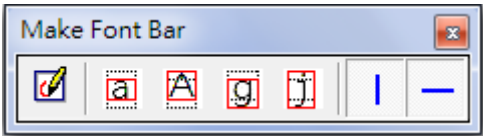


Fig. 1.7.13

	Enter or Exit Make Font mode.
	Using the default edge to set the new font.
	Adjust the right and up edge of the font.

1.7.12Text Tool Bar

When select a text object, the Text Tool Bar will also be shown on the screen, see Fig.1.7.14.

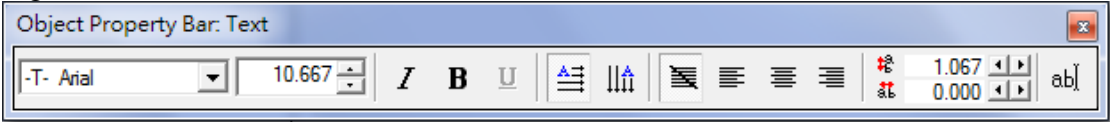


Fig. 1.7.14

Font		Select font.
Size		Adjust font size.
Italic Style		<i>Italic.</i>
Bold Style		Bold Style.
Underline		<u>Underline.</u>
Hori. Arrangement		Horizontal text.
Vert. Arrangement		Vertical text.
None alignment		None alignment.
Left alignment		Left alignment.
Center alignment		Center alignment.
Right alignment		Right alignment.
Line Pitch		Space between each line.
Text Pitch		Space between each character.

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Edit Text	ab	Set up the content of the text.
------------------	----	---------------------------------

MM3D 3.2

1.7.13 Vector Box

Provide several welding choices for users to apply, see Fig.1.7.15.

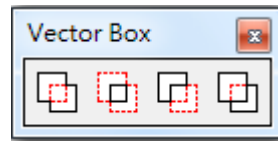


Fig. 1.7.15

Application

Fig.1.7.16 is the original appearance. The first object in the “Object Browser” is the main object. Take Fig.1.7.17 for example, the circle is the main object. If users want to change the objects’ order, please use “Reverse” function.

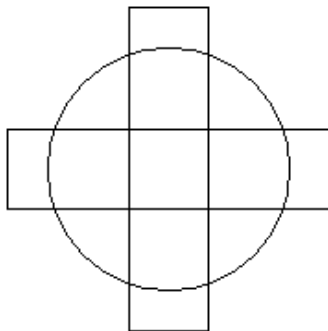


Fig. 1.7.16

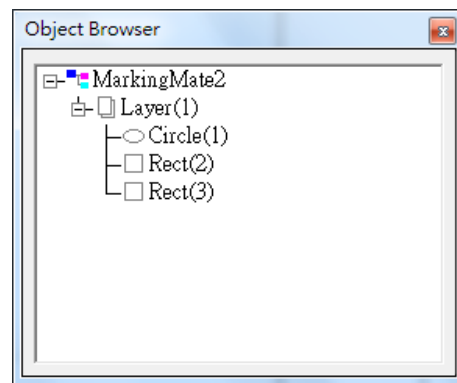


Fig. 1.7.17



Or: Retain the none-overlapping part of the objects, see Fig.1.7.18.

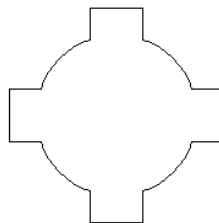


Fig. 1.7.18



And: Retain the overlapping part of objects, see Fig.1.7.19.



Fig. 1.7.19

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Subtract: Retain the none-overlapping part of main object, see Fig.1.7.20.

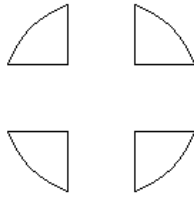


Fig. 1.7.20



Main: Retain the main object and the none-overlapping parts of the other objects, see Fig.1.7.21.

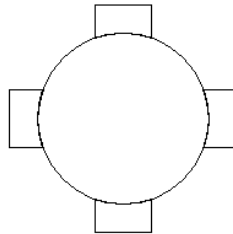


Fig. 1.7.21

1.7.14 Property Table

Click to open property table.

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1.7.15 3D View Control Panel

Edit mold position and size. Refer to fig.1.7.22.

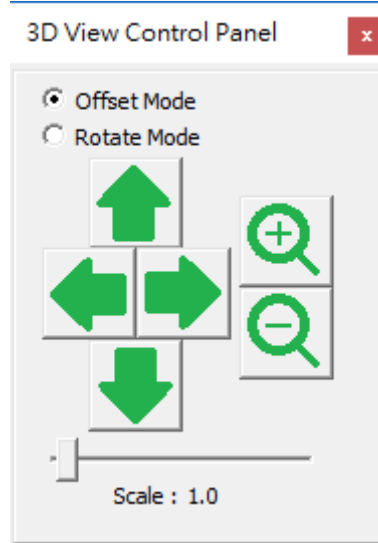


Fig.1.7.22

Offset ,mode

Rotate mode



Scale(0.5~20.0)

Use arrow key will move mold.

Use arrow key will rotate mold.

Move or rotate mold according to mode.

Zoom in/out mold.

Adjust amplitude of changing. Change will be larger if scale is large.


















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1.7.16 3D panel

Enable global view in 3D mode. Refer to fig.1.7.23.



Fig.1.7.23

Select mode		Allow user move across a mold and click left mouse button to select the mold.
Rotate mode		Allow user move across a mold then press left mouse button and move mouse to rotate the mold.
Move mode		Allow user move across a mold then pres left mouse button and move mouse to move the mold.
Lock mold		When select Move mode, if Lock Mold is enabled, the pasted 2D graphic will keep fixed relative position to mold during moving mold.
View		Select following button to change view.
View top		Show the top view.
View below		Show the below view.
View front		View the front view.
View back		View the back view.
View left		View the left view.
View right		View the right view.
Show frame mode		Show unpasted 2D graphic in frame mode.
Set face reverse		Exchange model inner and outer side.
Scale model		Scale mold according to the specified ratio.
Move model		Move model to the specified position.
Rotate model		Move model to the specified angle.
Show 3D		Enable global view in 3D mode. Click again to leave 3D mode.

1.7.17 Mold bar

Edit mold position and size. Refer to fig.1.7.24:

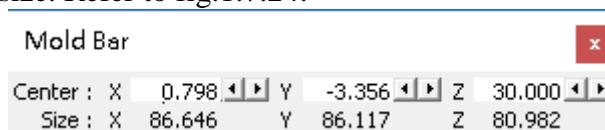


Fig. 1.7.24

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Center X, Y, Z
Size X, Y, Z

Show and edit mold center position.
Show and edit mold size in X, Y and Z direction.

1.7.18 Import Mold

Manage model adding, deleting, replacement, and selection. MM3D supports user import STLformat file. Refer to fig.1.7.25.

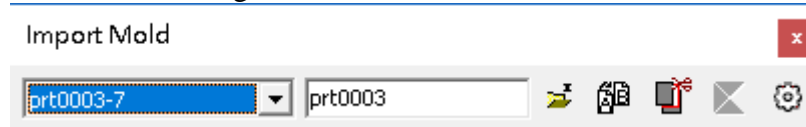


Fig.1.7.25

Show		Specific a model.
Edit		Edit model name.
Add		Import a model from *.STL file.
Replace one.		Import a model to replace the current
Delete		Delete the specified model.
Triangulation		(Not complete)
Setting arrow key.		Set offset and rotate angle when press

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1.7.19 Slicer Bar

User drag slicer to confirm each slice shape.



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1.7.20 Control Object Tool Bar

The Control Object Tool Bar allows user to insert control objects, see Fig.1.7.26. For more detail descriptions, please refer to section 3.4.

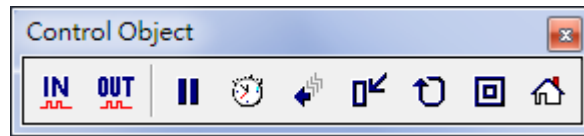











Fig. 1.7.26

Digital In		Set digital in signals.
Digital Out		Set digital out signals.
Do Pause		Insert a pause object into the marking sequence.
Delay Time		Insert a delay time object into the marking sequence.
Motion		Move the object to an assigned position.
Set Position		Set the current position as the assigned position.
Loop		Create a loop path in the marking sequence.
Ring		Insert a ring object into the marking sequence.
Homing		Insert an auto-home object.









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1.7.21 Mark Panel


The Mark Panel offers users to quickly execute some marking related functions, see Fig.1.7.27.



Fig. 1.7.27

Marking		Execute the marking function, please refer to section 1.6.1.
Remote Control		Use remote control function to connect two computers to mark, please refer to Practical Introduction.
Preview		Enter the Preview mode, please refer to section 1.6.2.
Mark Sample		Enter the Mark Sample mode, please refer to section 1.6.2.
X-Y Table		Allow users to adjust X-Y Table settings, please refer to section 1.7.16.1.
Rotary Control Panel		Allow users to adjust rotary axis settings, please refer to section 1.7.16.2.
Z Axis Control Panel		Allow users to adjust Z axis settings, please refer to section 1.7.16.3.
CCD Panel		CCD control setting, please refer to CCD Panel User Manual.

1.7.21.1XY-Table Control Panel

To control the XY Table, users must first activate the XY table function by clicking the layer object in Object Browser and then go to the XY Table page of Property Table and enable this function. After doing this, click  button and do the further setting, see Fig.1.7.28.

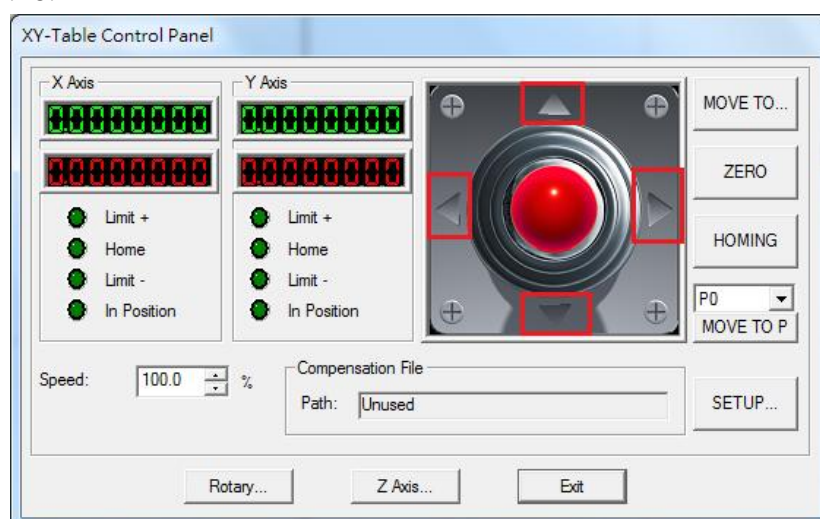


Fig. 1.7.28

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1. Click “MOVE TO...” button and then input the X and Y values in the dialog box like Fig.1.7.29 and click “GO,” the XY Table will move to that specific position. The moving speed can be adjusted from “Speed” parameter.

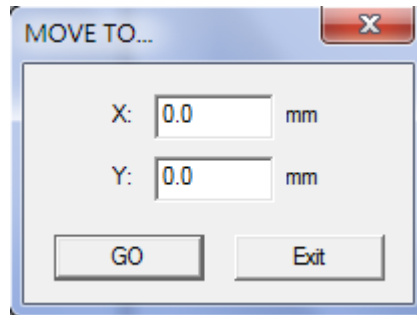


Fig. 1.7.29

2. Click the four direction buttons (the red part of Fig.1.7.24) to move the XY Table.
3. Click “ZERO” and the program will set the present position as (0,0).
4. Click “HOMING” and the XY Table will move to program origin.
5. Click “MOVE TO P”, the XY Table will directly move to the setting position (P0~P9). Users can click “SETUP...” button to set the value of these points.
6. Click “SETUP...” and do more detail settings, see Fig.1.7.30.
7. Click “Rotary...” button can do Rotary control setting, please refer to section 1.7.16.2.
8. Click “Z-Axis...” button can do Z-Axis control setting, please refer to section 1.7.16.3.
9. “Load Compensation File” shows the compensation file users loaded.

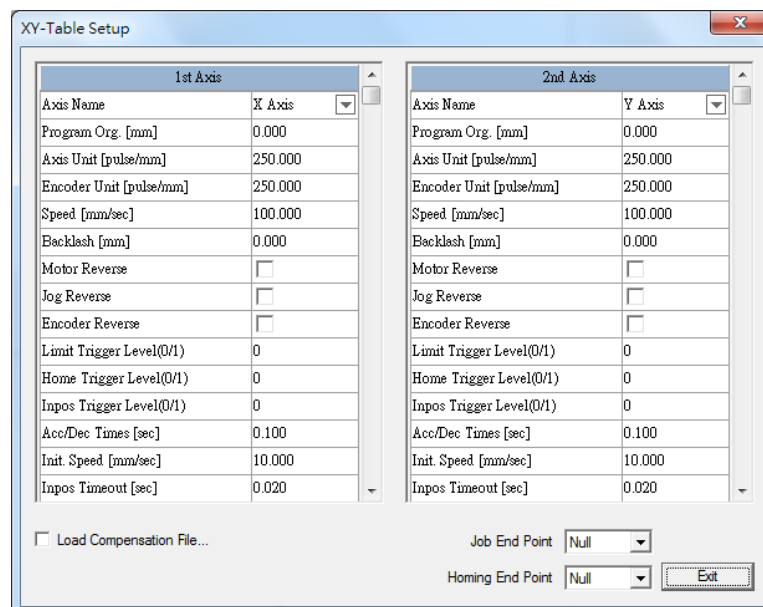


Fig. 1.7.30

Axis Name	Users can set the 1 st Axis as X or Y, and the 2 nd Axis as Y or X.
Program Org. [mm]	The program will consider this point as the program origin.
Axis Unit [pulse/mm]	The pulse needed for X/Y Axis to move 1 millimeter

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Encoder Unit [pulse/mm]	(must refer to the motor's specification).
Speed [mm/sec]	The pulse the encoder releases when moving 1 millimeter (must refer to the encoder's specification).
Backlash [mm]	The moving speed of X/Y Axis.
Motor Reverse	The transmission deviation between motor and axis.
Jog Reverse	Reverse the motor moving direction.
	When XY Table is placed in a different direction with the software's control panel, this parameter can make the X/Y axis move following the right direction.
Encoder Reverse	Reverse the direction of the encoder.
Limit Trigger Level (0/1)	0: active low; 1: active high
Home Trigger Level (0/1)	0: active low; 1: active high
InPos Trigger Level (0/1)	0: active low; 1: active high
Acc/Dec Times [sec]	The time motor needs to reach the setting speed.
Init. Speed [mm/sec]	The initial speed of motor.
Inpos Timeout [sec]	The program will consider X/Y axis completed position after passing the time setting here.
Inpos Delay [sec]	The program will wait for the setting time here to execute the next command.
Ext I/O Home	Using external controller (I/O) to do homing.
Ext I/O Jog+	Using external controller (I/O) to do positive shift.
Ext I/O Jog-	Using external controller (I/O) to do negative shift.
Home Speed [mm/sec]	The homing speed of the motor.
Home Back Speed [mm/sec]	The speed motor needs to move from home position to the edge of home sensor after reaching the home position.
Home Reverse	Reverse the direction of homing.
Home Sensor Touching Mode (0/1)	Decide that XY-Table will stop or do home in reverse direction when touching the limit sensor during homing. 0 is stop, and 1 is homing reversely.
Limit Stop Mode	Decide the motor stop rapidly (0) or slowly (1) when moving to limit sensor.
Distance of Travel [mm]	The maximum available travel distance X/Y Axis can reach.
P0~P9 [mm]	Set the position of P0~P9.
Job End Point	XY-Table will move to the assigned position (P0~P9) after marking is completed.
Homing End Point	XY-Table will move to the assigned position (P0~P9) after homing.
Load Compensation File	Click "Load Compensation File" to load the compensation file. Fig.1.7.31 is an example of the compensation file.

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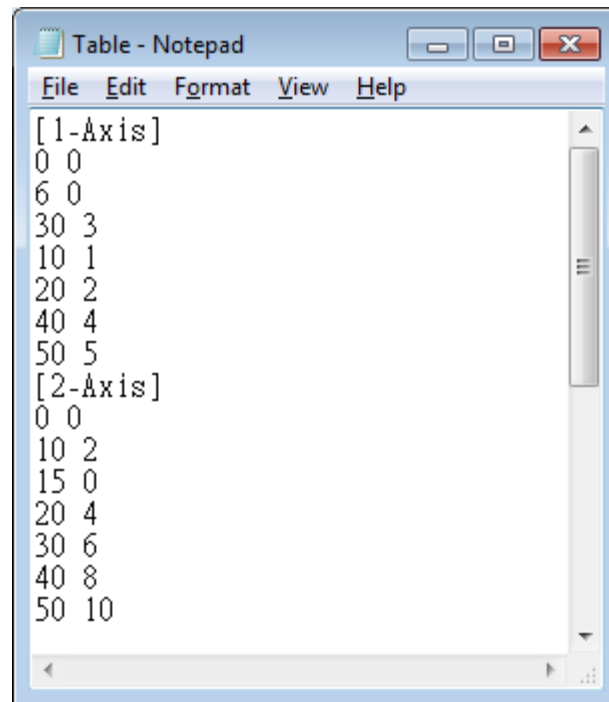



Fig. 1.7.31

In this text file, [1-Axis] represents the compensation value of the first axis, while [2-Axis] means the second one. Take the line "30 3" for example. When the program makes a command of moving 30mm but the actual movement was only 27mm, users can add the value "30 3" in the compensation file. As a result, when get an order of moving 30mm, the program will change to 33mm automatically to do compensation.

It is no need to sort the position of compensation values; the program will automatically do the sorting. And there is no limitation for numbers. If the position is not in the file, the program will calculate the compensation automatically using interpolation method. If the value of position is larger than the maximum compensation value, the program will set the maximum compensation value as the compensation of that position. And the minimum compensation value will be the compensation value when the position is smaller than it.

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1.7.21.2 Rotary Control Panel

To control the Rotary Axis, users must first activate the Rotary function by clicking the layer object in Object Browser and then go to the Rotary page of Property Table and enable this function. After doing this, click  button and do the further setting, see Fig.1.7.32.

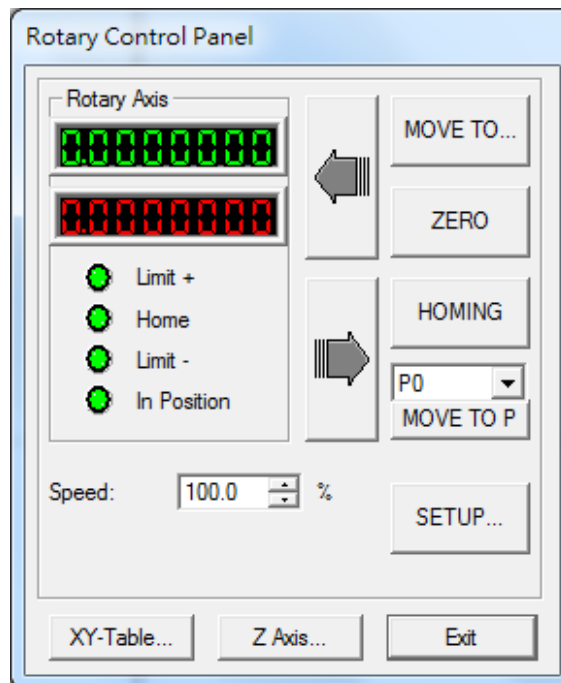


Fig. 1.7.32

1. Click “MOVE TO...” button and input the degree value in the dialog box like Fig.1.7.33 and click “GO,” the rotary axis will rotate to that specific angle. The rotating speed can be adjusted from “Speed” parameter.

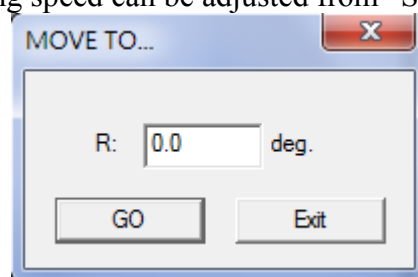


Fig. 1.7.33

2. Click the two direction buttons to move the rotary axis.
3. Click “ZERO” and the program will set the present position as (0,0).
4. Click “HOMING” and the rotary will move to program origin.
5. Click “MOVE TO P”, the rotary axis will directly move to the setting position (P0~P9). Users can click “SETUP...” button to set the value of these points.
6. Click “SETUP...” and do more detail settings, see Fig.1.7.34.
7. Click “XY-Table...” button can do X/Y Table control setting, please refer to section 1.7.16.1.
8. Click “Z-Axis...” button can do Z-Axis control setting, please refer to

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section 1.7.16.3.

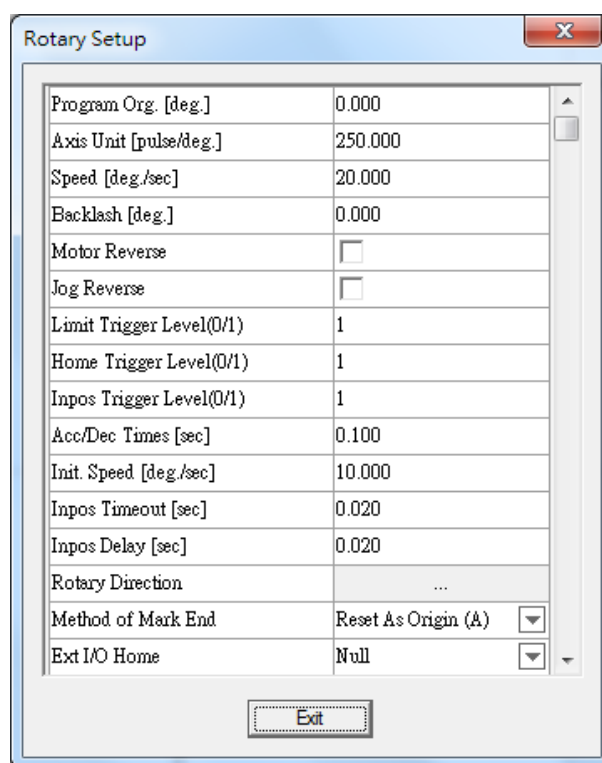


Fig. 1.7.34

Program Org. [deg]	The program will consider this point as the program origin.
Axis Unit [Pulse/deg]	The pulse needed for rotary to move 1 millimeter (must refer to the motor's specification).
Speed [deg/sec]	The rotating speed of the rotary axis.
Backlash [deg.]	The transmission deviation between motor and axis.
Motor Reverse	Reverse the motor rotating direction.
Jog Reverse	When rotary axis is placed in the different direction with the software's control panel, this parameter can make it rotate following the right direction.
Limit Trigger Level (0/1)	0: active low; 1: active high
Home Trigger Level (0/1)	0: active low; 1: active high
InPos Trigger Level (0/1)	0: active low; 1: active high
Acc/Dec Time [sec]	The time motor needs to reach the setting speed.
Init. Speed [mm/sec]	The initial speed of motor.
Inpos Timeout [sec]	The program will consider rotary axis completed position after passing the time setting here.
Inpos Delay [sec]	The program will wait for the setting time here to execute the next command.
Rotary Direction	Click to do further settings for the rotating direction of the rotary axis, see Fig.1.7.35.

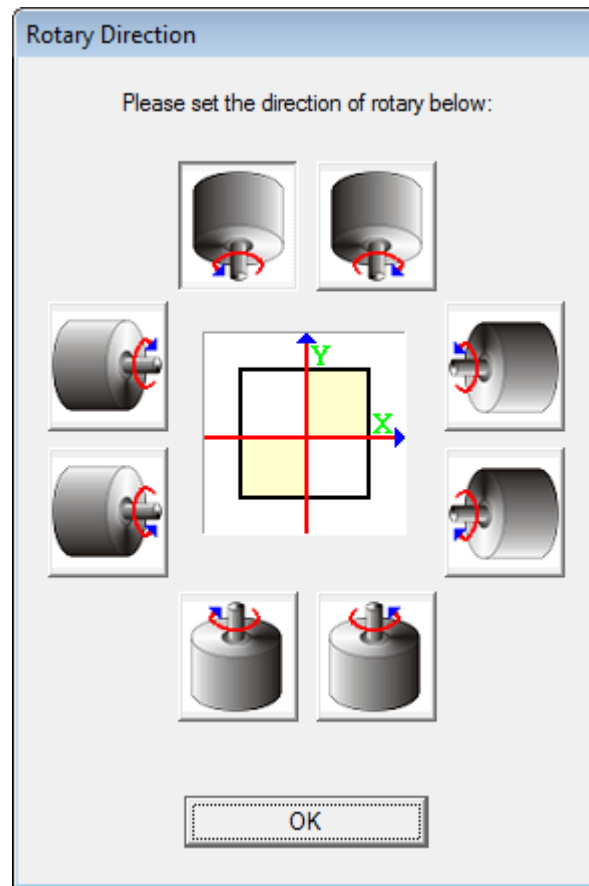


Fig. 1.7.35

Method of Mark End

Five ways for laser to go back to the origin after finishing marking job.

- ◆ Reverse Direction: go back to the origin by backward direction.
- ◆ Shortest Path: go back to the origin by the shortest path.
- ◆ Reset As Origin A: set the mark end point as the new origin and the start point for the next marking.
- ◆ Reset As Origin B: set the mark end point as the new origin, but the rotary will move some distance (based on the distance of the object and the upper edge of software's working area) and then start the next marking.
- ◆ Forward Direction: go back to the origin by forward direction.

Please note that the origin represent different position according to the method of mark end. Only "Reset As Origin" method will consider the latest point as the origin, the other methods will treat the left-top corner of the work area as the origin.

Ext I/O Home
Ext I/O Jog+
Ext I/O Jog-
Home Speed [deg/sec]
Home Back Speed

Using external controller (I/O) to do homing.
 Using external controller (I/O) to do positive shift.
 Using external controller (I/O) to do negative shift.
 The homing speed of rotary axis.
 The speed motor needs to move from home position to

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[deg/sec]	the edge of home sensor after reaching the home position (only for PMC2 & PCMark).
Home Reverse	Reverse the direction of homing.
Home Sensor Touching Mode (0/1)	Decide that rotary axis will stop or do home in reverse direction when touching the limit sensor during homing. 0 is stop, and 1 is homing reversely.
Home End Point	Rotary axis will move to the assigned position (P0~P9) after homing.
Limit Stop Mode	Decide the motor stop rapidly (0) or slowly (1) when moving to limit sensor.
P0~P9 [deg.]	Set the position of P0~P9.

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1.7.21.3 Z Axis Control Panel

Please note that only PMC2 driver supports Z Axis control. Click  button and do the further setting, see Fig.1.7.36.

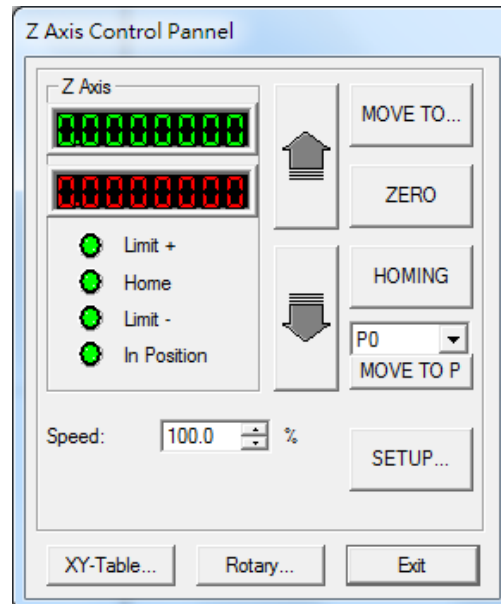


Fig. 1.7.36

1. Click “MOVE TO...” button and input the value in the dialog box like Fig.1.7.37 and click “GO,” the Z Axis will move to that specific position. The moving speed can be adjusted from “Speed” parameter.

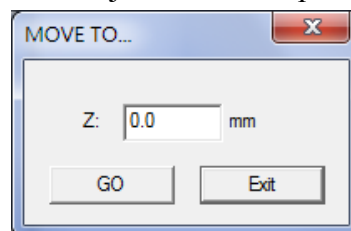


Fig. 1.7.37

2. Click the two direction buttons to move the Z axis.
3. Click “ZERO” and the program will set the present position as the program origin. Users can also click “SETUP...” button to set the program origin.
4. Click “HOMING” and the Z axis will move to program origin.
5. Click “MOVE TO P”, the Z axis will directly move to the setting position (P0~P9). Users can click “SETUP...” button to set the value of these points.
6. Click “SETUP...” and do more detail settings, see Fig.1.7.38.
7. Click “XY-Table...” button can do X/Y Table control setting, please refer to section 1.7.16.1.
8. Click “Rotary...” button can do Rotary control setting, please refer to section 1.7.16.1.

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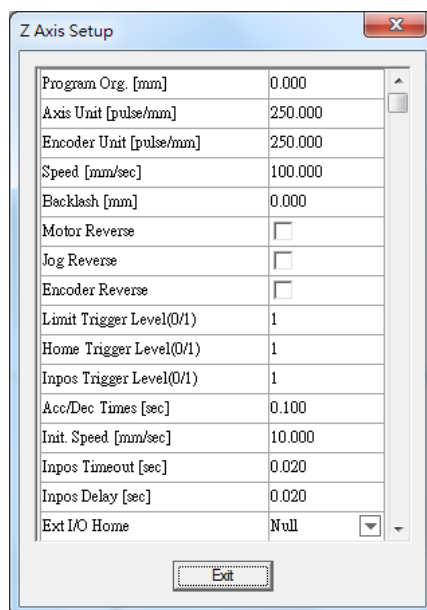


Fig. 1.7.38

Program Org. [mm]	The program will consider this point as the program origin.
Axis Unit [pulse/mm]	The pulse needed for Z Axis to move 1 millimeter (must refer to the motor's specification).
Encoder Unit [pulse/mm]	The pulse the encoder releases when moving 1 millimeter (refer to the encoder's specification).
Speed [mm/sec]	The moving speed of the Z axis
Backlash [mm]	The transmission deviation between motor and axis.
Motor Reverse	Reverse the motor moving direction.
Jog Reverse	When Z Table is placed in a different direction with the software's control panel, this parameter can make the Z axis move following the right direction.
Encoder Reverse	Reverse the direction of the encoder.
Limit Trigger Level (0/1)	0: active low; 1: active high
Home Trigger Level (0/1)	0: active low; 1: active high
InPos Trigger Level (0/1)	0: active low; 1: active high
Acc/Dec Times [sec]	The time motor needs to reach the setting speed.
Init. Speed [mm/sec]	The initial speed of motor.
Inpos Timeout [sec]	The program will consider Z axis completed position after passing the time setting here.
Inpos Delay [sec]	The program will wait for the setting time here to execute the next command.
Ext I/O Home	Using external controller (I/O) to do homing.
Ext I/O Jog+	Using external controller (I/O) to do positive shift.
Ext I/O Jog-	Using external controller (I/O) to do negative shift.
Home Speed [mm/sec]	The homing speed of the motor.
Home Back Speed [mm/sec]	The speed motor needs to move from home position to the edge of home sensor after reaching the home position (only for PMC2 & PCMark).
Home Reverse	Reverse the direction of homing.

MM3D 3.2

Home Sensor Touching Mode (0/1)	Decide that Z axis will stop or do home in reverse direction when touching the limit sensor during homing. 0 is stop, and 1 is homing reversely.
Home End Point	Rotary axis will move to the assigned position (P0~P9) after homing.
Limit Stop Mode	Decide the motor stop rapidly (0) or slowly (1) when moving to limit sensor.
Distance of Travel [mm]	The maximum available travel distance Z Axis can reach.
P0~P9 [mm]	Set the position of P0~P9.

MM3D 3.2

1.7.22 Status Bar

Enable or disable the Status Bar which display on the bottom of the software, see Fig.1.7.39.

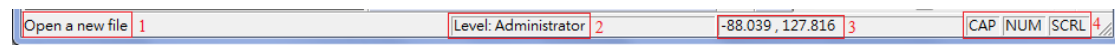


Fig. 1.7.39

Display the function description positioned by the mouse.

Show the user level.


The X, Y-axis value of the mouse position

1. When press the Caps Lock key, the CAP will appear.
When press the Num Lock key, the NUM will appear.
When press the Scroll Lock key, the SCRL will appear.

1.7.23 Desktop Mode

Change the setting Desktop Mode.

1.7.24 Composing Setting

Include tooltips, ruler, grid, and grid lock settings here. The toolbar with a  mark means that function has been opened.

1.7.20.1 Show Order

Use this function can see the mark order of each object, see Fig.1.7.40.

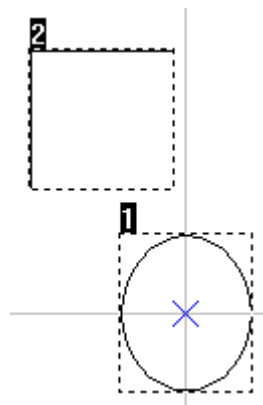


Fig. 1.7.40

1.7.20.2 Tooltips / Tooltips Setting

The tooltips setting descriptions please refer to 1.1.7.5.3.

1.7.20.3 Ruler / Ruler Setting

The ruler setting descriptions please refer to 1.1.7.5.1.

1.7.20.4 Grid / Grid Lock / Grid Parameter

The grid setting descriptions please refer to 1.1.7.5.2.

MM3D 3.2

1.7.25 Zoom In

Enlarge a specific area.

1.7.26 Zoom Out

Shrink a specific area.

1.7.27 Zoom Previous

Go back to the previous view.

1.7.28 Zoom All

Show the whole Work Area.

1.7.29 Zoom Extend

Show all objects.

1.7.30 Zoom Select Object

Zoom the selected objects to fit the whole editing area.

MM3D 3.2

1.8 Window Menu

“Window” menu offers the following functions:

New	Create new window
Cascade	Allow all open windows overlapping
Tile	Show all open windows without overlapping
Arrange	Rearrange the windows
Close All	Close all windows

1.8.1 New

Create new window, and the content of the new window will be the same with the one user is using. Users can create multiple windows to view the different parts of the content. The modifications in any one of the window will also be displayed in other windows.

1.8.2 Cascade

Display all open windows in an overlapping way, see Fig.1.8.01.

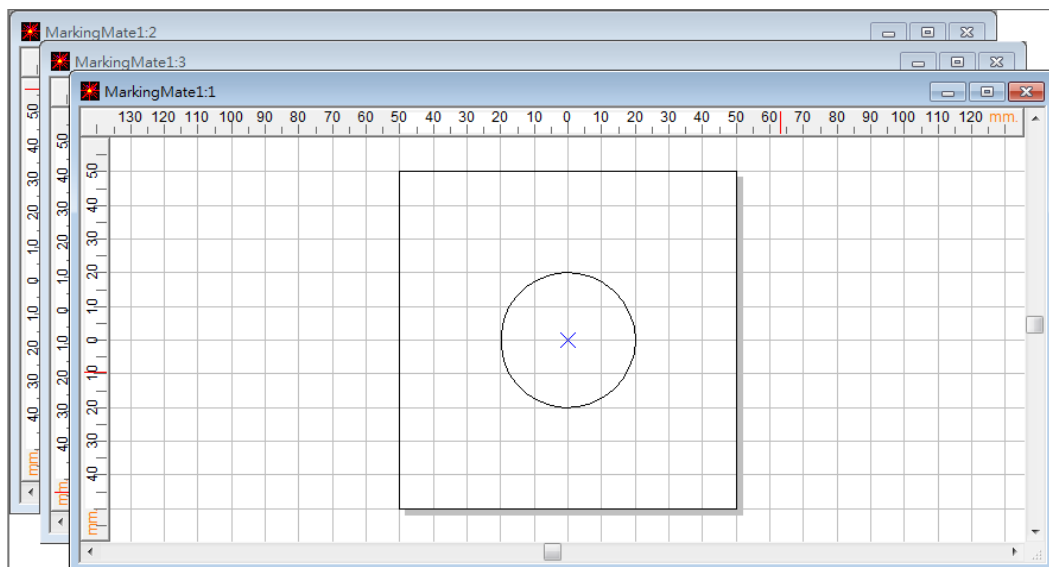


Fig. 1.8.01

MM3D 3.2

1.8.3 Tile

Show all open windows side by side, see Fig.1.8.02.

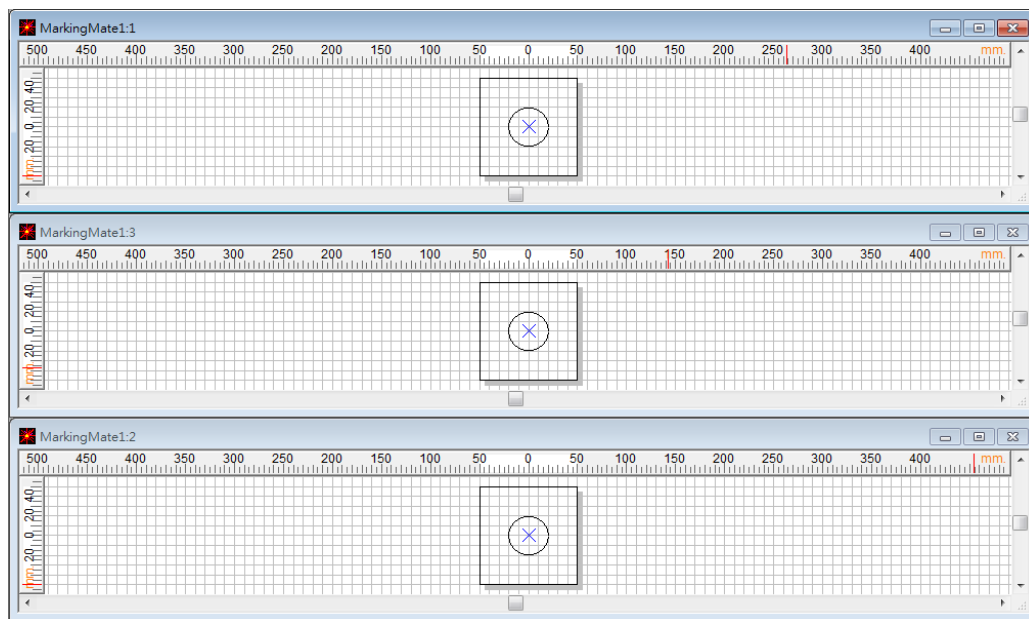


Fig. 1.8.02

1.8.4 Arrange

Rearrange the windows. The shrink window will be list at the bottom of MM3D, see Fig.1.8.03.



Fig. 1.8.03

1.8.5 Close All

Close all opened windows.

MM3D 3.2

1.9 Help Menu

“Help” menu will assist you to use this software

Help Topics Offers the manuals of the software.

Key Information The key version and content, see Fig.1.9.01.

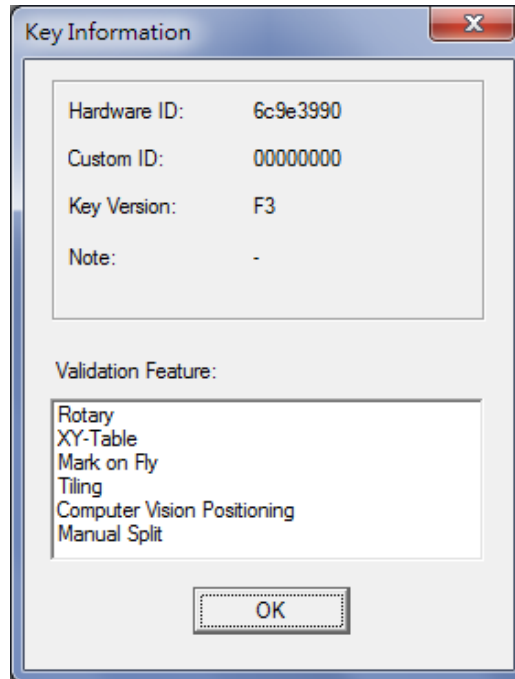


Fig. 1.9.01

Machine Information Show the information of the laser machine, see Fig.1.9.02.

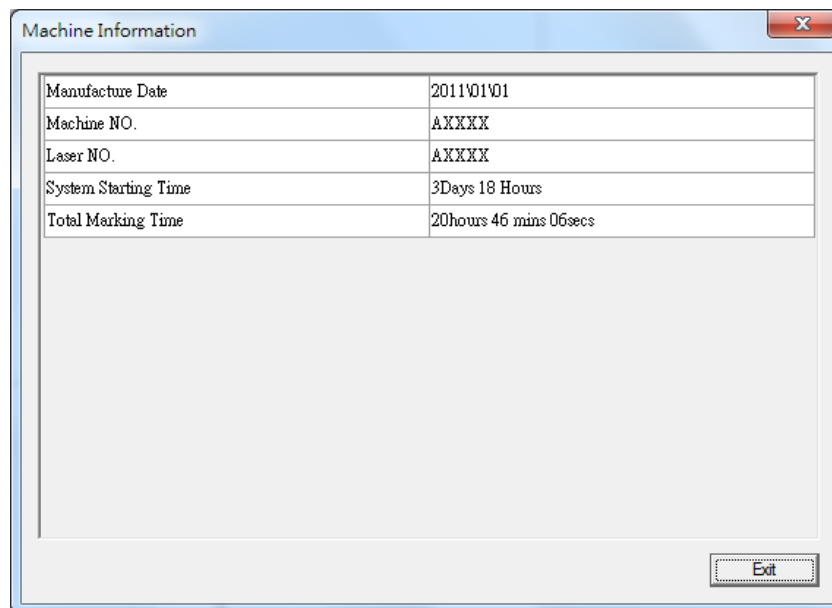


Fig. 1.9.02

About MM3D Show the current using version and driver of MM3D, see Fig.1.9.03.

MM3D 3.2

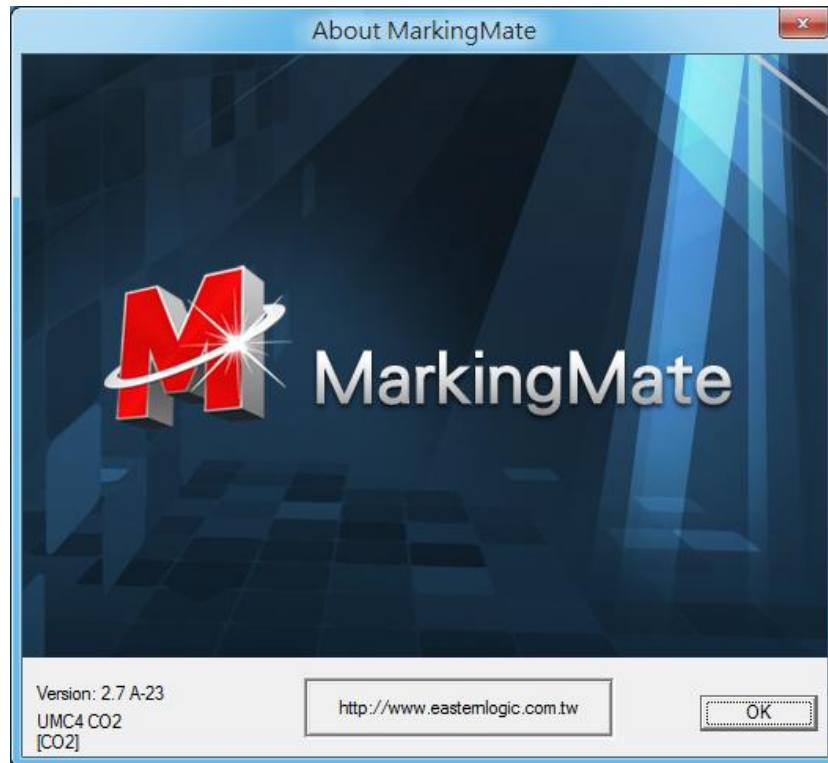


Fig. 1.9.03

MM3D 3.2

2. Objects

MM3D offers “Object Function” for users to draw graphics, texts, and barcodes. These functions include dot, line, arc, circle, rectangle, curve, curve brush, text, arc text, rect text, 1D barcode, 2D barcode, matrix, and spiral. Whatever an object being selected, its related property table will be displayed for setting.

Besides, click the right button of mouse after selecting an object will display a popup menu providing the normal use functions and additional functions. For example, select a curve, click right mouse button, a function of edit vertex will be added in the popup menu.

Select the Curve object.

The property table of the Curve object will be displayed as the left side of the picture below.

Click the mouse right button will see the popup menu include the “Add Vertex” function.

2.1 Common Settings

This section will discuss the common setting page of the Property Table that includes Frame/Fill, Output Parameter, CAM Parameter, and the Popup Menu.

2.1.1 Property Table

When an object in the Work Area being selected, the property table of this object will be displayed. Users can set up some marking related parameters over the dialogue box; mainly include the object’s frame/fill, marking parameter, and delay.

Frame/Fill	Adjust the color of the border and interior shading of a selected object.
Mark Parameter	This menu in the Property Table will allow you to edit the assigned speed, power, and frequency output of the laser machine.
Delay	Setting some parameters about marking speed and quality.

MM3D 3.2

2.1.2 Popup Menu

Select a general object and click the right button of the mouse, users will see a popup menu, see Fig.2.1.01.

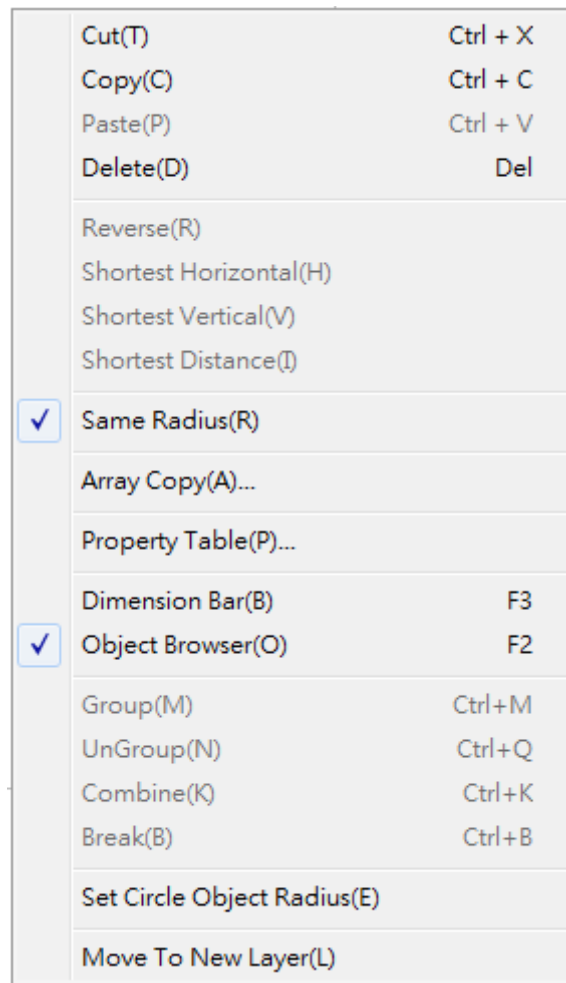


Fig. 2.1.01

Cut	Remove selected data and store it in the clipboard for future use
Copy	Duplicate selected data and store it in the clipboard for future use
Paste	Attach data from the clipboard to the current document
Delete	Delete and remove the selected data
Reverse	Reverse sorting mark order
Shortest Horizontal	Sorting mark order by the shortest horizontal direction
Shortest Vertical	Sorting mark order by the shortest vertical direction
Shortest Distance	Sorting mark order by the shortest distance of object center
Same Radius	Make the circle become the same radius

MM3D 3.2

Array Copy	Execute the array copy function
Property Table	Show the Property Table of the object
Dimension Bar	Enable/disable Dimension bar
Object Browser	Enable/disable Object Browser
Group	Group selected object
Ungroup	Ungroup selected group
Combine	Combine several objects into one object
Break	Break one object into several objects
Set Circle Object Radius	Modify circle that radius same as original radius to modified radius.
Move To New Layer	Move selected objects to new layer

MM3D 3.2

2.2 Create Objects

Create objects such as line, arc, circle, rectangle, curve, curve brush, text, arc text, Rectangle Text, 1D barcode, or 2D barcode.

Vector	Draw a point.
Line	Draw a straight line.
Arc	Draw an arc.
Circle	Draw a circle or oval.
Rectangle	Draw a square or rectangle.
Curve	Draw a curve.
Curve Brush	Draw a freehand line using the mouse.
Text	Insert a text object.
Arc Text	Insert an arc text object.
Rectangle Text	Insert a rectangle text object.
1D Barcode	Create a 1D barcode.
2D Barcode	Create a 2D barcode.
Matrix	Create a matrix object.
Spiral	Draw a spiral object.

MM3D 3.2

3. Property Table

All objects have their own unique properties. These properties define how each specific object or each group of objects be displayed or how they will be marked.

NOTE: Any modification of the property will take effect after users click “Apply” button. Users can also click “Apply All” after modify several property pages to make sure all the changes are effective.

The Property Table contains the following five portions.

System	Adjust system-related parameters.
Marking Parameter	Adjust marking-related parameters.
Object	Adjust general object-related parameters.
Control Object	Adjust settings of control objects.
Layer	Set the layer-related functions.

MM3D 3.2

3.1 System-Related Property Table

Users can edit the system-related property table when there has no object been selected. There are five setting pages under system-related property table.

3.1.1 Work Area

The size of f-theta lens will affect the working area. If it is not properly adjusted, center drifting and distortion might be caused. Adjust the parameters carefully, and the marking result will be extremely similar to the users' design, see Fig.3.1.01.

Lens

Users can select the lens they want to use from here.

Correction/ Lens Manager

This button is used for lens correction or lens management.

Scale X/Y

If the scale is too small, please enter a number larger than 100 (because unit is percentage); on the contrary, please enter a value smaller than 100.

X Offset / Y Offset

If the position of marking result has 5mm shift to the right side, users can enter -5mm in the X column. The other situations are the same.

Rotate

Set the angle of the marking result to fit the marking platform when the platform or work piece cannot be placed appropriately.

Galvo Direction:

X reverse / Y reverse / XY exchange

Provides X reverse, Y reverse, and XY exchange for users to apply when they need to adjust the axis' direction of working area.

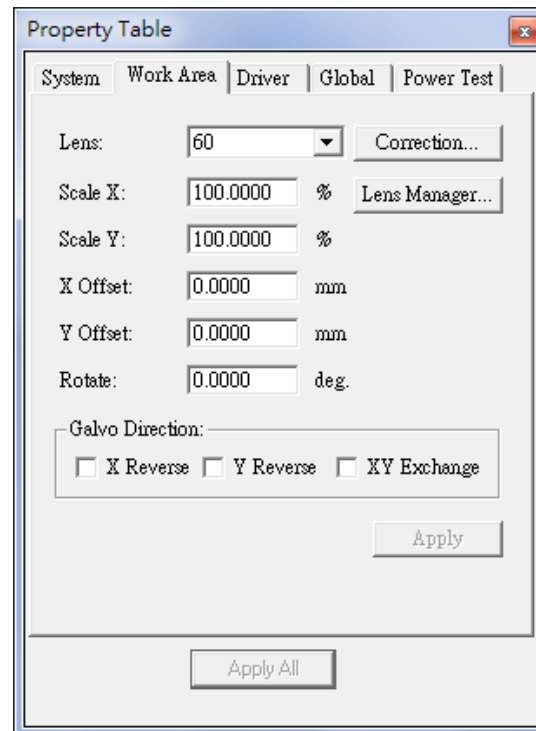


Fig. 3.1.01

MM3D 3.2

3.1.2 Driver

The page displays the driver's name and version, see Fig.3.1.02.

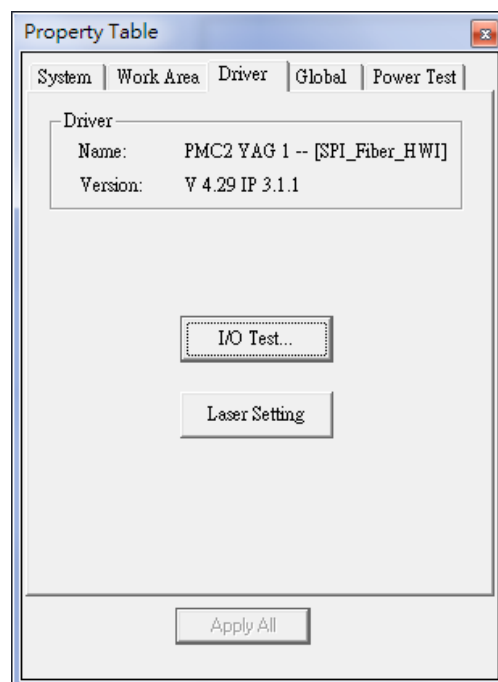


Fig. 3.1.02

I/O Test

Press the button of "I/O Test", a dialogue box like Fig.3.1.03 will be displayed to show the input and output status. The name of the I/O point can be assigned by the user. Please refer to Appendix A for more details.

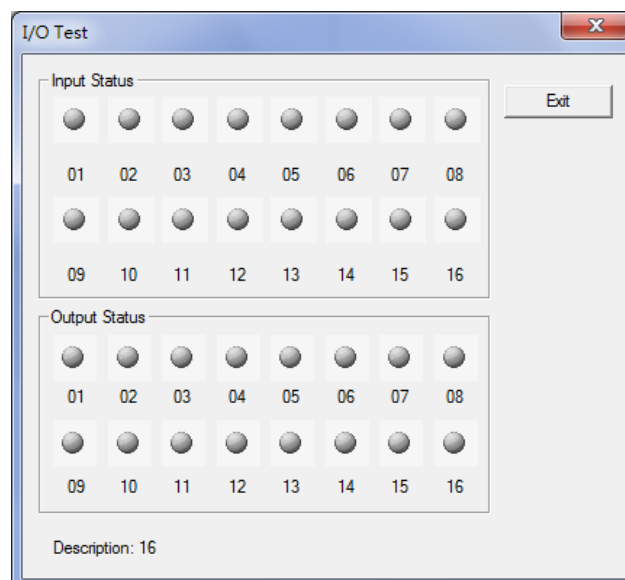


Fig. 3.1.03

MM3D 3.2

Laser Setting:

Only when use SPI laser can active the dialog box, see Fig.3.1.04.As to the setting of this part, please refer to the user manual of SPI Laser.

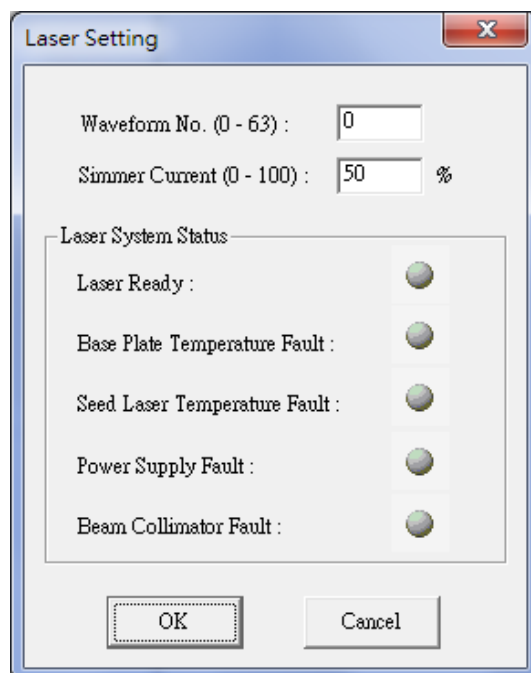


Fig. 3.1.04

MM3D 3.2

3.1.3 Global

The Global Property Page shows like Fig.3.1.05.

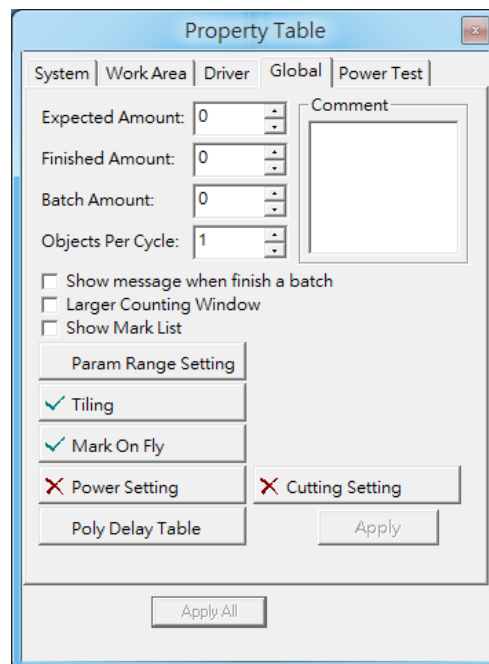


Fig. 3.1.05

Expected Amount: Set the expected marking amount. If the marking reach the setting value, the system will pop up a warning box like Fig.3.1.06.

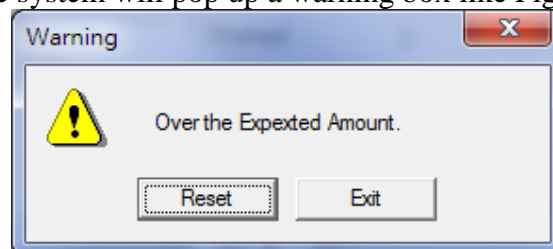


Fig. 3.1.06

Finished Amount: Enable users to record how many work pieces they have already marked.

Batch Amount: Set the marking amount of each batch.

Objects Per Cycle: Set the marking times of one marking cycle. For example, suppose this value is 5, then it will automatically mark 5 times when execute marking. If execute marking again, it will also mark 5 time in this cycle, and the finished amount will shows 10 when this cycle complete.

Show message when finish a batch: The system will pop up a warning dialog box like Fig.3.1.07 when reach the value of Batch Amount if the option has been checked.

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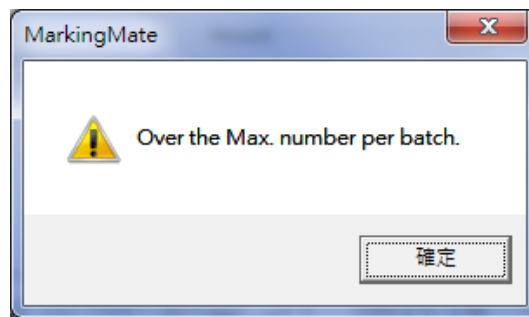


Fig. 3.1.07

Larger Counting Window: If users activate this option, then the system will display a large window to show the information of marking amount, see Fig.3.1.08.

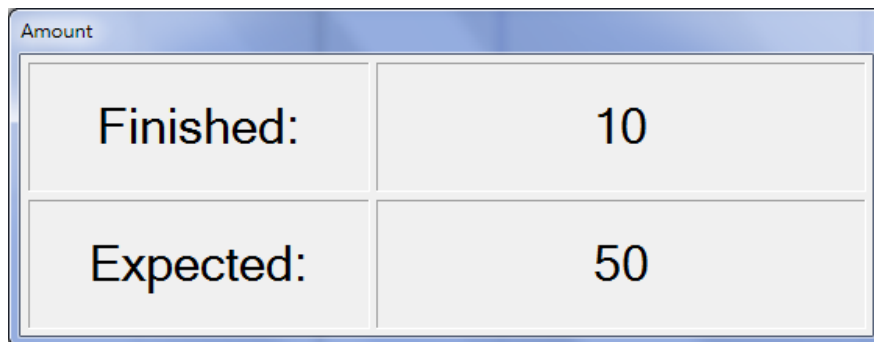


Fig. 3.1.08

Comment: Display the notation of the marking file. It shows the function and the notes of that file.

MM3D 3.2

Param Range Setting: Set the range of speed, power and frequency, see Fig.3.1.09.

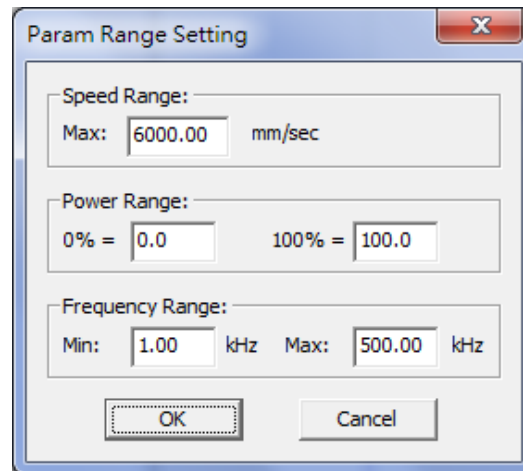


Fig. 3.1.09

Tiling

This function is used to divide an object into several parts when the object's size is larger than the working area or is used to fit the users special demands. It is default disabled. Users need to click the "Tiling" button to activate this function, see Fig.3.1.10.

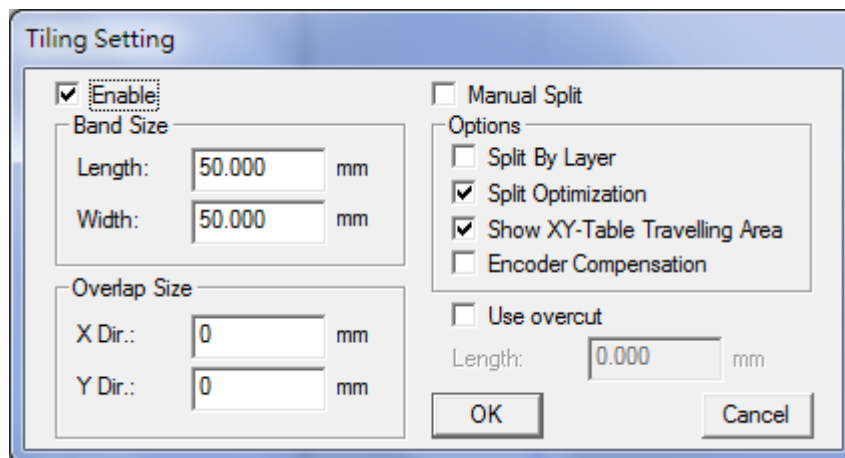


Fig. 3.1.10

Enable	Enable this function
Band Size	Length: Length of each divided part. Width: Width of each divided part.
Overlap Size	X Dir.: Length of the allowed overlap part. Y Dir.: Width of the allowed overlap part.
Manual Split	Enable manual split function, and the manual split bar will be activated.
Options	Split By Layer: Split graphic by layer. Split Optimization: Optimize the split path. If a graphic is smaller than the Band Size, this option will ensure it to be marked at one time. Please note that this option will be disabled under manual split mode.

MM3D 3.2

Show XY-Table Traveling Area: Decide to show the traveling area of XY-Table or not.

Show the bands: Show the bands while not in the band edit mode.

Avoid duplicate marking: Make sure will not mark same object twice. See fig. 3.1.11.

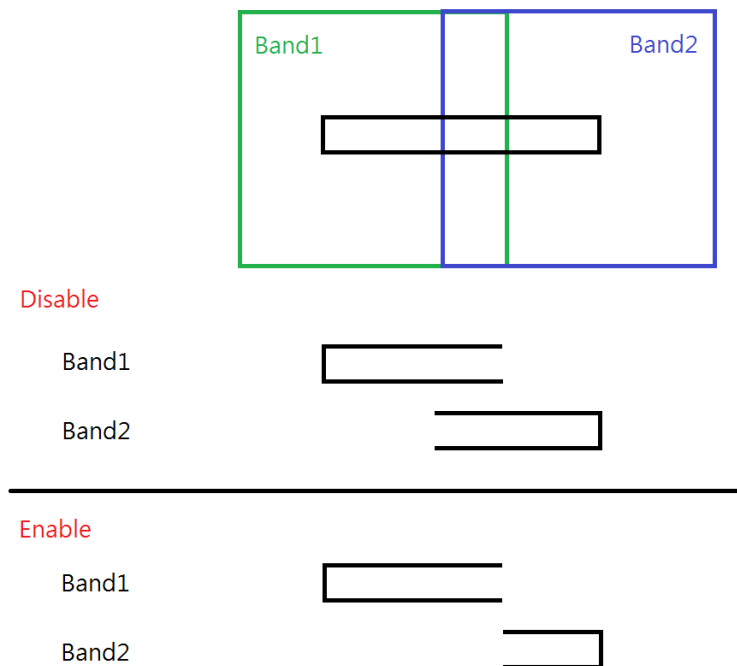


Fig. 3.1.11

Encoder Compensation: Decide to use encoder to do compensation

Use Overcut

Set the overcut length. This value must follow the rule of lens area is equal to or greater than the sum of tiling size and twice overcut length, see Fig.3.1.12. The difference between overlap and overcut is that the overlapping area will be marked twice but overcut won't, see Fig.3.1.13 and Fig.3.1.14. Overlap and overcut cannot be used at the same time.

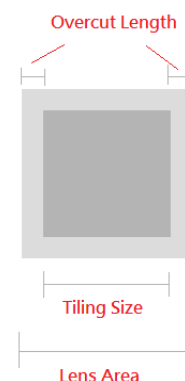


Fig. 3.1.12

MM3D 3.2

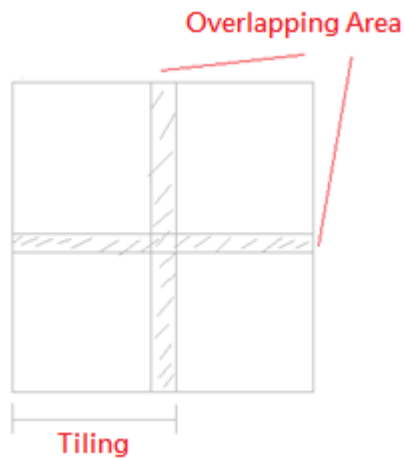


Fig. 3.1.13

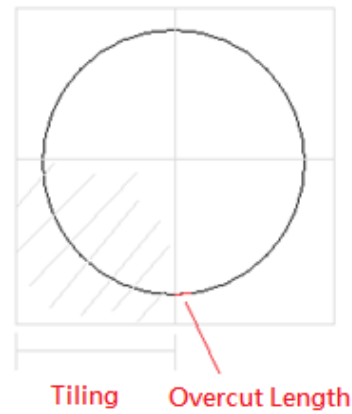


Fig. 3.1.14

When graphic split function is activated, the workingarea will be changed according to the settings of XY Table area and lens area as Fig.3.1.15.

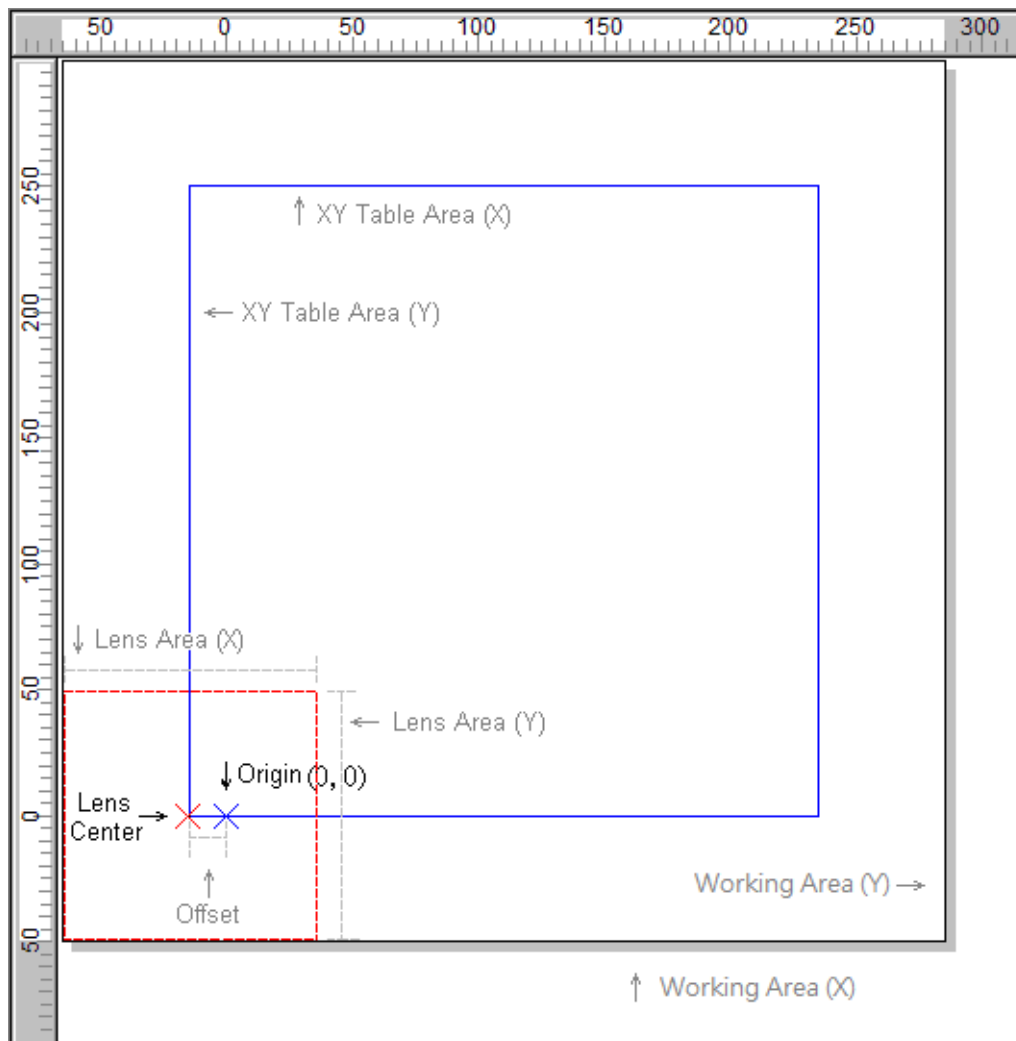


Fig. 3.1.15

Working The Working Area for graphic split is the sum of XY Table Area and

MM3D 3.2

Area	the half of Lens Area.
XY Table Area	When the lens center moves along with the edge of XY Table Area, the marking area will be the same as Working Area. About the setting method please refer to section 1.7.16.1 XY Table Control Panel.
Lens Area Offset	About the setting method please refer to Lens Manager. The distance between origin (0, 0) and the program origin. About original setting method please refer to section 1.7.16.1 XY Table Control Panel.

Cutting Setting

Cutting means beam out position will maintain at scanner original position, and XY-table will move along the cutting path. In order to use cutting function, users will need to have tilling license.

Enable Enable cutting function.

Limit See Fig 3.1.16. If limit angle is smaller than cutting path outer corner, cutting there will tune the motion speed to move along the cutting path. This will make the cutting more accurate.

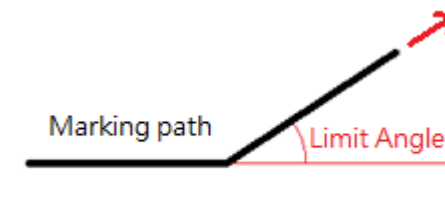

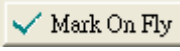

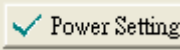


Fig3.1.16

Mark On Fly

The button  means this function is disabled. When it is enabled, the button will become to this . Please refer to the description of section 1.1.6.3 Mark On Fly.

Power Setting

The button  means this function is disabled. When it is enable, the button will become to this . Please refer to the description of section 1.1.6.14 Power Setting.

MM3D 3.2

Poly Delay Table:

Press the “Poly Delay Table” button will show a dialogue box like Fig.3.1.17.

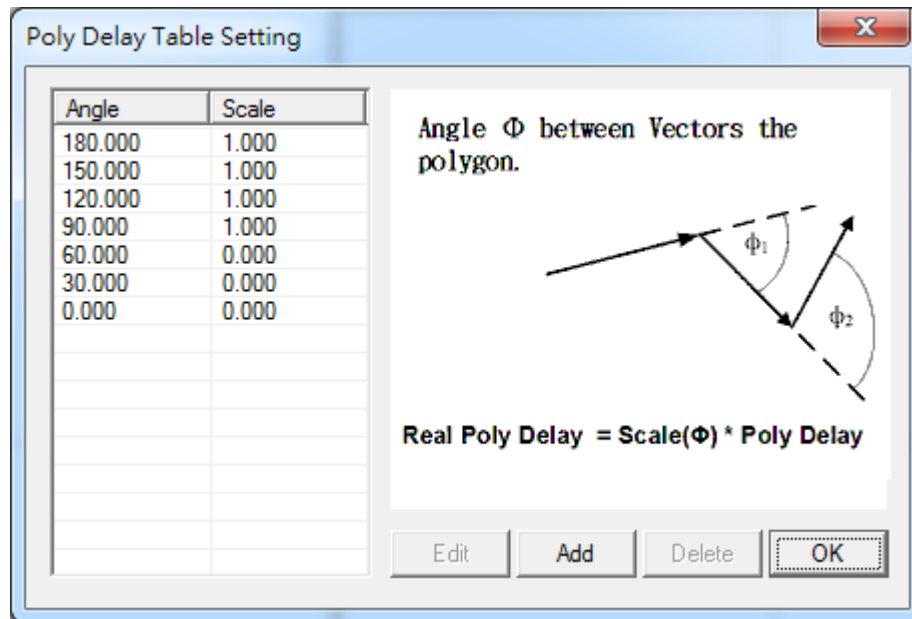


Fig. 3.1.17

The value of Angle and Scale will affect the Poly Delay under the Delay page of Property Table (refer to section 3.2.3). The following is the formula of delay time.

$$\text{Delay Time}(\phi) = \text{scale}(\phi) \cdot (\text{Poly Delay})$$

Scale(ϕ) is a ratio value between 0 and 2. Please note that ϕ is a supplementary angle of an included angle, and it is calculated as Fig.3.1.18 and Fig.3.1.19.

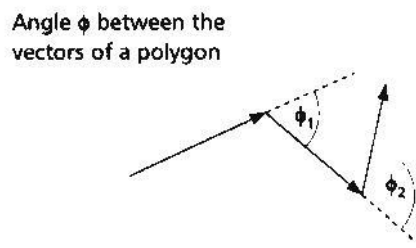


Fig. 3.1.18

MM3D 3.2

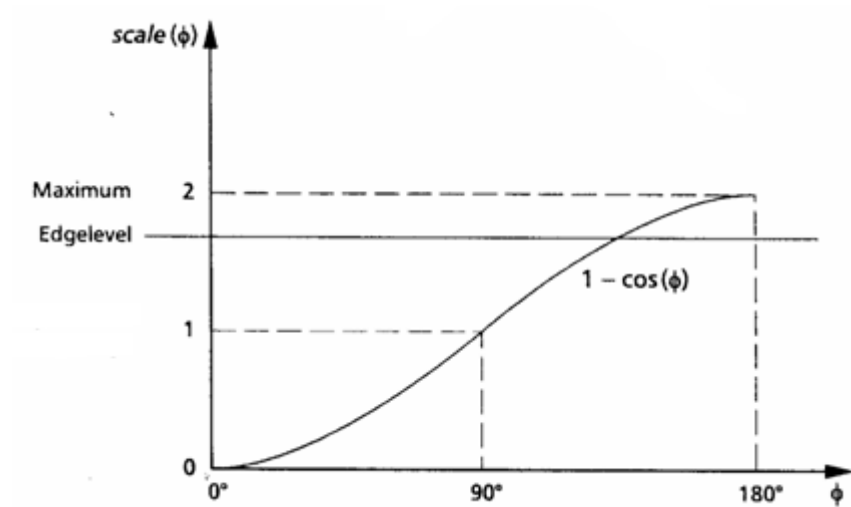


Fig. 3.1.19

Click “Add” button and a dialogue box “Poly Delay Table Editor” will pop up, see Fig.3.1.20 for users to enter the new value of angle and scale. Besides, users can select a angle and click “Edit” to edit that angle.

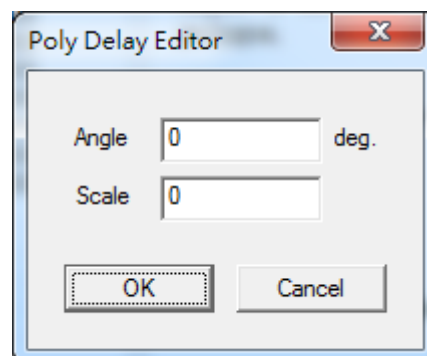


Fig. 3.1.20

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3.1.4 Power Test

This function is for users to realize the difference between the setting power and real power output through opening the laser for a period of time for users to measure the power, see Fig.3.1.21.

The screenshot shows a software window titled "Property Table" with a tabbed interface. The "Power Test" tab is selected. It contains four input fields: "Power:" with a value of 30 and a percentage symbol, "Duration:" with a value of 10 and "sec", "Freq:" with a value of 20 and "kHz", and "Pulse Width:" with a value of 10.0 and "us". Below these is a "Laser On" section containing a "Manual" button and a dropdown menu currently showing "Start" with "External Input" as an option. A "Laser Setting" button is positioned below the dropdown. At the bottom of the window is an "Apply All" button.

Fig. 3.1.21

Power

For CO2 laser, this value means the ratio of power. For example, if the maximum power of CO2 laser is 10W and the value is 30%, then the output power should be 3W. As to YAG laser, this value means the electric current of laser. For instance, suppose the electric current range is 0~10V, then the output value will be 3V when users set 30%.

Duration

The beam out duration of laser. Unless users shut down the laser, the laser will keep opening till the setting duration.

Freq.

Set the frequency of laser.

Pulse Width

Set the pulse width when using YAG laser or SPI laser.

Laser On

Click the “**Manual**” button or select an external signal input from the list and then click “**External Input**” button to start the laser.

Laser Setting:

[Refer to 3.1.2.](#)

MM3D 3.2

3.1.5 System

This page shows the total objects of the selected layer, see Fig.3.1.22.

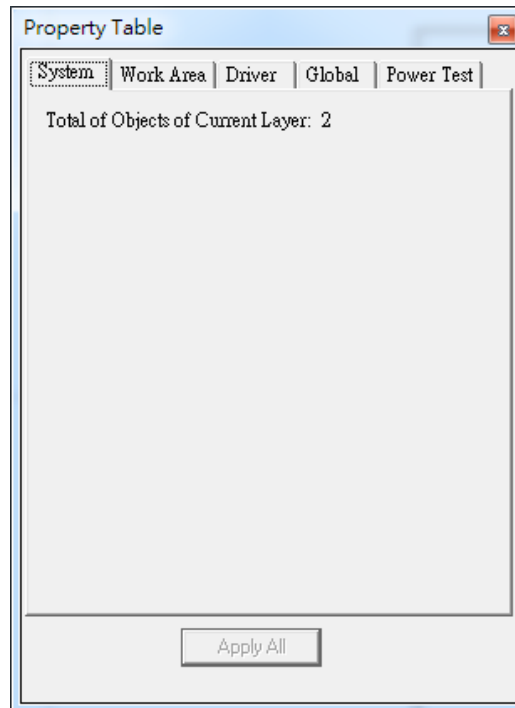


Fig. 3.1.22

MM3D 3.2

3.2 Mark-related Property Table

When an object in the Working Area is being selected, the property table of this object will be displayed. Users can set up some marking related parameters such as the object's frame/fill, mark parameter, delay, array copy, and motion setup.

3.2.1 Mark Parameter

Provide maximum five marking passes for users to set. Users can edit different marking parameters for each pass. Fig.3.2.01 shows the Mark Parameter Page when using CO2 or YAG driver (without Dot Mode). Fig.3.2.02 is the Mark Parameter Page using SPI driver under Dot Mode.

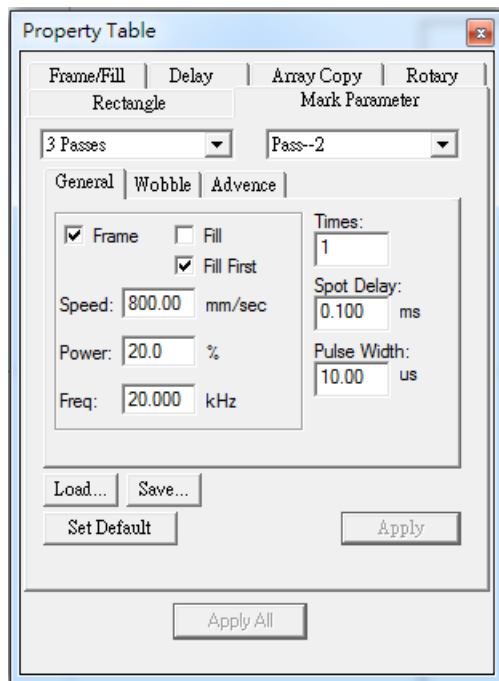


Fig. 3.2.01

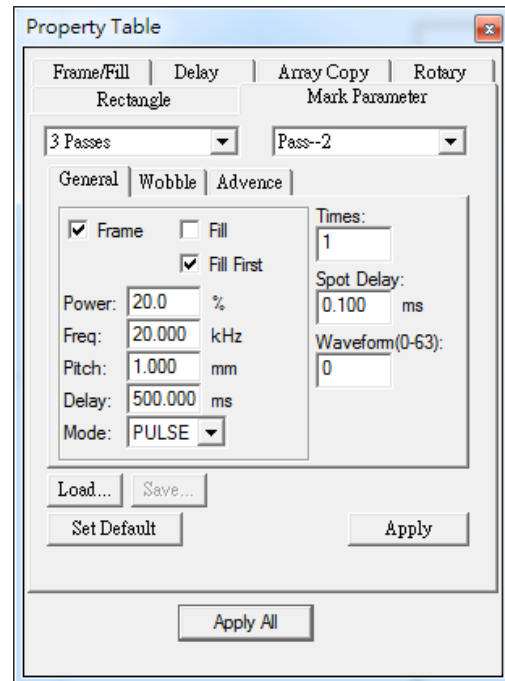


Fig. 3.2.02

General

Frame/ Fill

Decide whether to mark the object's frame or fill the object at each pass.

Fill First

Do filling first when marking.

Speed

Set the marking speed. This value cannot exceed the maximum speed of the system.

Power

Current percentage (YAG) or percentage of PWM high signal (CO2).

Frequency

The cycle of laser's trigger. This item is useless in some CO2 system controlled by voltage.

Pitch (Under Dot Mode)

The gap between each dot.

Delay (Under Dot Mode)

The waiting time laser needs to start marking after moving to next dot.

MM3D 3.2

Mode

Select “PULSE,” “MCW” or “CW” mode to mark (SPI driver only).

Times

Set the marking times for a work piece using the same marking parameters. If this value is 3, the object will be marked on the work piece three times at one process. If the value is 0, the object won't be marked.

Spot delay

The required time for laser to mark a spot or the marking time for each pixel **when marking image objects. If this value is 0.5ms that means each spot will be marked for 0.5ms.**

Pulse Width

Set the pulse width (YAG driver only).

Waveform No. (0-63)

Set the Waveform Number (SPI driver only). Each waveform has its default frequency. For more details, please contact to SPI laser providers.

Wobble

Mark by spiral type and make the line segment become thicker, see Fig.3.2.03.

Thick(W)

The diameter of the circle.

Overlap

Higher overlap percentage will get thicker line segment, see Fig.3.2.04.

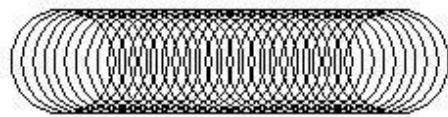


Fig. 3.2.04

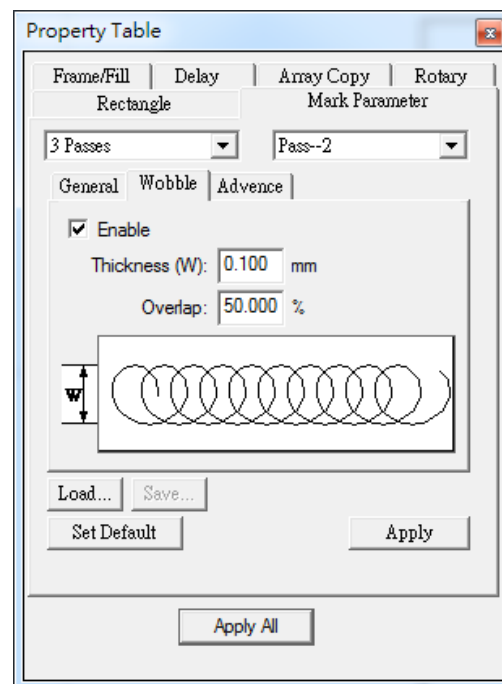


Fig. 3.2.03

MM3D 3.2

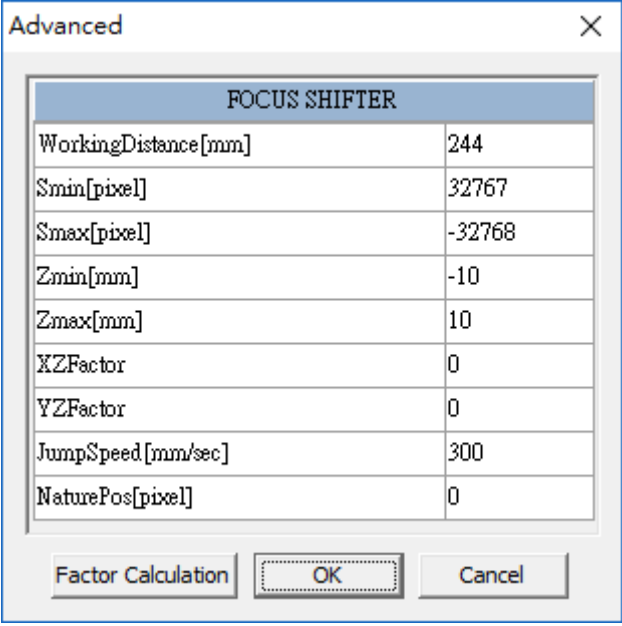
Focal Axis

Set and use focal axis. Refer to fig.3.2.05.

Fig.3.2.05

Enable	Enable 2.5D marking
Hole Mode	Altitude constantly decline when use 2.5D marking.
Position	Initial marking altitude.
Every times decline mm	Altitude decline distance after certain times marking.
Z-axis	Z-axis compensation at certain altitude.
Same Scale	Scale keep + and – the same value.
Scale X	X axis scale rate at current position.
Scale Y	Y axis scale rate at current position.
Advanced	Click Advanced button to open Advance dialog.Refer to fig.3.2.06.

MM3D 3.2



The image shows a software dialog box titled "Advanced" with a close button (X) in the top right corner. Inside the dialog is a section titled "FOCUS SHIFTER" which contains a table of parameters. The parameters and their values are: WorkingDistance[mm] (244), Smin[pixel] (32767), Smax[pixel] (-32768), Zmin[mm] (-10), Zmax[mm] (10), XZFactor (0), YZFactor (0), JumpSpeed[mm/sec] (300), and NaturePos[pixel] (0). At the bottom of the dialog are three buttons: "Factor Calculation", "OK", and "Cancel".

FOCUS SHIFTER	
WorkingDistance[mm]	244
Smin[pixel]	32767
Smax[pixel]	-32768
Zmin[mm]	-10
Zmax[mm]	10
XZFactor	0
YZFactor	0
JumpSpeed[mm/sec]	300
NaturePos[pixel]	0

Factor Calculation OK Cancel

Fig.3.2.06

Working Distance

Working distance of laser.

Smin

Limitation of 3rd axis min value.

Smax

Limitation of 3rd axis max value.

Zmin

The lowest position of marking.

Zmax

The highest position of marking.

XZFactor

Do not change if unnecessary.

YZFactor

Do not change if unnecessary.

JumpSpeed

Moving speed of the 3rd axis.

NaturePos

Initial position of the 3rd axis.

MM3D 3.2

Advance

Provide users some further mark settings, see Fig.3.2.07 and Fig.3.2.08.

Mark End Add Spot

Set the Spot Delay to mark a spot again at the mark end position.

Speed Mode

Users can select to use Dot Mode or Normal Mode when marking.

Repeat

Set the repeat times for each dot.

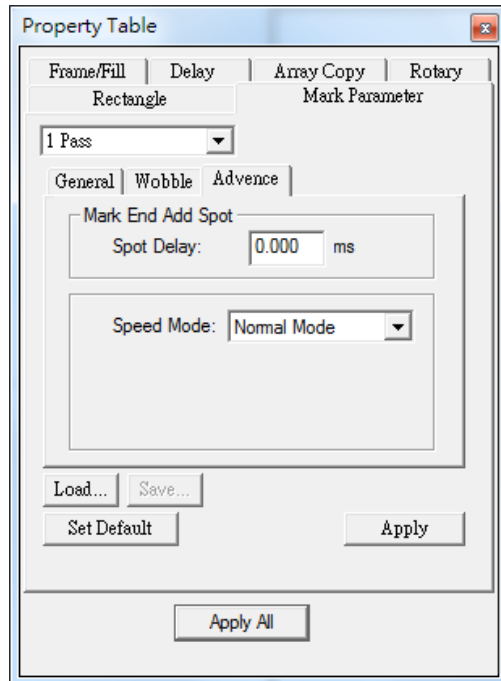


Fig. 3.2.07

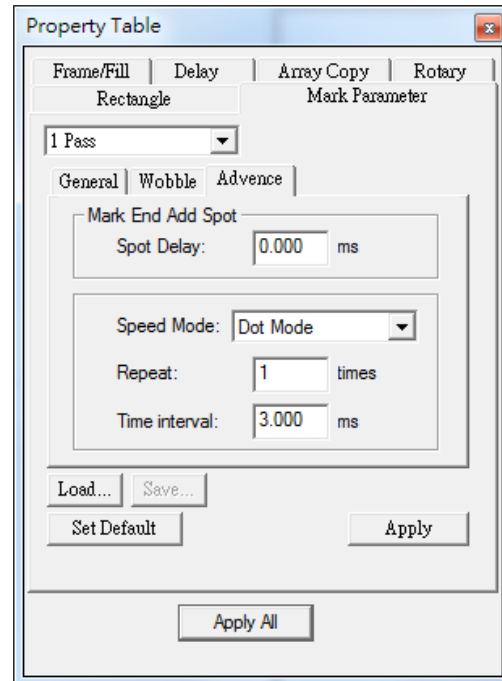


Fig. 3.2.08

Time Interval

The time interval between each dot on one spot.

Load

Load the previous saved parameter setting.

Save

Save the current setting.

Set Default

Set the current setting as the default setting.

MM3D 3.2

3.2.2 Frame/Fill

Set the frame color, fill color and fill style, see Fig.3.2.09.

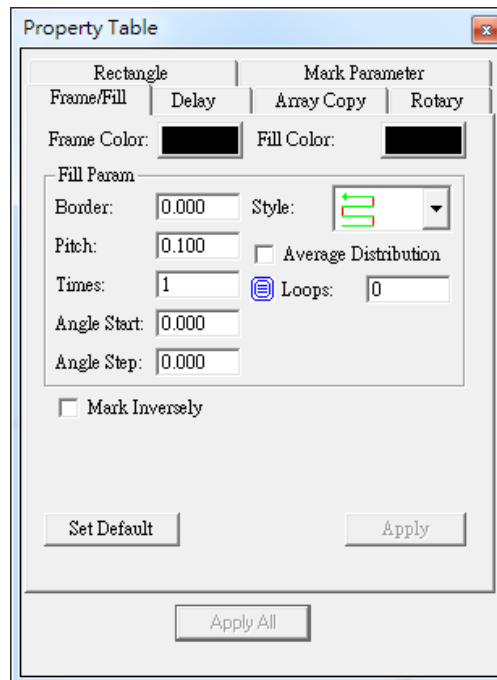


Fig. 3.2.09

Frame/ Fill Color: Select the frame of fill color.

Fill Param: Modify the related parameters when fill.

Border: The distance between hatch line and the frame.

Pitch: The distance between each hatch line.

Average Distribution: Distribute the hatch line averagely based on the pitch and the frame.

Times: The fill repetition times.

Angle Start: The start angle of each hatch line. Fig.3.2.10 shows the fill representation when this value is 45°.

Angle Step: The progressive angle of each hatch line. Fig.3.2.11 show the fill representation when Angle Start is 45°and Angle Step is 90°.

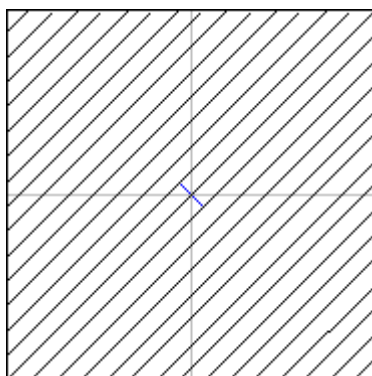


Fig. 3.2.10

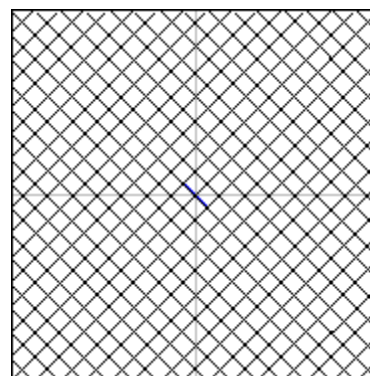



Fig. 3.2.11

Style: Decide the traveling path mode of laser when fill. There are five styles for users to select.

MM3D 3.2



 **Loops:** Decide the amount of loop created inside the object according to the pitch. The hatch line will be filled in the loop. Fig.3.2.12 shows the hatch representation when this value is 2.

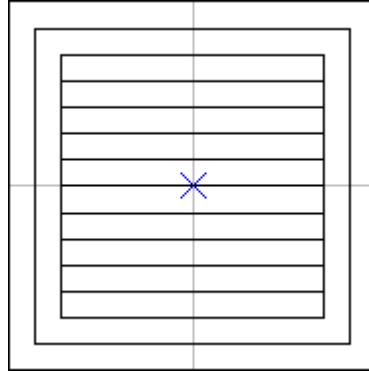



Fig. 3.2.12

* If choose  mode, users can only set pitch parameter.

Mark Inversely: Only when the object is Text, Arc Text or Rect Text. The system will mark the non-text part instead of mark the text object when using this function.

MM3D 3.2

3.2.3 Delay

Adjust the delay time parameters which affect the mark quality, see Fig 3.2.13.

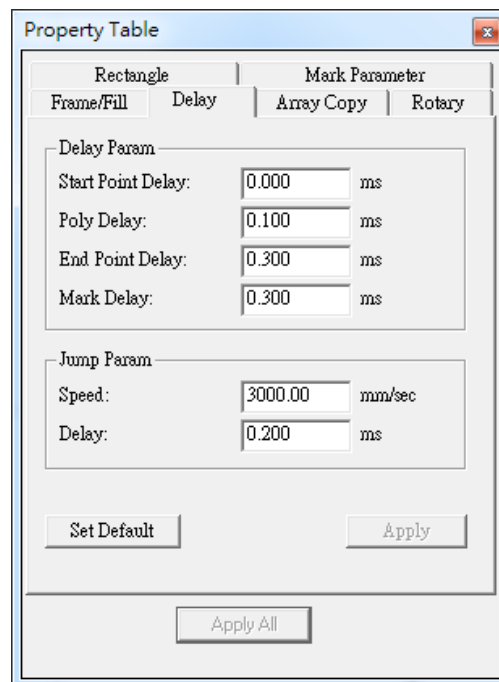


Fig. 3.2.13

Delay Param: Provides four parameters for users to regulate. Users can adjust the required delay time based on the mark result.

Start Point Delay:

The time difference between the lens starts moving and the laser starts hitting. The default value is 0. It can be set depending on users needs. This value can also be negative, and it means the lens will start moving after the laser hitting through the setting time. Table 3.1 shows the different result under different Start Point Delay Time.

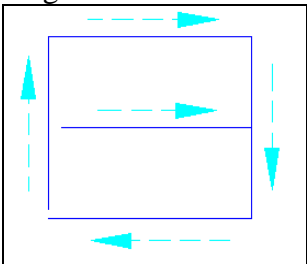
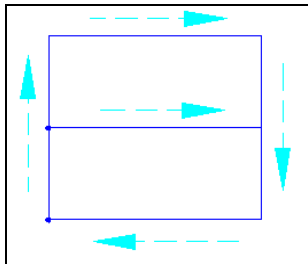
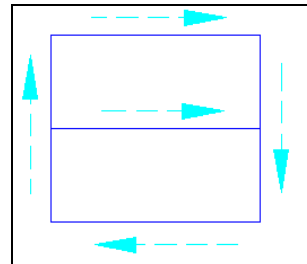
<p>The delay time is too long.</p> 	<p>The delay time is too short.</p> 	<p>The delay time is suitable.</p> 
--	---	---

Table 3.1

MM3D 3.2

Poly Delay:

The time value will affect the mark quality of the connection part of two segments. Table 3.2 shows the mark result under different settings.

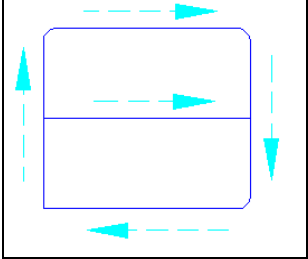
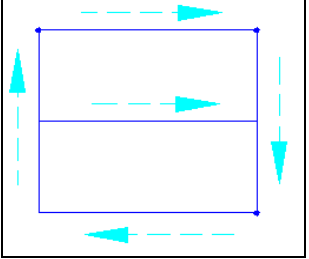
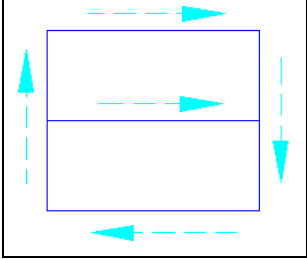
The delay time is too short.	The delay time is too long.	The delay time is suitable.
		

Table 3.2

End Point Delay:

The time value will affect the accuracy on the ending of the object. Table 3.3 shows the mark result under different settings.

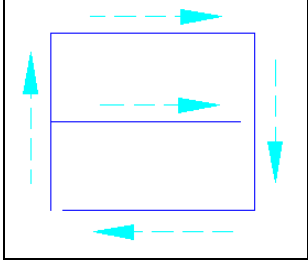
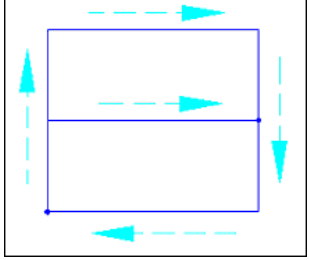
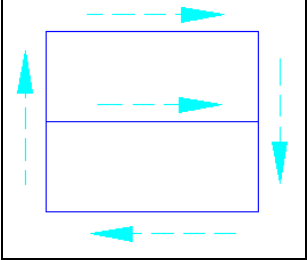
The delay time is too short.	The delay time is too long.	The delay time is suitable.
		

Table 3.3

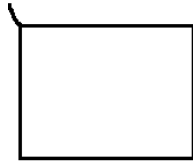
Mark Delay:

The delay time that ensures the scanner will reach the assigned position before the next command (mark or jump) starts. This delay time includes the End Point Delay.

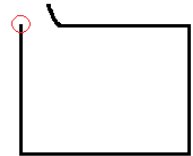
MM3D 3.2

End Point Delay and Mark Delay

If there is no tail marking at the marking end stage, end point delay and mark delay are totally equal. On the other hand, if there is a tail seen as the figure below:



User will need to adjust mark delay. First of all, set both end point delay and mark delay to 0. This time the result will be seen as below:



Then enlarge the mark delay until the tail is disappeared. Seen as below:



At this moment synchronously add end point delay and mark delay. Until rectangle start point and end point is the same point. See as below:



Jump Param: Set the parameters about the moving of lens.

Speed: The moving speed of lens. The maximum value must refer to the manual of the lens.

Delay: The waiting time laser needs to start hitting after the lens moves to the mark position.

MM3D 3.2

3.2.4 Array Copy

This function uses the selected object as the main body to copy and create the same new objects. However, the new object is a virtual object, which means the Object Browser will only show the original object. Users can only modify the original object, and the other virtual objects will be changed according to the change of original one. Nevertheless, using “Break” function will make the virtual objects become single objects and allow users to edit them individually. There are two array copy mode for users to select: By Matrix and By Circle.

Array Copy Mode: By Matrix

The Property Table of this mode shows like Fig.3.2.14, and Fig.3.2.15 is the result under this mode.

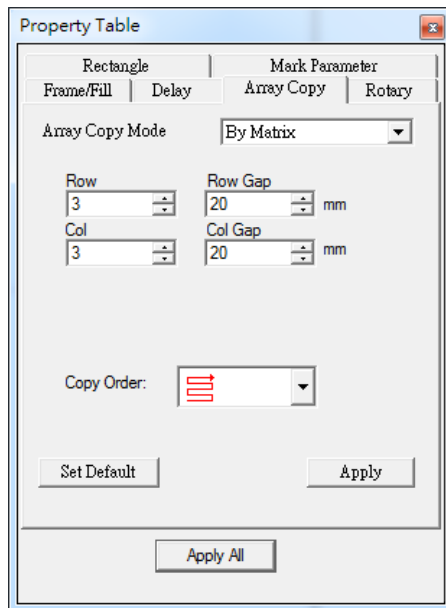


Fig. 3.2.14

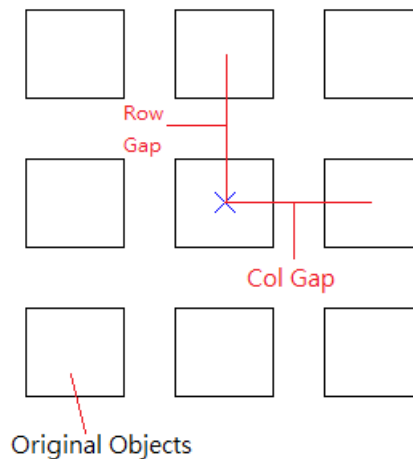


Fig. 3.2.15

Row/ Col: The amount of objects in a row/ column.

Row Gap/ Col Gap: The vertical and horizontal distance between the centers of each object.

Copy Order: Select the copy order of the object. There are four types to choose.



MM3D 3.2

Array Copy Mode: By Circle

The Property Table of this mode shows like Fig.3.2.16, and Fig.3.2.17 is the result under this mode.

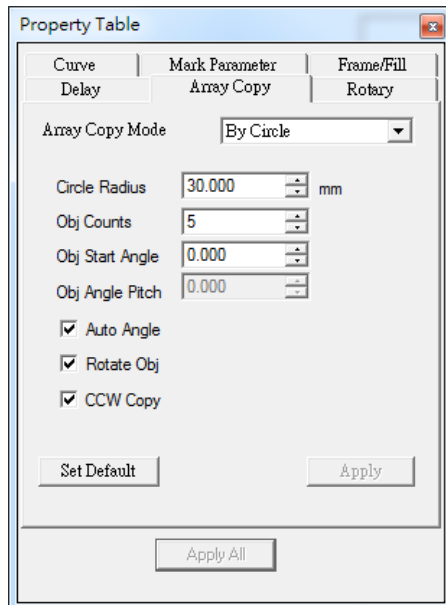


Fig. 3.2.16

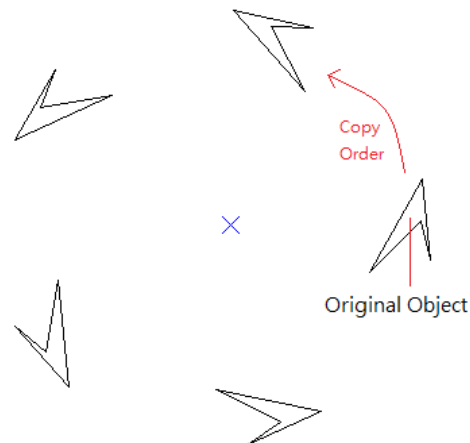


Fig. 3.2.17

Circle Radius: Edit the size of the circle.

Obj Counts: The amount of the objects.

Obj Start Angle: Set the start angle of the first copy object.

Obj Angle Pitch: Arrange the objects according to the input pitch degree and the center of the object.

Auto Angle: Arrange the objects averagely as a cycle. This option cannot be used with Obj Angle Pitch at the same time.

Rotate Object: Decide to rotate the object or not. Fig.3.2.17 uses this function, but Fig.3.2.18 doesn't.

CCW Copy: Decide to use the clockwise copy order or counterclockwise copy order. The default is counterclockwise.

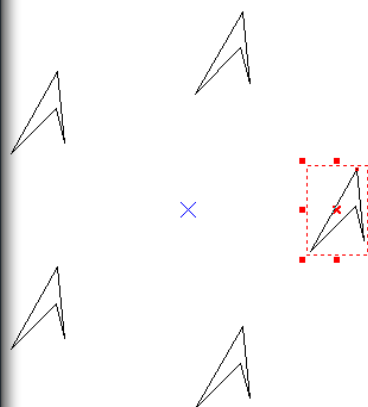
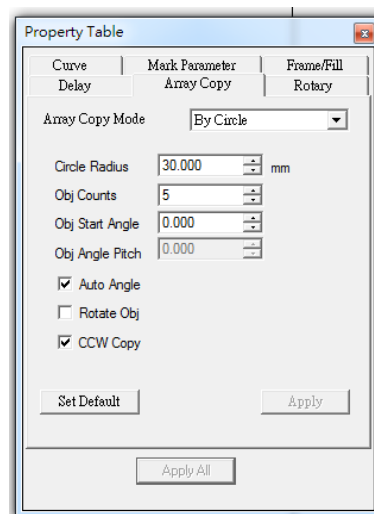


Fig. 3.2.18

MM3D 3.2

3.2.5 Rotary

This page allows users to enable rotary marking for individual object. Fig.3.2.19 is the property page when selecting a general object.

Enable

Allow users to enable or disable the rotary axis function.

Start Position

The initial angle of the rotary.

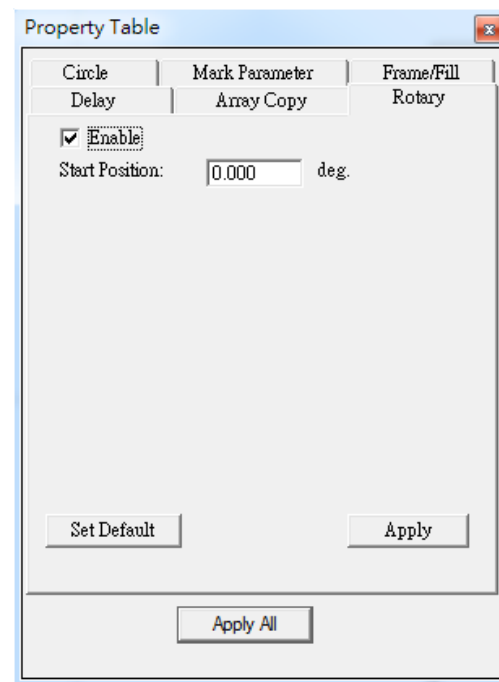


Fig. 3.2.19

Text Object

When a general text object has being selected, the Rotary Page has some particular options, like Fig.3.2.20.

Text option

Separate To Character

Separate the selected text into individual characters.

Pitch

The distance between each character.

Center: Calculate the pitch based on the center of the character, see Fig.3.2.21.

Edge: Calculate the pitch based on the edge of the character, see Fig.3.2.22.

Diameter: The software needs the diameter of the working-piece to calculate the pitch when select Edge mode.

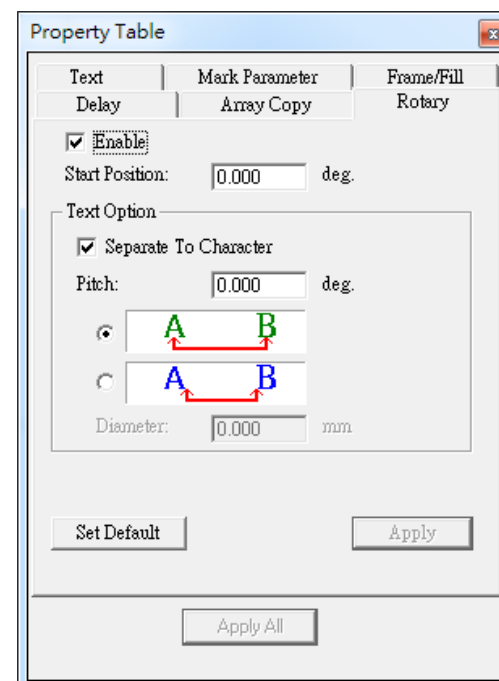


Fig. 3.2.20

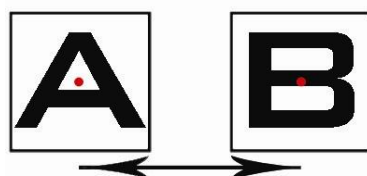


Fig. 3.2.21

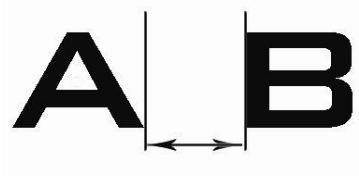


Fig. 3.2.22

MM3D 3.2

3.2.6 3D property page

Manage selected object 3D parameter. Please check “Option”→ “Focal axis config” → “Enable 3D mode” and “Enable 3D correction mode” to enable this page. Refer to fig.3.2.23 :

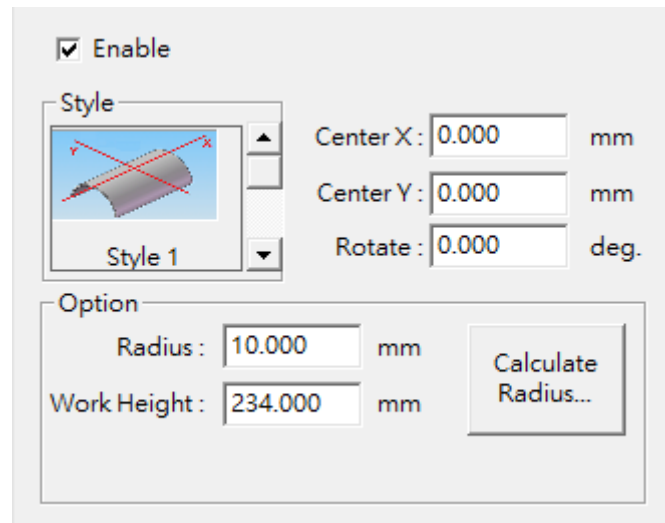


Fig.3.2.23

Enable	Active 3D marking. Check to enable style selection.
Style	Select a model style
Style1	Convex tube (Built-in)
Style2	Concave tube (Built-in)
Style3	Convex sphere (Built-in)
Style4	Concave sphere (Built-in)
Style5	Cant (Built-in)
Style6	Cone (Built-in)
Style7 or above	User imported model.
CenterX	Center position at X direction.
CenterY	Center position at Y direction.
Rotate	Model rotate angle.
Radius	Curve radius. This could be calculated by “Calculate curve radius”.
Work Height	Distance from center position to lens.
Slope Angle	The angle between slop and horizon plane. This could be calculated by “Calculate Bevel”.
Calculate Radius	Calculate radius. Refer to fig.3.2.24.

MM3D 3.2

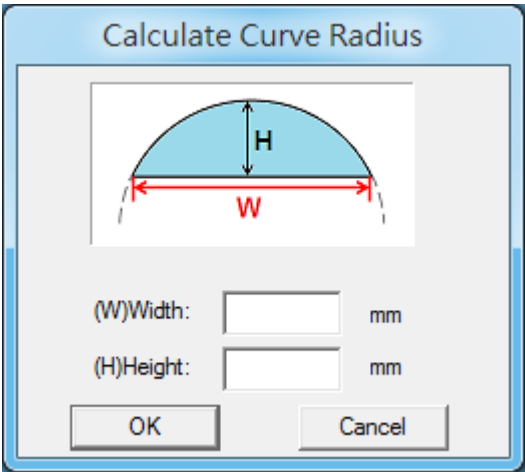


Fig.3.2.24

Width
Height
Calculate Bevel

The distance between two end points.
The chord height.
Input the parameter to calculate the slopr angle. Refer to fig.3.2.25

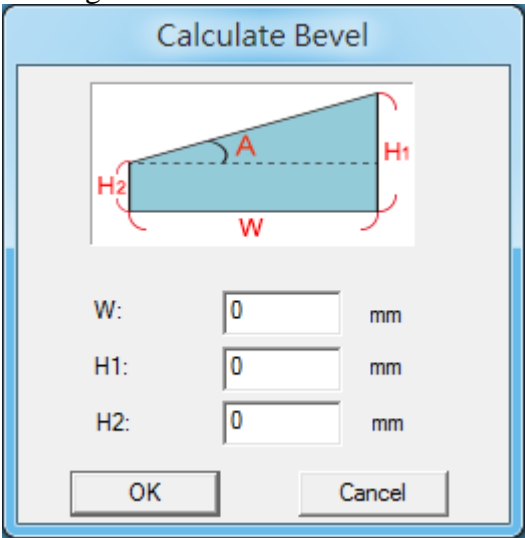


Fig.3.2.25

W
H1
H2
Set Default
Apply

Underside width.
Distance from upper side of slop to underside.
Distance from lower side of slop to underside.
Set current 3D parameter as default value.
Apply the current setting.

MM3D 3.2

3.3 Object-related Property Table

When an object in Work Area has being selected, the Property Table of this object will be displayed. Users are allowed to edit the parameters of this object through its own property page.

3.3.1 Curve

When create a curve which is not closed path, such as line, curve and curve brush, users can transform that curve into a closed path curve, see Fig.3.3.01.

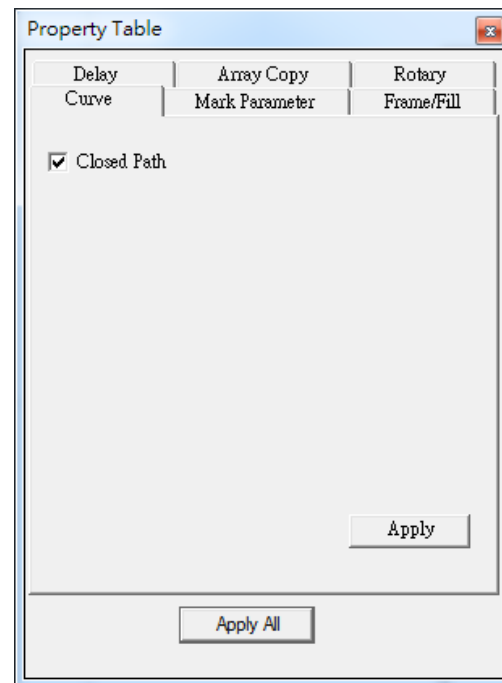


Fig. 3.3.01

3.3.2 Arc

Create an arc object, and its parameter page will show like Fig.3.3.02.

Center: Adjust the center position of the arc.

Radius: Adjust the radius of the arc.

Same as X: Make the radius of Y same as X.

Start Dot: Set the start point angle of the arc. X and Y value will change automatically following the angle.

End Dot: Set the end point angle of the arc. X and Y value will change automatically following the angle.

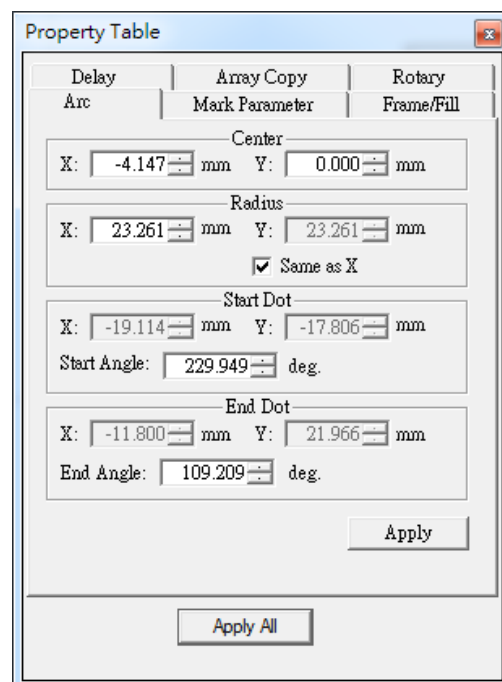


Fig. 3.3.02

MM3D 3.2

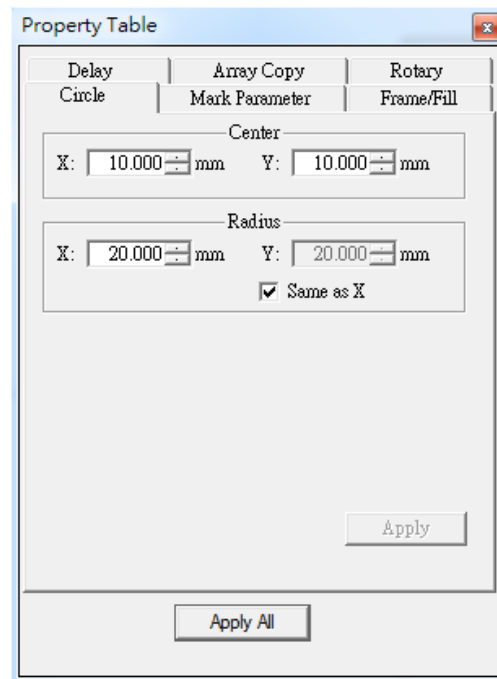
3.3.3 Circle

Create a circle object and the parameter page will show like Fig.3.3.03.

Center: Adjust the center position of the arc.

Radius: Adjust the radius of the arc.

Same as X: Make the radius of Y same as X.



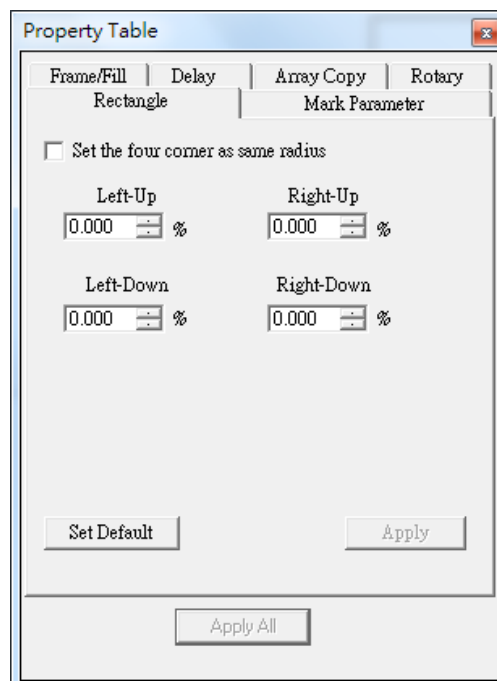
The Property Table for a Circle object has tabs for Delay, Circle, Array Copy, Mark Parameter, Rotary, and Frame/Fill. The Center section shows X: 10.000 mm and Y: 10.000 mm. The Radius section shows X: 20.000 mm and Y: 20.000 mm, with a checked box for 'Same as X'. There are 'Apply' and 'Apply All' buttons at the bottom.

Fig. 3.3.03

3.3.4 Rectangle

Create a rectangle object and the parameter page will show like Fig.3.3.04. Users can set the four corners of rectangle as circle cape. The radius of circle cape can be set individually or set as same radius.

Set the four corners as same radius: Corner radius is the radian of the rectangle's four angles. The radius is set according to the percentage of the rectangle's short side or the square's side, see Fig.3.3.05.



The Property Table for a Rectangle object has tabs for Frame/Fill, Delay, Rectangle, Array Copy, Mark Parameter, and Rotary. The 'Set the four corner as same radius' checkbox is unchecked. Individual corner radius settings are shown for Left-Up, Right-Up, Left-Down, and Right-Down, all set to 0.000 %. There are 'Set Default', 'Apply', and 'Apply All' buttons.

Fig. 3.3.04

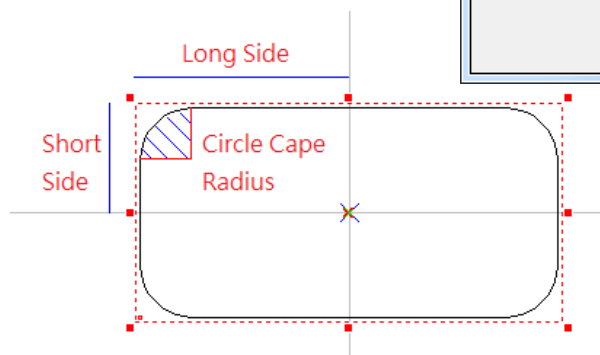


Fig. 3.3.05

MM3D 3.2

3.3.5 1D Barcode

Create a 1D Barcode object and the parameter page will show like Fig.3.3.06.

The screenshot shows a 'Property Table' dialog box with a tabbed interface. The '1D Barcode' tab is selected. It contains the following fields and controls:

- Code Type:** A dropdown menu showing 'Code 39'.
- Code Data:** A text input field containing '123456'.
- Width Ratio:** A numeric input field with a spinner, set to '3.000'.
- Code Rule:** A text area containing the rule 'Code data must less than 30 words'.
- Show Text:** A checked checkbox.
- Set Font:** A button next to the 'Show Text' checkbox.
- Check Digit:** A checked checkbox.
- Invert:** A checked checkbox.
- Quiet:** A numeric input field with a spinner, set to '1', followed by a '%' symbol.
- Auto Text:** An unchecked checkbox.
- Manager:** A button next to the 'Auto Text' checkbox.
- Buttons:** 'Set Default', 'Apply', and 'Apply All' buttons are located at the bottom of the dialog.

Fig. 3.3.06

Code Type

There are several code types for users to select: Code 39, Code 128, Code 128A, Code 128B, Code 128C, Code 93, Code Bar, ITF, MSI Code, Us PosNet, UPC-A, UPC-E, EAN 8, EAN 13, UCC 128, EAN 128, FIM, Code 25 or ITF 25.

Code Data

Input the code data here.

Width Ratio

Set the ratio of narrow bar to wide bar. This value is between 2.0~3.0.

Code Rule

Display the special rule of selected code type.

Show Text

Decide to show the code data under barcode or not.

Set Font

Change the font, font style and font size of code data.

Invert

Invert the bar and space of the bar code. This application is when the work piece is black, see Fig.3.3.07.

Quiet

The size of quiet area when using Invert function, see Fig.3.3.07.

Check Digit

A check digit is calculated automatically and added.

Auto Text

Use auto text as the content of code data.

Manager

Manage the auto text.

MM3D 3.2

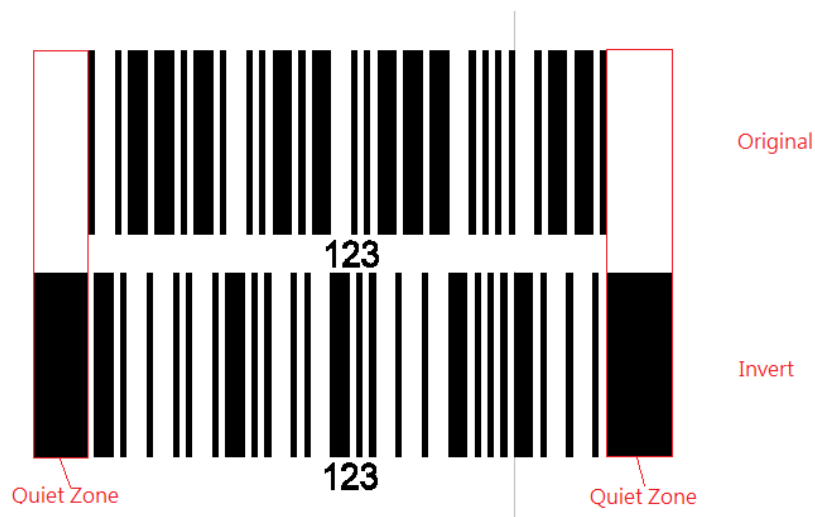


Fig. 3.3.07

3.3.6 1D Marking

Some marking-related settings, see Fig.3.3.08.

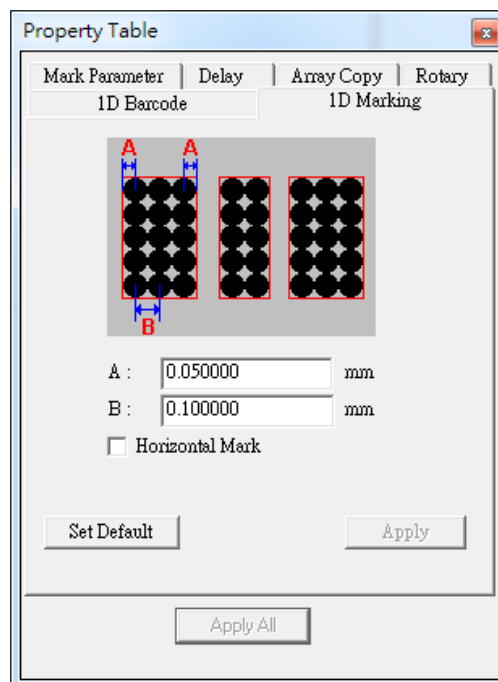


Fig. 3.3.08

A

The distance between laser spot center and the edge of barcode.

B

The distance between two laser spots (according to the spot center).

Horizontal Mark

Mark the bar code in horizontal way (generally is in vertical way).

MM3D 3.2

3.3.7 2D Barcode

Create a 2D Barcode object and the parameter page will show like Fig.3.3.09.

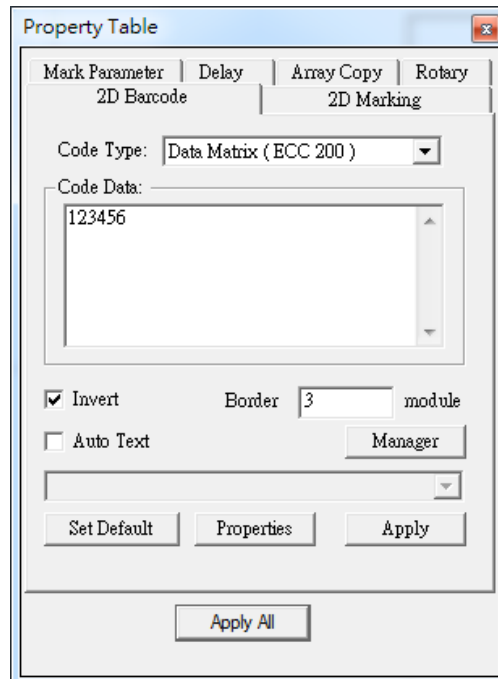


Fig. 3.3.09

Code Type

There are several code types for users to select: Data Matrix (ECC 000~140), Data Matrix (ECC 200), PDF417, QR Code, and Maxi Code, PDF417 Truncated 、Micro PDF417 、Micro QR Code.

Invert

Invert the bar and space of the bar code. This application is when the work piece is black, see Fig.3.3.10.

Border

The size of quiet area when using Invert function, see Fig.3.3.10.

Auto Text

Use auto text as the content of code data.

Manager

Manage the auto text.

Properties

Select the rectangular size and format of 2D Barcode.

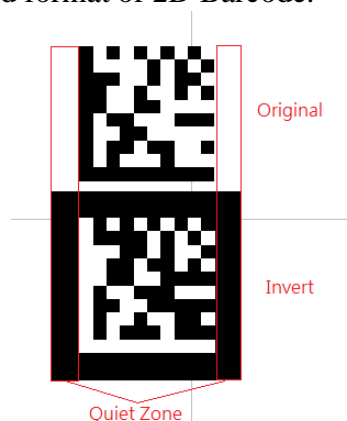


Fig. 3.3.10

MM3D 3.2

3.3.8 2D Marking

Some marking-related options, see Fig.3.3.11.

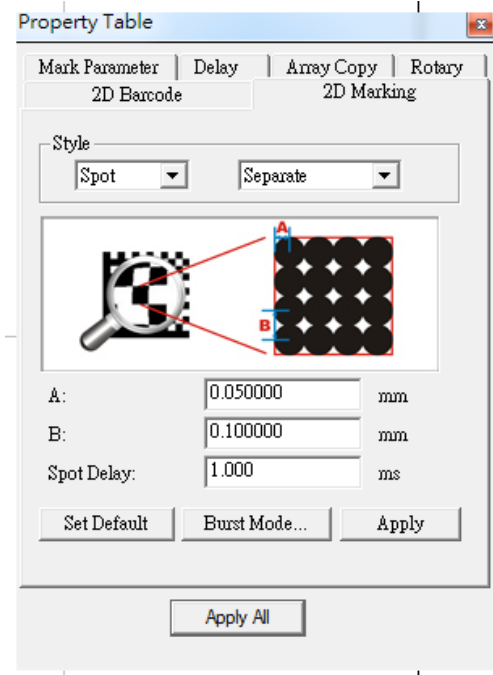




Fig. 3.3.11

Style
2D barcode is divided into many cells and has three mark style to mark each cell. Besides, in order to make the instruction more lucid, we consider that 2D Barcode has two parts: cell and row, see Fig.3.3.14.

	Spot: Mark each cell in spot manner.
	Line: Mark each cell in line manner.
	Rectangle: Mark each cell as a rectangle.
	Spiral: Mark each cell as a spiral.
	Circle: Mark each cell as a circle.
Custom	Custom: After user choosing Custom and press on Apply, will appear 2D Barcode toolbar . Clicking on  to enter edit mode. If we draw as fig 3.3.12, after clicking on  to leave edit mode, 2D barcode will be seen as like fig 3.3.13.

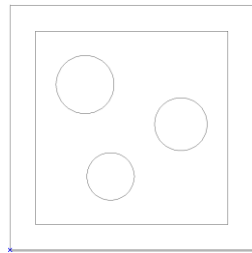


Fig. 3.3.12

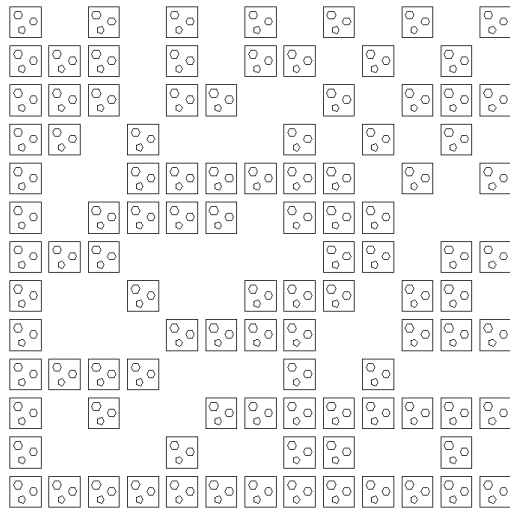


Fig. 3.3.13

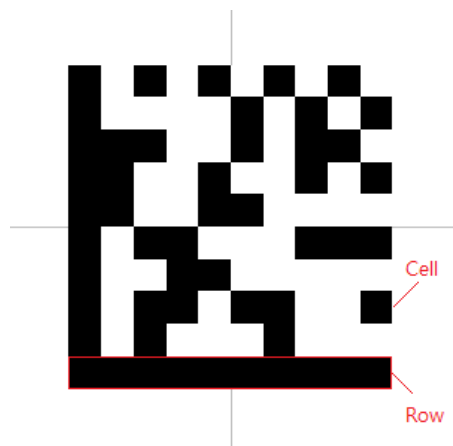


Fig. 3.3.14

Each style has two mark modes.

Spot and Rectangle Style

Orderly: Mark following the cell's and row's order.

Separate: Mark without following the cell's order. This method can avoid the blurred result caused thermal effects.

Line Style

Continuous: Consider all the cells on the same row as one unit and mark.

By Cell: Mark all the cells one by one and follow the row's order.

A: The distance between laser spot center and the edge of barcode.

B: The distance between two laser spots (according to the spot center).


Spot Style

Spot Delay: The required time for laser to mark a spot.

Burst Mode: Click "Burst Mode..." button the dialogue box of options will appear to set up the Burst Mode settings (please refer to 1.1.6.8).

Line Style

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Non-Stop: Mark all the cells (By Cell) or each row (Continuous) by  style.

Alternate Lines: Mark without following the row's order to avoid the blurred result caused thermal effects.

Rectangle Style

Poly Delay: Set the poly delay. For more details about Poly Delay, please refer to Section 3.2.3.

Spiral Style

Out ring circle: Mark an outer ring after each spiral is marking completed.

Outer to inner: Setting spiral marking direction is from outer to inner.

CCW: Setting spiral marking direction is counter clockwise.

3.3.9 Image

Import an image, and the property table will show the related information of this image, see Fig.3.3.15.

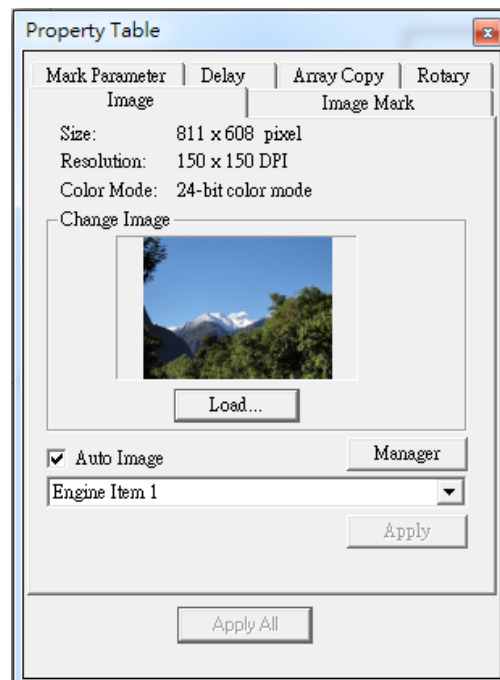


Fig. 3.3.15

Auto Image: Mark the image based on the application of Auto Text when there has a series of images to mark.

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3.3.10 Image Mark

Adjust the mark settings of the image, see Fig.3.3.16.

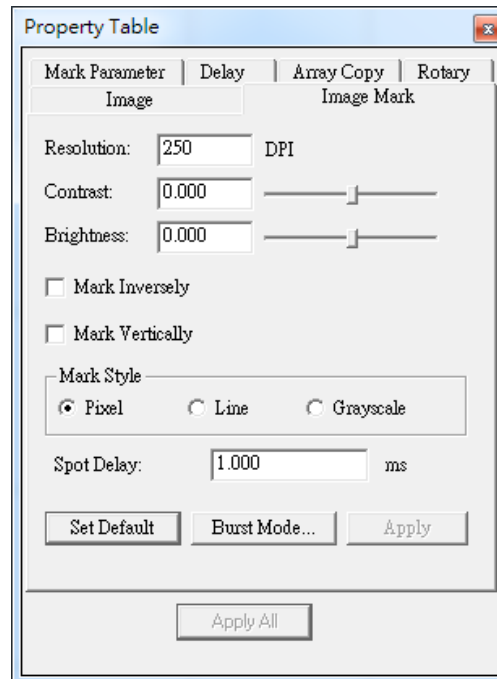


Fig. 3.3.16

Resolution

The resolution of the image. DPI means “Dots Per Inch.”

Contrast/ Brightness

Adjust the contrast/ brightness of the image.

Mark Inversely

This function is used when the color of work piece is black.

Mark Vertically

Mark the image in vertical way.

Mark Style: An image is composed by pixels which are according to the size of the image. For example, if the size of the image is 600×800, then the amount of pixels of that image will be 480,000.

Pixel: Mark the image as dots.

Spot Delay: The required time for laser to mark a spot.

Burst Mode: Click “Burst Mode...” button the dialogue box of options will appear to set up the Burst Mode settings (please refer to 1.1.6.8).

Line: Connect the pixels on the same row as a line and mark the image.

Grayscale: Transfer the image into a black-and-white color image.

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3.3.11 Text

Create a Text object, and the Text Property Page will display like Fig.3.3.17.

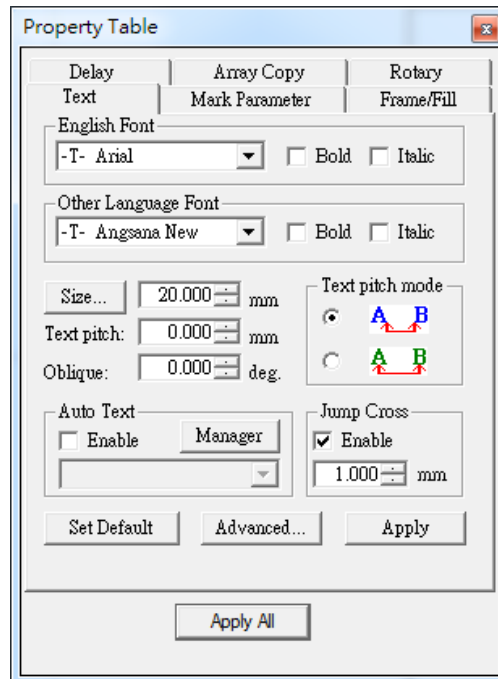


Fig. 3.3.17

English Font: Select the font for letters of the alphabet and numerals.



Other Language Font: Select the font for other language characters.

Bold/ Italic: Select the font type as bold, italic or both.

Size: Adjust the font size.

Text Pitch: Adjust the spacing between two characters.

Oblique: Adjust the tilt angle of the text.

Text Pitch Mode: Select the text pitch base. There are two modes for users to apply: based on the edge of characters  or based on the center .

Auto Text: Apply the Auto Text function.

Jump Cross: Enable or disable the jump cross function. [Refer to 1.2.24.](#)

Advance: Offer further settings for text, see Fig.3.3.18.

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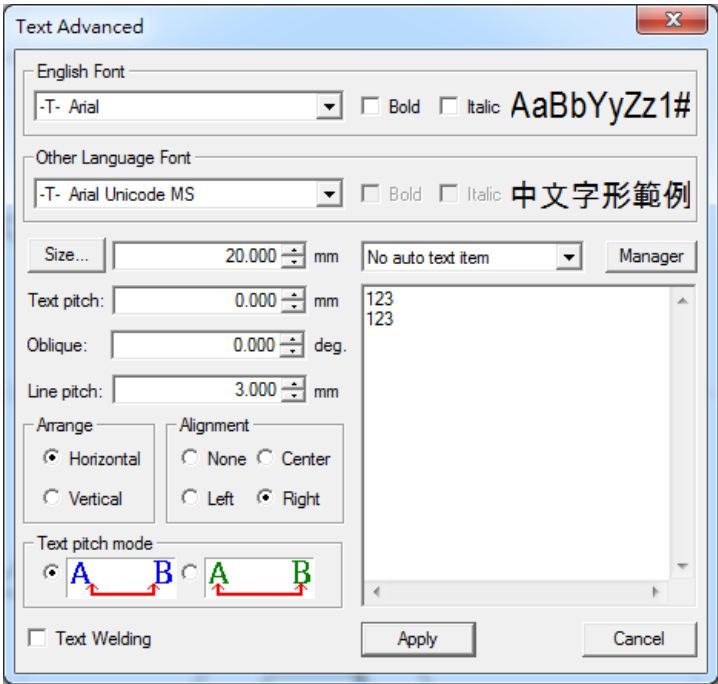


Fig. 3.3.18

Line Pitch: Adjust the spacing between each line.
Arrange:Select the character arrange style, see Fig.3.3.19.

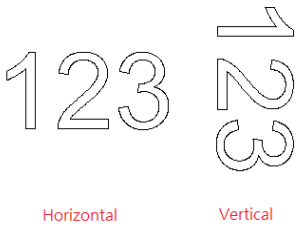
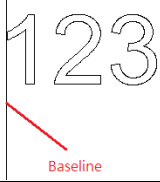
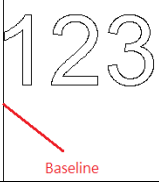
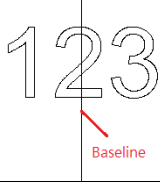
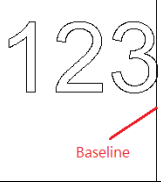


Fig. 3.3.19

Alignment: Use the insert position as the baseline, and align the text object along that baseline.

None	Left	Center	Right
			

Text Welding: Use to avoid the overlapping part of character's strokes.

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3.3.12 Arc Text

Create an Arc Text object, and the Arc Text Property Page will be displayed like Fig.3.3.20.

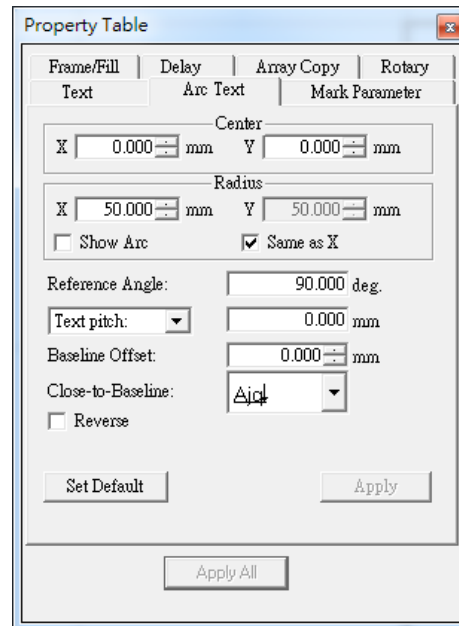


Fig. 3.3.20

Center: Set the center position of the arc.

Radius: Set the arc's radius.

Show Arc: Show the arc path, see Fig.3.3.21.

Same as X: Make the arc has the same radius (becomes a circle).

Reference Angle: Set the angle between 0° line and reference line. Users can adjust the text's alignment from Text Tool Bar or Text Property Table—Advance. Please note that the system will suppose the reference line as the alignment baseline when using Arc Text.

Text Position: Adjust the spacing between characters.

Spread Angle: Set the spread angle and the characters will distribute averagely in this range.

Baseline Offset: Set the spacing between the text and the baseline.

Close-to-Baseline: Select the position of text based on the baseline.

Reverse: Reverse the text part of the art text, see Fig.3.3.22.

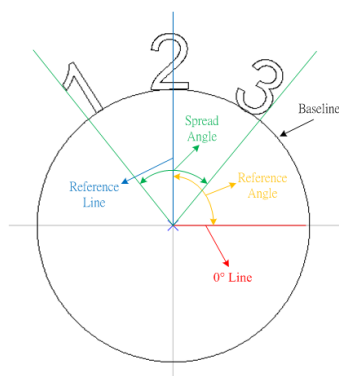


Fig. 3.3.21

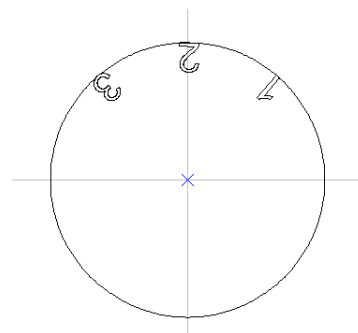


Fig. 3.3.22

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3.3.13 Rectangle Text

Create a Rectangle Text object, and the Rectangle Text Property Page will be displayed like Fig.3.3.23.

The image shows a software window titled "Property Table" with a close button in the top right corner. Inside the window, there are several tabs: "Frame/Fill", "Delay", "Array Copy", "Rotary", "Text", "Rect Text", and "Mark Parameter". The "Rect Text" tab is currently selected. Below the tabs, the "Center" section has input fields for "X" and "Y", both set to "0.000 mm". The "Dimension" section has input fields for "Length" (set to "50.000 mm") and "Width" (set to "10.000 mm"). The "Shrink" section has input fields for "Top", "Left", "Bottom", and "Right", all set to "1.000 mm". Below these sections is a checkbox labeled "Show Rect" which is currently unchecked. Underneath the checkbox is a text input field labeled "Content" containing the text "123". At the bottom of the dialog, there are three buttons: "Set Default", "Apply", and "Apply All".

Fig. 3.3.23

Center: Set the center position of the Rectangle.

Dimension: Set the rectangle width and height.

Shrink: Set the gap between text and rectangle edge.

Show Rect: Reveal rectangle.

Content: Text content.

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3.3.14 Baseline

The Baseline Property Page will be displayed when using “Baseline” function. There are two different positions according to the baseline-type, see Fig.3.3.24 and Fig.3.3.25.

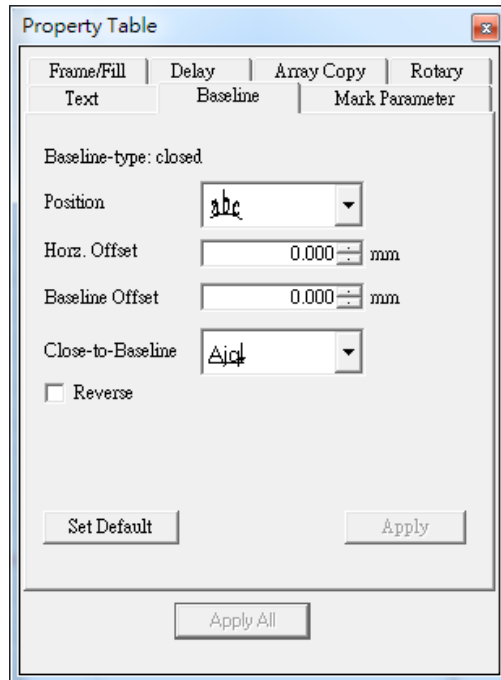


Fig. 3.3.24

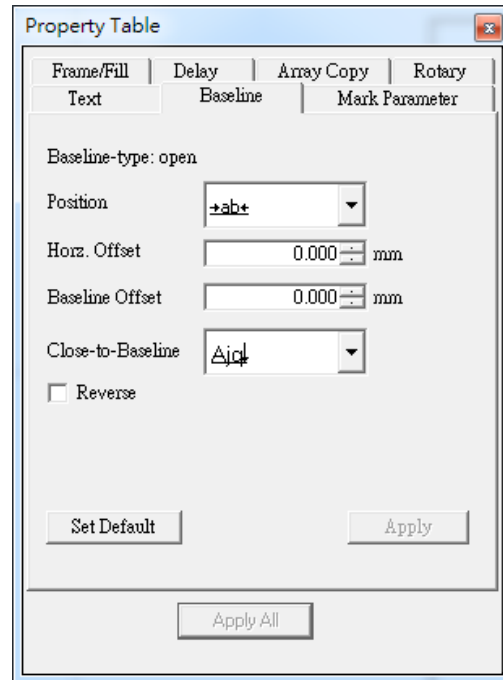


Fig. 3.3.25

Baseline-type: The baseline-type is based on the curve types (closed or open) users used.

Position: Decide the text position. For example, when the baseline is an open curve, the position can be chosen to align center (default), left or right.

Horz. Offset: The horizontal offset between the text and the selected position.

Baseline Offset: The space between the text and baseline.

Close-To-Baseline: Select the position of text based on the baseline.

Reverse: Reverse the text, see Fig.3.3.26

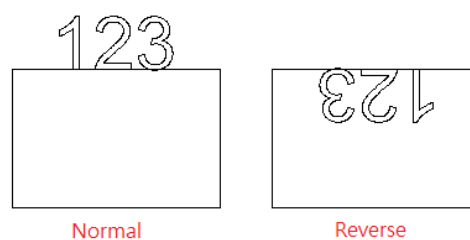


Fig. 3.3.26

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3.3.15 Graphic

When users import a “*.dxf” file, the Graphic Property Page will be display like Fig.3.3.27.

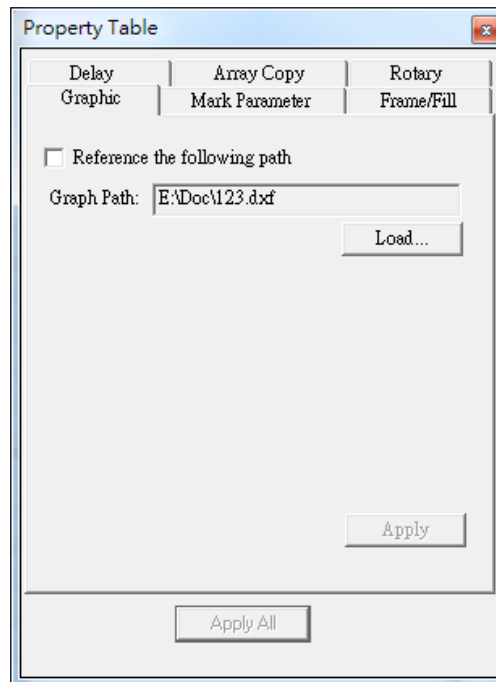


Fig. 3.3.27

Reference The Following Path: Suppose that users click this option and import a “*.dxf” file and then save it as a “*.ezm” file. If the graphic of the assigned Graph Path has been modified, the graphic of the “*.ezm” file will update automatically when users load that “*.ezm” file next time.

Load...

This option can only import a “*.dxf” file.

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3.3.16 Spiral

While a spiral object has been created, spiral property table will show as fig 3.3.28.

Property Table

Frame/Fill | Array Copy | Rotary
Spiral | Mark Parameter | Delay

Center
X: 0.000 mm Y: 0.000 mm

Max Radius: 5.000 mm
Min Radius: 0.000 mm
Pitch: 0.500 mm

☒ CCW ☒ Use Same Radius
☐ Outer to Inner

Set Default Apply

Apply All

Fig. 3.3.28

Center: The center position of the spiral.

Max. Radius: The spiral outer ring radius.

Min. Radius: The spiral inner ring radius.

Pitch: The interval distance between two spiral lines.

CCW: Spiral is generated as counter-clockwise direction.

Use Same Radius: Let spiral could fit into a perfect circle.

Outer to inner: Spiral is generated from outer to inner instead of from inner to outer.

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3.3.17 Deep carving

User plans deep engraving method within this page. Refer to [fig.3.3.29](#).

Property Table

Mark Parameter | Delay | Frame/Fill

Deep Carving | Mark Plan

☒ Enable

Slice Height : 0.10000 mm

Work Mode

☒ Concave ☐ Convex

Frame File Path : ...

Motion

Z Axis Stepping : 0.100000 mm

Fill

Angle Step : 0.000 deg.

Set Default Apply

Apply All

Fig.3.3.29

Enable

Active 3D marking. Check to enable style selection.

Slice Height

Thickness for each slice.

Work Mode

Slice method. Refer to the figure below.

Concave

Erase mold part from work-piece.

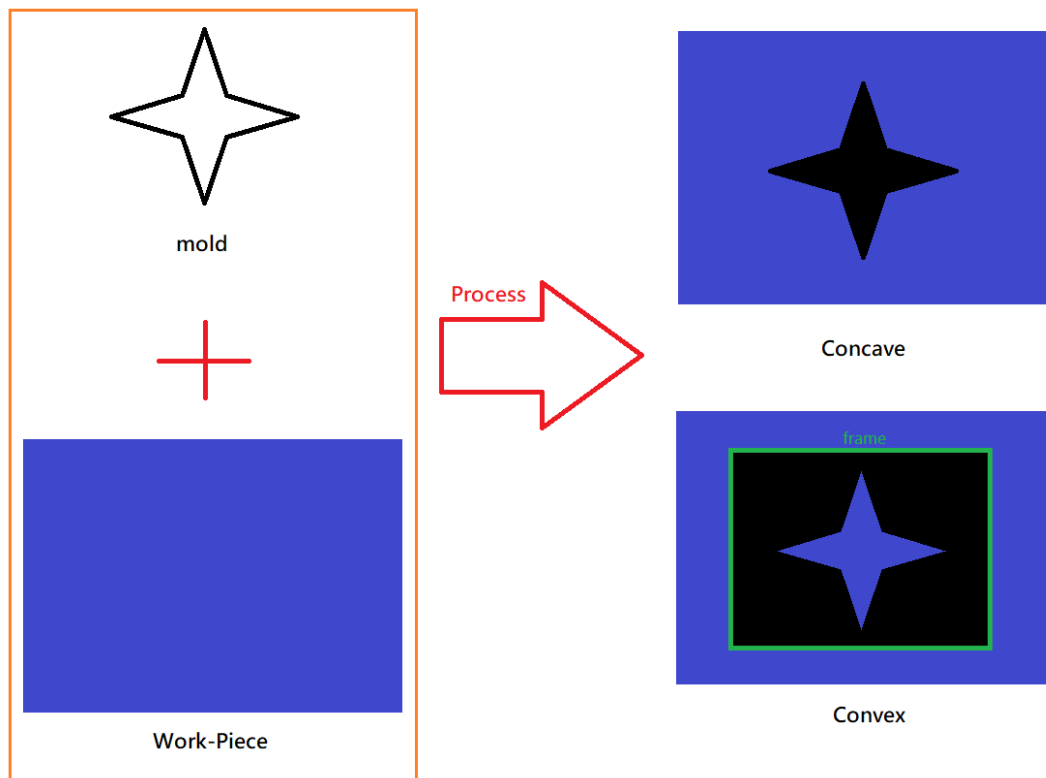
Convex

Keep mold part and erase other parts from work-piece.

Frame File Path

User has to provide a frame shape of outer ring of erased part. File format is DXF.

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Motion
Z Axis Stepping

Fill
Angle Step

Z axis table moving distance.
If Z axis stepping is larger than slice height, Z axis will move only after total distance of slice height is greater than this value. Such as Slice Height is 0.1mm, and Z axis Stepping is 1mm. Z axis will move 1mm after mark 10 slices because $10 \times 0.1\text{mm} = 1\text{mm}$.
Parameter for fill.
Filling angle difference between each side.

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3.3.18 Mark Plan

Set slice and mark parameter. Refer to fig.3.3.30.

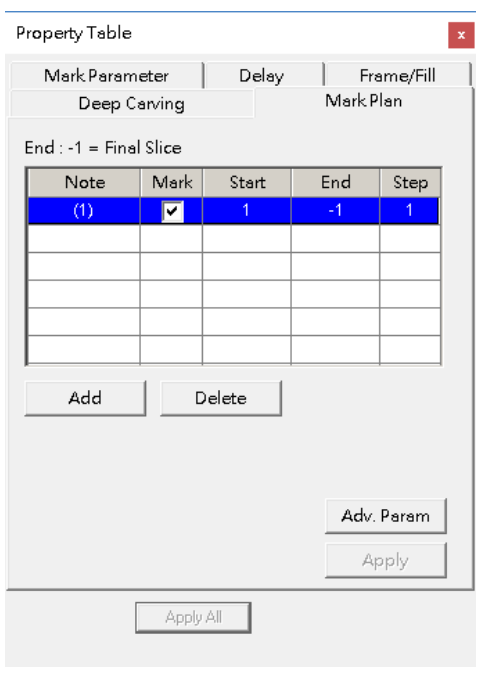


Fig.3.3.30

Plan List	The list of mark plan.
Note	The entry index.
Mark	Check to mark this entry.
Start	The entry starting slice.
End	The entry ending slice.
Step	The effective oredor of slice.
Add	Add a new entry.
Delete	Delete the selected entry.
Adv. Param	Add an advanced parameter set.

The advance parameter set includes Start, End, Step, Mark parameter, Delay parameter, and Fill/Hatch parameter. The parameters only affect the slices order from Start to End slices, other slices are affected by other entry or Deep Carving object mark parameter.

For instance, there are 11 slices in the deep carving object, and there are two entries in the mark plan. The first entry starts from 1, end to 4; the second entry starts from 5, end to 8. The advance parameter in entry 1 will affect slices 1 to 4, in entry 2 will affect slices 5 to 8; on the other hand, mark parameter in deep carving object will affect slices 9 to 11.

For another instance. Assume slice a deep carving object into 5 slices, mark speed is 2,000mm/s, and assign all slices for marking. Now build a new set of advance parameter, mark speed is 500mm/s, and assign to 3rd and 4th slices; then build another set of advance parameter, mark speed is 800mm/s, and assign to 4th and 5th slices. After marking is started, the 1st and 2nd slices will be mark speed as 2,000mm/s, 3rd

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slice will be mark speed as 500mm/s, 4th and 5th slices will be mark speed as 800mm/s.

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3.4 Control Object-related Property Table

When insert a control object in Work Area, or select the control object in the Object Browser, the Property Table of this object will be displayed. Users are allowed to edit the parameters of this object.

3.4.1 Digital In



Digital_In

“Digital In” is used to check the input potential signal is correct or not when marking. Users can set potential signal (high or low) at IN 1~8, see Fig.3.4.01. If the input signal is correct, then the system will do the next step.

SET: High potential.

CLEAR: Low potential.

-----: Ignore.

Time Out: The time that system needs to wait for the input signal.

Example: Suppose that this value is 10ms. If there is no signal input within 10ms, then the system will start to mark the next object.

Fig. 3.4.01

3.4.2 Digital Out



Digital_Out

Set the output potential signal (high or low) at OUT 1~8, see Fig.3.4.02. When the mark process execute to “Digital Out” object, the system will follow the settings on this page and do the next step.

SET: High potential.

CLEAR: Low potential.

-----: Ignore.

Clear Signal: Activate this function and then users can set the Wait Time. The system will change the high potential signal (SET) to low potential signal (CLEAR) after passing the Wait Time.

Fig. 3.4.02

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3.4.3 Do Pause



Do Pause

Stop marking and wait for the Start signal.

3.4.4 Delay Time



Delay_Time

Suppose a mark process order is “Object A”→“Delay Time Object”→“Object B.” After Object A has been marked, the system will wait for the setting delay time and then start to mark Object B. The Delay Time can be set at Delay Time Property Table, see Fig.3.4.03.

Fig. 3.4.03

3.4.5 Motion



Motion

When the mark process execute to “Motion” object, the axis will move to the assigned position or angle (Only PMC2 driver supports Z axis control), see Fig.3.4.04.

Relative

If check the box, the assigned position will be considered as a relative position, otherwise, it will be considered as an absolute position.

Fig. 3.4.04

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3.4.6 Set Position



Set Position

The system will consider the current position as the assigned position when the mark process execute to “Set Position” object (Only PMC2 driver supports Z axis control). Users can assign the position at Set Position Property Table, see Fig.3.4.05.

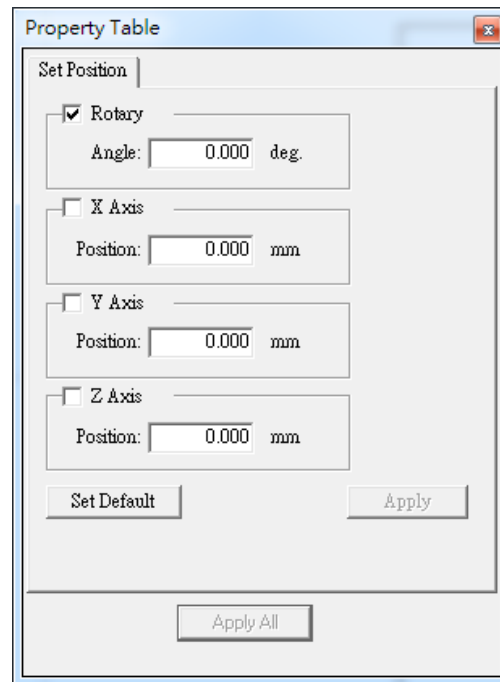


Fig. 3.4.05

3.4.7 Loop



Loop

“Loop” is used to mark the selected objects repeatedly. Users can set the repeated time at Loop Property Table, see Fig.3.4.06. When insert this object, users will see two sub-objects (Loop Begin and Loop End) in the Object Browser and then drag the objects users want to repeated mark into the loop, like Fig.3.4.07.

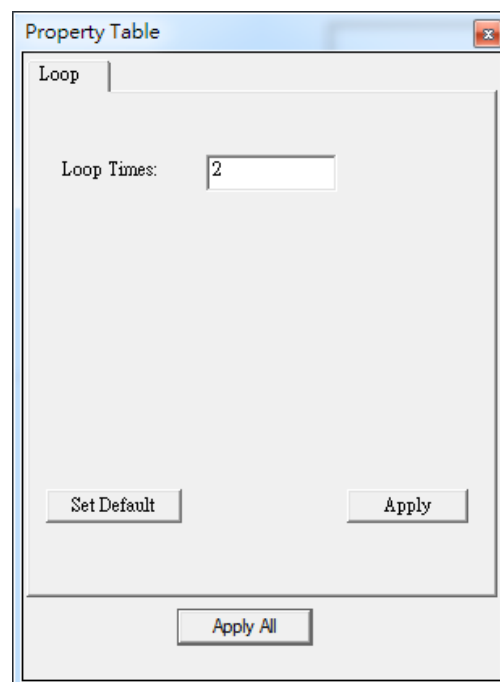


Fig. 3.4.06

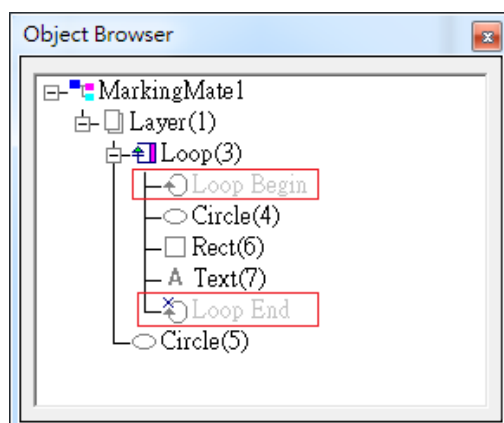


Fig. 3.4.07

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3.4.8 Ring



Ring

“Ring” object must be used accompanied with rotary axis.

When the mark process executes to “Ring” object, the Galvo will move to the X/Y position users set at Property Table (see Fig.3.4.08) first and the laser will start to hit. When the rotary axis rotate to the assigned angle, the laser will be turned off. Please note that the “Position” here means the Galvo’s position, not X/Y Table.

Property Table

Ring | Mark Parameter | Delay

Position

☒ Relative

X Position: 0.000 mm

Y Position: 0.000 mm

Rotary

☒ Relative

Angle: 360.000 deg.

Set Default Apply

Apply All

Fig. 3.4.08

3.4.9 Homing



Homing

When the mark process execute to “Home” object, the axis users select at Property Table (see Fig.3.4.09) will go back to origin.

Property Table

Homing

☐ Rotary

☐ X Axis

☐ Y Axis

☐ Z Axis

Set Default Apply

Apply All

Fig. 3.4.09

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3.5 Layer-related Property Table

When a layer object in the Object Browser has being selected, the Property Table will display the layer-related property page for uses to edit.

3.5.1 Layer

The Layer Property Page allows users to set the parameters of the selected layer, see Fig.3.5.01.

Processing Method: Marking or cutting this layer.

Name: Edit the layer's name.

Color: Edit the layer's color.

View: Enable or disable to view the layer.

Edit: Enable or disable to edit the layer.

Output: Enable or disable to output the layer.

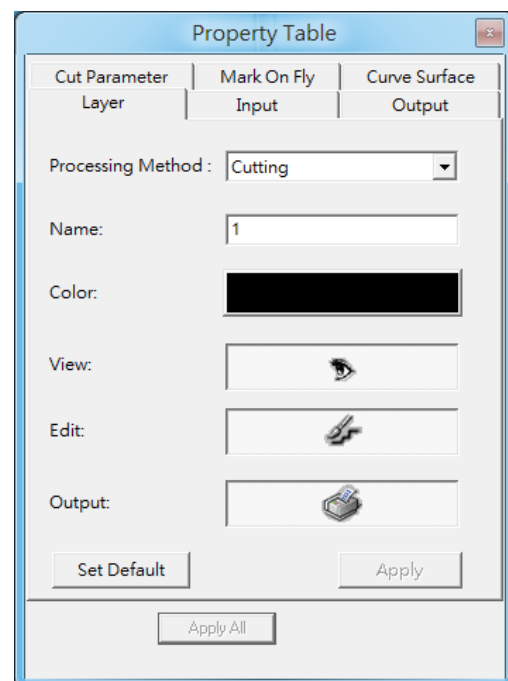


Fig. 3.5.01

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3.5.2 Input

The Input Property Page allows users to set up the input status of the layer, see Fig.3.5.02. The system will first check the Input Status settings and then start to mark the layer's objects.

Input Status

Set the potential (high or low) of the input points.

- ☒ High Potential.
- ☐ Low Potential.
- ☒ Ignore.

Timeout

The time system needs to wait for the input signal. The default is -1.

Wait Input

Wait until all input status exist, otherwise wait for Timeout

Match Input

Wait until all input status exist, otherwise skip the layer.

Property Table

XYTable | Rotary | Mark On Fly | Curve Surface
Layer | Input | Output | Mark Parameter | Delay

Input Status

☒ 1 ☐ 2 ☒ 3 ☒ 4
☒ 5 ☒ 6 ☒ 7 ☒ 8
☒ 9 ☒ 10 ☒ 11 ☒ 12
☒ 13 ☒ 14 ☒ 15 ☒ 16

Timeout: -1 ms

☒ Wait Input
☐ Match Input

Set Default Apply

Apply All

Fig. 3.5.02

3.5.3 Output

Use this function to set up the output status of the layer.

The system will first handle the graph and then the output status.

Output Status

High or low voltage of the output points

For example:

- ☒ 1 Point 1: high
- ☐ 5 Point 5: low
- ☒ 9 Point 9: don't care

Auto Clear Signal

Wait for Delay Time and auto clear signal after the voltage settings are done

Property Table

XYTable | Rotary | Mark On Fly | Curve Surface
Layer | Input | Output | Mark Parameter | Delay

Output Status

☒ 1 ☐ 2 ☒ 3 ☒ 4
☒ 5 ☒ 6 ☒ 7 ☒ 8
☒ 9 ☒ 10 ☒ 11 ☒ 12
☒ 13 ☒ 14 ☒ 15 ☒ 16

☒ Auto Clear Signal

Delay Times: 0 ms

Set Default Apply

Apply All

Fig. 3.5.03

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3.5.4 Mark Parameter

The Mark Parameter Property Page here is for the selected layer, see Fig.3.5.04. Its setting method is the same with the individual object. Please refer to the section 3.2.1 Mark Parameter.

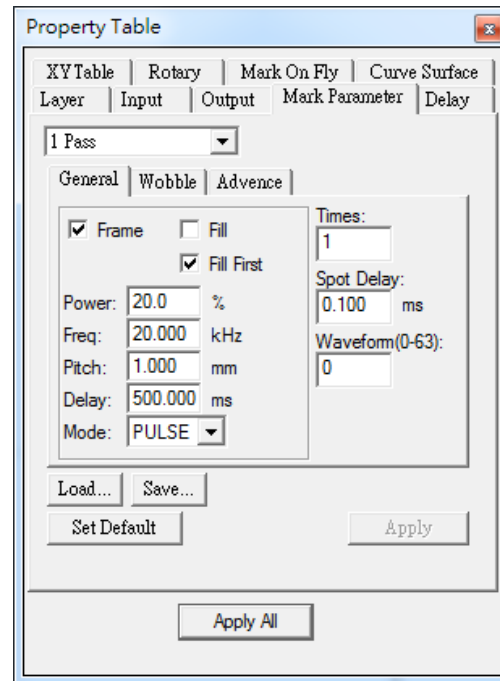


Fig. 3.5.04

3.5.5 Delay

The Delay Parameter Property Page here is for the selected layer. Its setting method is the same with the individual object. Please refer to the section 3.2.3 Delay.

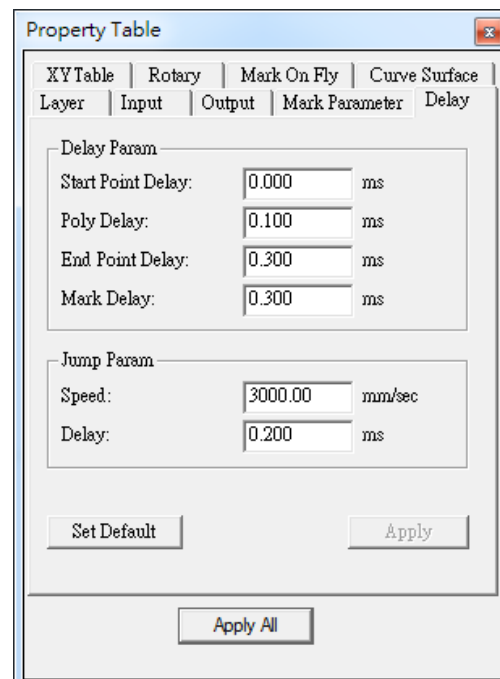


Fig. 3.5.05

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3.5.6 XY(/Z) Table

Allow users to enable XY (/Z) Table.
Users can add coordinates and then the XY(/Z) axis will move to the assigned positions in order, see Fig.3.5.06.

Add/Edit

Add or edit the XY (/Z) position, see Fig.3.5.07.

Delete/Delete All

Delete the selected position or delete all setting positions.

Move Up/ Move Down

Move up/down the selected position to change its order.

Array Copy

Create several positions at one time based on array principle, see Fig.3.5.08.

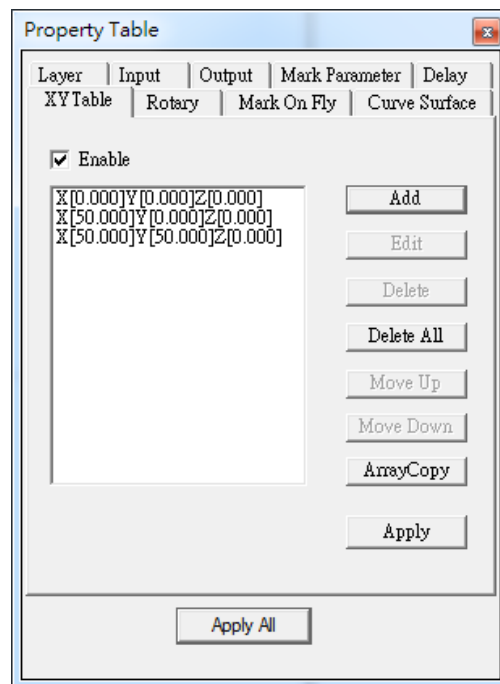


Fig. 3.5.06

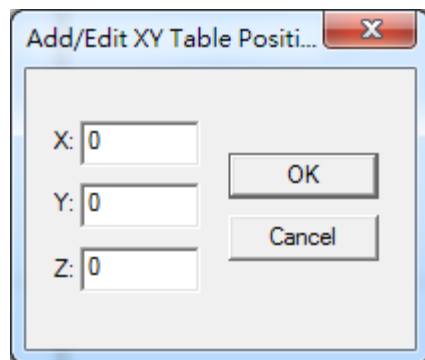


Fig. 3.5.07

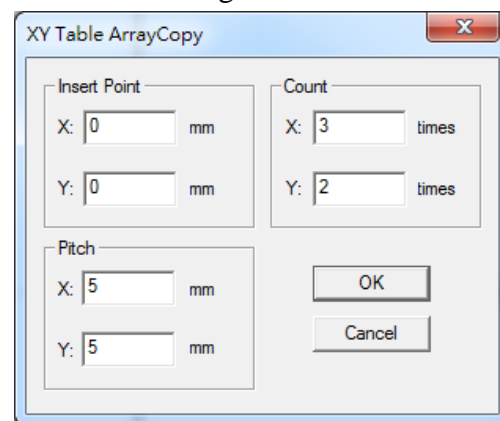


Fig. 3.5.08

Insert Point: Set the start point.

Count: The duplicate amount.

Pitch: The interval of each point.

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3.5.7 Rotary

Allow users to enable rotary to mark. There are two methods of rotary: Cylinder Mode (see Fig.3.5.09) and Disc Mode (see Fig.3.5.10). The difference between cylinder and disc is the figure of the rotary axis.

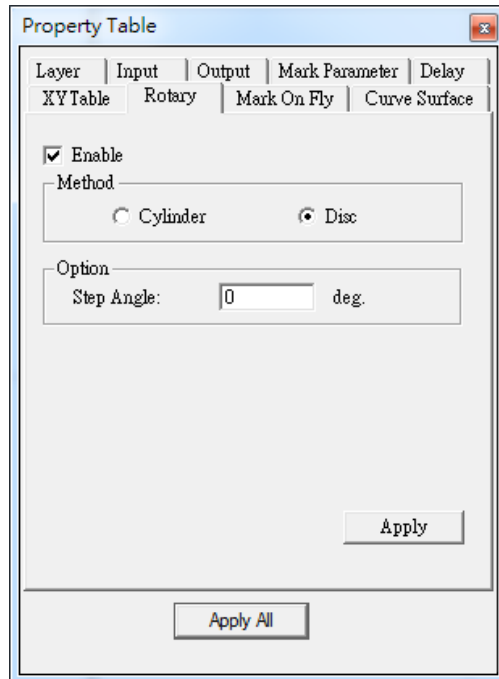


Fig. 3.5.09

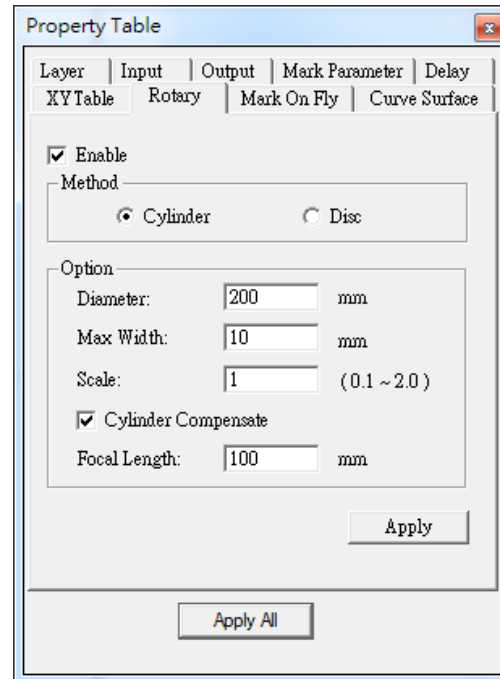


Fig. 3.5.10

Cylinder Mode

Diameter: The diameter of the object.

Max Width: The ideal section width when marking. This value is based on the radius of axle.

Scale: Adjust the ratio of radius to reach the optimum marking effect. The default value is 1. Please refer to the following example and figures.

Example

Suppose that users set the value of rotate rate as 1.5, and the marking result shows like Fig.3.5.11, all sections are overlapping. In this case, users should lower that value, such as 1.0, to make the marking effect optimum, see Fig.3.5.12. On the contrary, if the value of rotate rate is 0.5, and the marking result displays like Fig.3.5.13, there are intervals between each section. As a result, users should increase this value to make the marking effect become ideal, like Figure 3.5.12.

MM3D 3.2

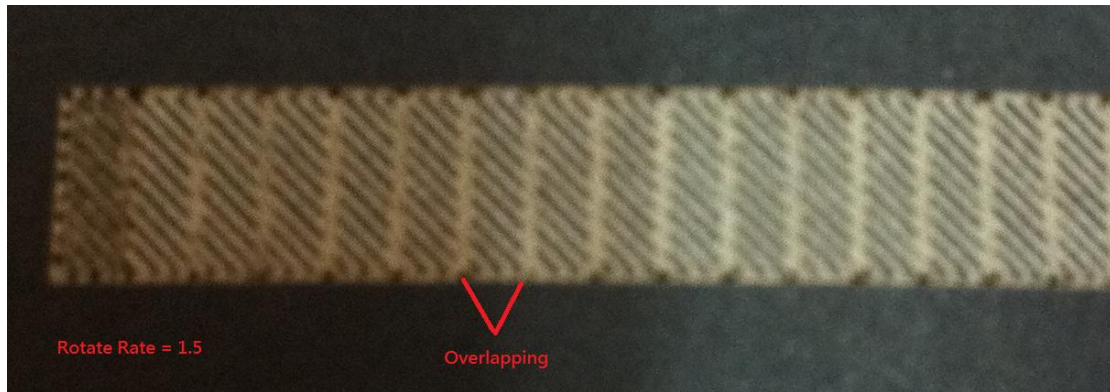


Fig. 3.5.11



Fig. 3.5.12

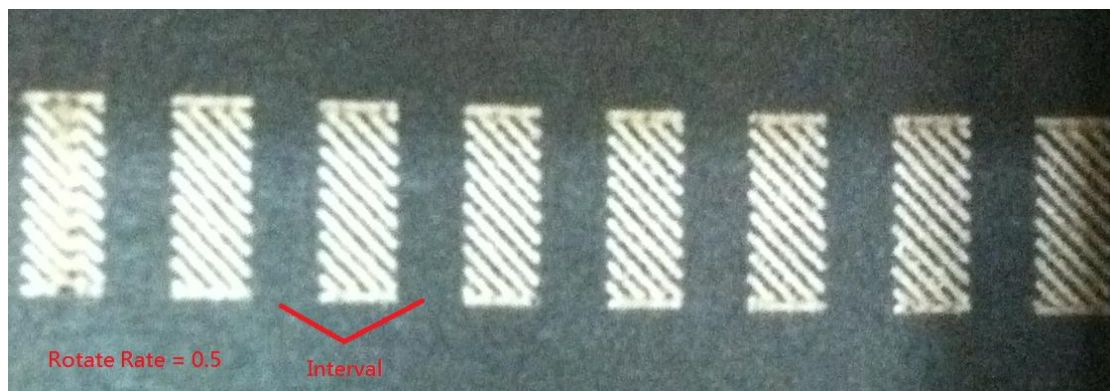


Fig. 3.5.13

Cylinder Compensate: The default value of this function is disable. Enable the function, MM3D system will fix the overlapping of marking result according to the object's radius and the Focal Length.

Focal Length: Input the focal length of the lens.

Disc Mode

Step Angle: Set the rotary angle for each step of marking.

MM3D 3.2

3.5.8 Mark On Fly

This function is set up when using “Mark on Fly” function for marking, enable or disable the delay marking between layers, see Fig.3.5.14.

Enable this function, the system will mark the first layer and then wait for conveyer moving this setting distance, and then continue the next layer’s marking. The distance between layers is the calculation of encoder factor multiplied by encoder feedback value. Encoder factor is set up at the page of “Mark on Fly” setting on Options dialogue box (please refer to section 1.1.6.3).

The following lists are conditions for enable this function:

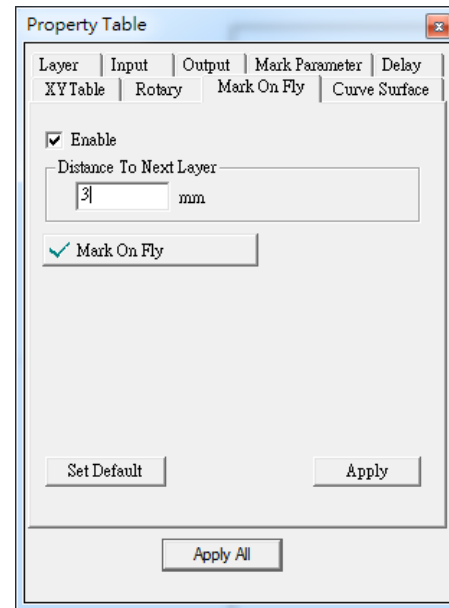


Fig. 3.5.14

1. Diver need to support encoder function, and make sure encoder have connected to controller. About encoder connection method, please refer to encoder manual.
2. Need to enable the “Mark on Fly” function, and checked the “Encoder” options, in addition, input the rational value at “Factor” section. About the Mark on Fly Settings, please refer to section 1.1.6.6.
3. Input a rational value for “Distance to Next Layer” option. This value need larger than the distance which conveyer has moved while marking this layer. When system has finished marking this layer’s objects, will wait until conveyer has moved this distance, and then start marking next layer’s objects. If the setting value is less than the distance conveyer has moved when marking this layer, it will cause incorrect result.

For example:

Suppose the EZM file has a circle object and a text object like Fig.3.5.15, and the “Mark on Fly” function is enabled and the “Encoder” option is checked:

MM3D 3.2

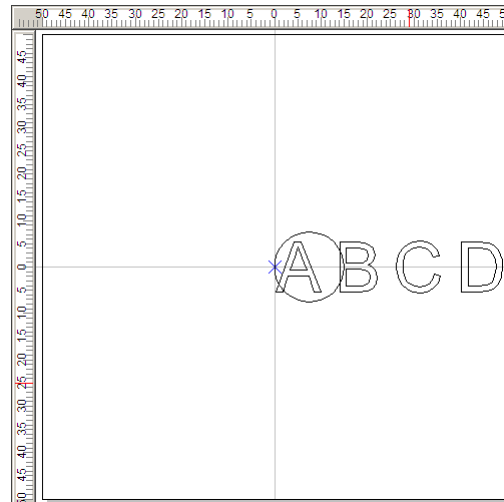


Fig. 3.5.15

1. If two objects are in the same layer, the result of marking will like Fig.3.5.16.



Fig. 3.5.16

2.If in different layer which the circle object is in layer 1, and the text object is in Layer 2, and the moving direction of objects is right-to-left, the system will reset encoder position, and consider the current position as the origin point while marking different layers.

(a) If Layer 1 (circle object) disable the encoder delay function, the marking result will like Fig.3.5.17.



Fig. 3.5.17

Distance between red arrows pointed means which conveyer has moved while executing Layer 1 marking process. Because of disable the layer encoder delay function, so the system will reset encoder position after finishing marking Layer 1, and then consider the current position as the origin point to mark Layer 2. This distance will be changed depends on the marking speed.

(b) If Layer 1 (circle object) enable the encoder delay function, the marking result will like Fig.3.5.18.

MM3D 3.2



Fig. 3.5.18

Distance between red arrows pointed means the setting value of “Distance to Next Layer” at Encoder page. This value cannot be less than the distance which conveyer has moved when marking this layer. Otherwise, it will cause incorrect result.

Suppose when finishing marking Layer 1, conveyer has moved 30 mm, just as triangle position as the figure. Because of enable the layer delay function, so after system finishing marking Layer 1, the system will wait until conveyer has moved 50 mm as settings. In this example, conveyer only moved 30 mm after finish marking Layer 1, so the system will wait for conveyer to continue moving 20 mm, such as distance between orange arrows pointed. After conveyer has moved 50 mm, the system will reset encoder position, and consider the current position as origin point to execute marking Layer 2.

MM3D 3.2

3.5.9 Curve Surface

When Curve Surface function is enabled, the objects of this layer will be marked according to the setting parameters, see Fig.3.5.19.

Enable

Check this box to enable this function. The default setting is disabled.

Style

There are several styles of the object are listed at Table 3.4.

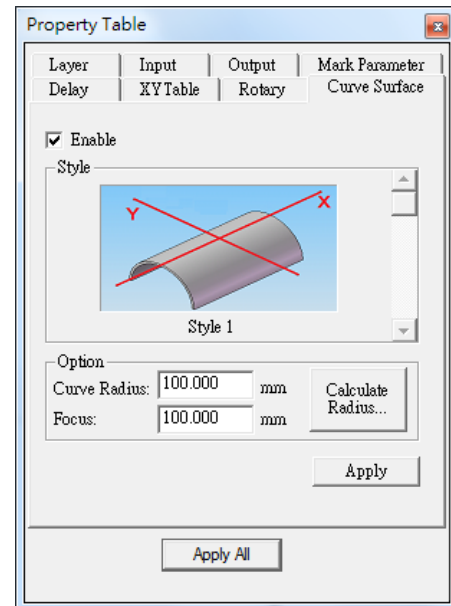


Fig. 3.5.19

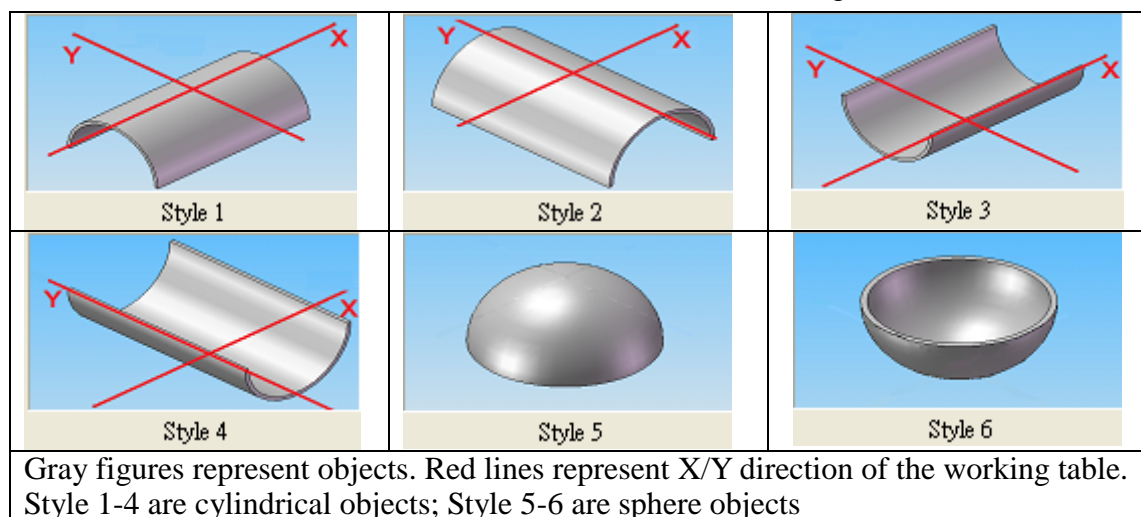


Table 3.4

Option

Curve Radius: radius of the curve.

Focus: focus of the lens.

Calculate Radius

Click the button will see the dialog box, see Fig.3.5.20.

Blue area represents object.

(W) Width: width of the object

(H) Height: the distance between the top point and the surface.

Click "OK" button to renew the curve radius.

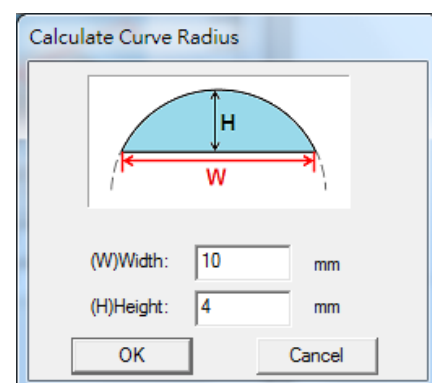


Fig. 3.5.20

MM3D 3.2

3.6 Manual-split Property Table

3.6.1 Band

Select a band which is generated by Auto create bands or New a band will appear band property page in the property table. See Fig 3.6.01.

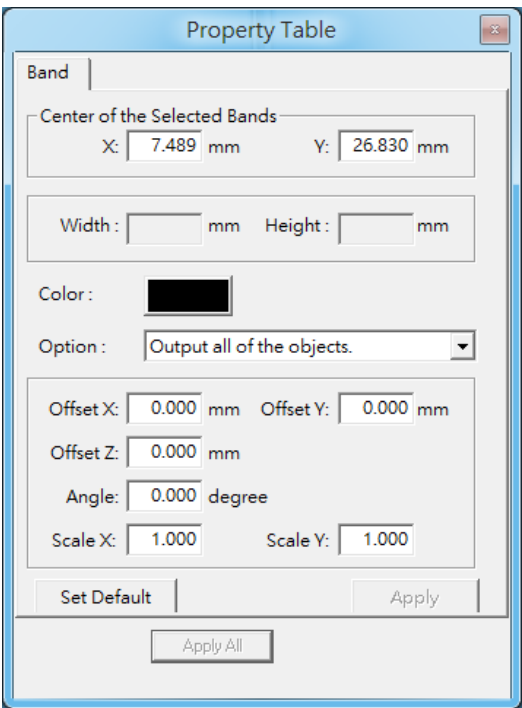


Fig3.6.01

Center of the Selected Bands

Width

Height

Color

Option

Output complete objects only
belong to the band.

Output all of objects

Offset X

Offset Y

Offset Z

outputting.

Angle

Scale X

direction.

Scale Y

direction.

Band center position.

Band width.

Band height.

Band color.

Band output option.

Output the graphic which is completely

Output every graphic belong to the band.

Band output offset at X-axis direction.

Band output offset at Y-axis direction.

Z-axis motion distance while band is

Band output rotate angle.

Band output scale at X-axis

Band output scale at Y-axis

MM3D 3.2

3.6.2Template

Set the using split band template at this layer.
This function is depended on Split by Layer.
See Fig 3.6.02

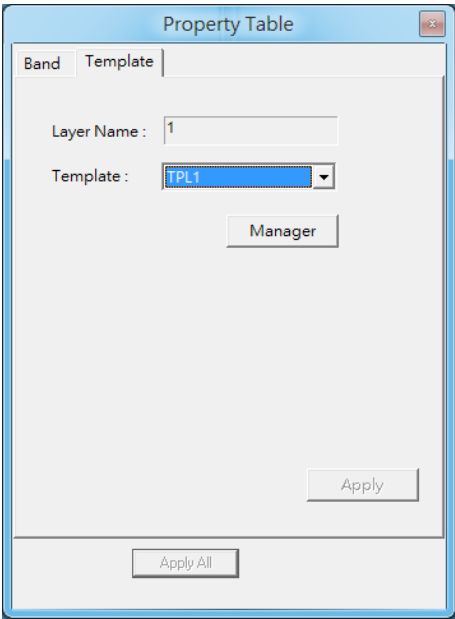


Fig3.6.02

- Layer Name**
Template
Current editing layer.
Current using template.
One template applied to multiple layers is allowed.
- Manager**
The manager is allowed to add, delete and rename template. See Fig 3.6.03.
- Add**
Delete
Add a template.
Delete a selected template. A using template could not be deleted.
- Rename**
Rename a template.

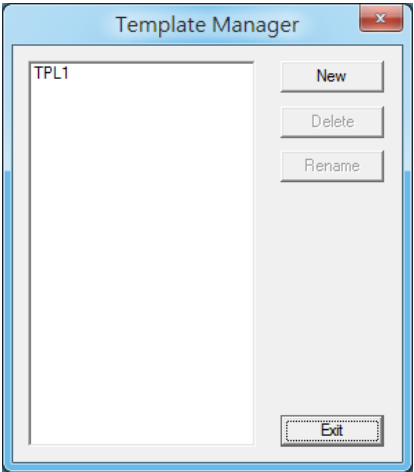


Fig3.6.03

MM3D 3.2

4. Popup Menu

Click the right button of the mouse will display a quick view menu. When Show Order in View Menu is activated, users can change the mark order. And when the object has been transferred to curve (in Edit Menu), user is able to Add Vertex to the object.

The popup menu is different when users select different objects.

4.1 General Object

Select a general object and click the right button of the mouse, users will see the popup menu like Fig.4.1.01.

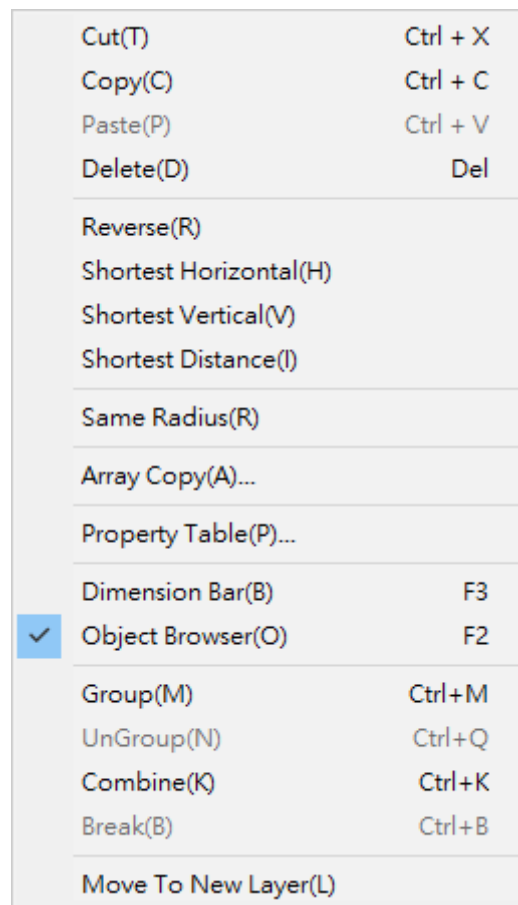


Fig. 4.1.01

Cut	Remove selected data and store it in the clipboard for future use
Copy	Duplicate selected data and store it in the clipboard for future use
Paste	Attach data from the clipboard to the current document
Delete	Delete and remove the selected data
Reverse	Reverse sorting mark order

MM3D 3.2

Shortest Horizontal	Sorting mark order by the shortest horizontal direction
Shortest Vertical	Sorting mark order by the shortest vertical direction
Shortest Distance	Sorting mark order by the shortest distance of object center
Same Radius	Make the circle object become the same radius
Array Copy	Execute the array copy function
Property Table	Show the Property Table of the object
Dimensional Bar	Enable/disable Dimension bar
ObjView Bar	Enable/disable Object Browser
Group	Group selected object
Ungroup	Ungroup selected group
Combine	Combine several objects into one object
Break	Break one object into several objects
Set Circle Object Radius	Modify circle that radius same as original radius to modified radius.
Move To New Layer	Move selected objects to new layer

4.1.1 Reverse

This function is used to reverse sorting marking order.

For example: the original marking order 1-2-3-4-5-6 will be changed to be 6-5-4-3-2-1.

4.1.2 Shortest Horizontal

This function is used to sort mark order by the shortest horizontal direction.

Input the partition count number in the box like Fig.4.1.02. The work area will be divided into several partitions in vertical direction. The mark order will be sorted from left to right first as Fig.4.1.03. If the checkbox of “Reverse” is checked, the mark order will then changed to be sorted from right to left first.

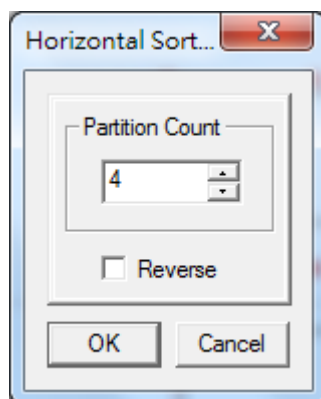


Fig. 4.1.02

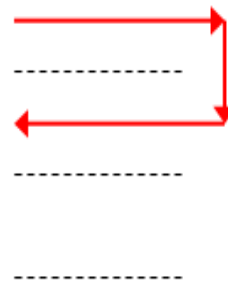


Fig. 4.1.03

MM3D 3.2

4.1.3 Shortest Vertical

This function is used to sort mark order by the shortest vertical direction. Input the partition count number in the box like Fig.4.1.04. The work area will be divided into several partitions in horizontal direction. The mark order will be sorted from bottom to top first as Fig.4.1.05. If the checkbox of “Reverse” is checked, the mark order will then changed to be sorted from top to bottom first.

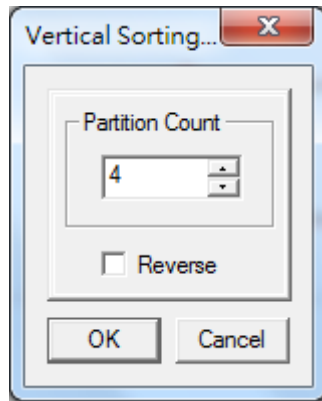


Fig. 4.1.04

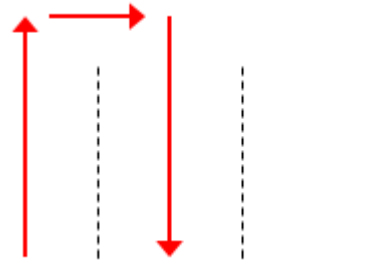


Fig. 4.1.05

MM3D 3.2

4.1.4 Shortest Distance

This function is used to sort mark order by the shortest distance of object center. Select all objects in the work area, a red box as below will appear. The mark order will be sorted by the shortest distance between the left-bottom of the red box and the center of each object like Fig.4.1.06.

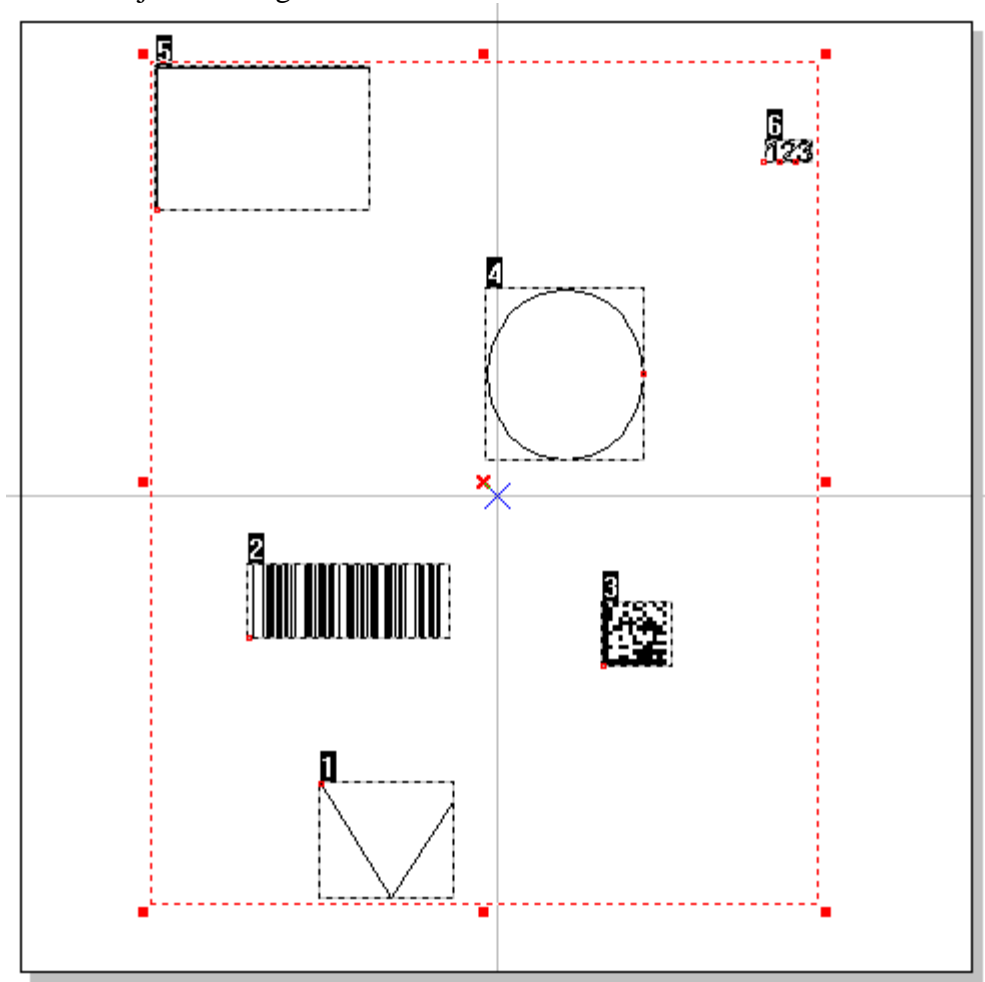


Fig. 4.1.06

MM3D 3.2

4.2 Curve

Select a curve users drew or the curve transferred from objects, and click the right button of the mouse, users will see the popup menu like Fig.4.2.01.

Cut(T)	Ctrl + X
Copy(C)	Ctrl + C
Paste(P)	Ctrl + V
Delete(D)	Del
Reverse(R)	
Shortest Horizontal(H)	
Shortest Vertical(V)	
Shortest Distance(I)	
Add Vertex(A)	
Del Vertex(X)	
Break Vertex(B)	
Edit Vertex(E)	
Curve To Line(L)	
Line To Curve(I)	
Arc To Curve(R)	
Cusp(U)	
Smooth(S)	
Symmetrical(Y)	
Array Copy(A)...	
Property Table(P)...	
Dimension Bar(B)	F3
✓ Object Browser(O)	F2
Group(M)	Ctrl+M
UnGroup(N)	Ctrl+Q
Combine(K)	Ctrl+K
Break(B)	Ctrl+B
Move To New Layer(L)	

Fig. 4.2.01

MM3D 3.2

4.2.1 Add Vertex

This function allows users to modify a curve object; more vertices will be more convenient to change the shape of the curve, see Fig.4.2.02.

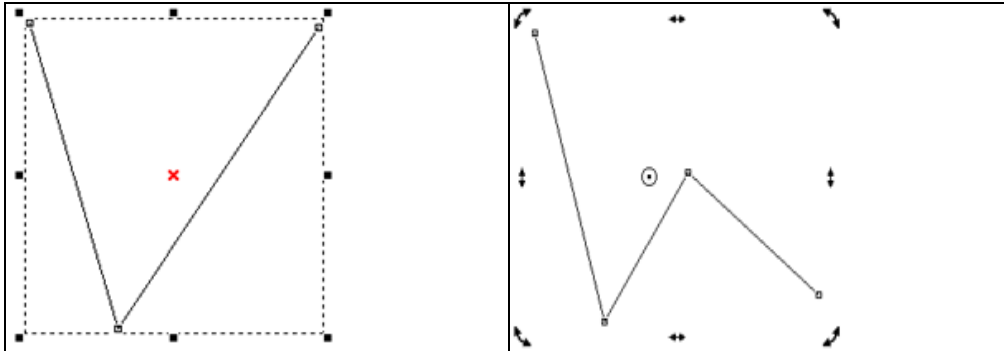


Fig. 4.2.02

4.2.2 Delete Vertex

Using “Delete Vertex” function will decrease the control points like Fig.4.2.03.

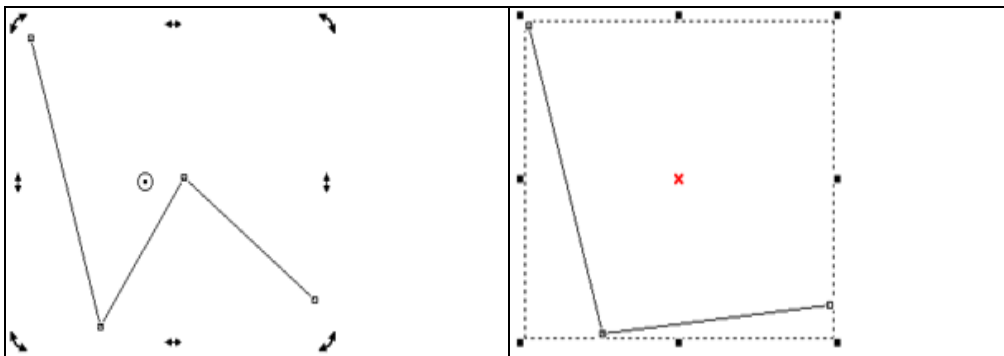


Fig. 4.2.03

4.2.3 Break Vertex

Click right mouse button on vertex will pop-up menu, and select Break Vetex. This function can break one line into two lines as the vertex is the break point. Refer to Fig.4.2.04.

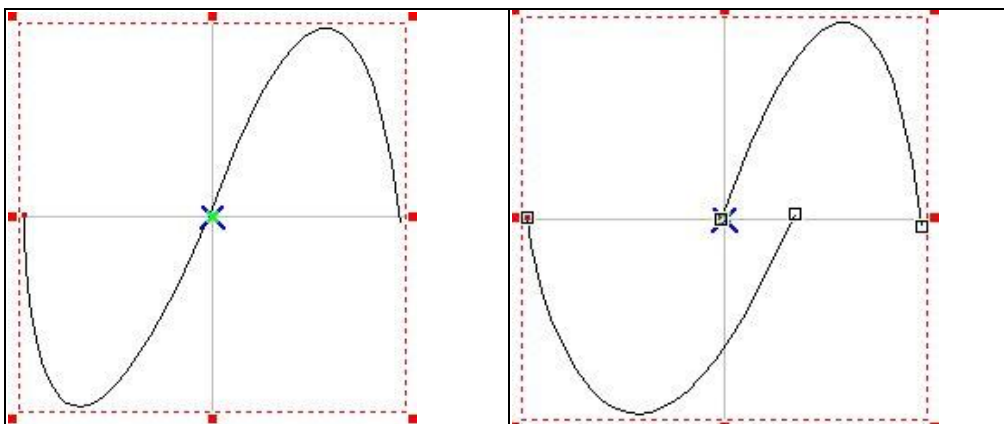


Fig. 4.2.04

MM3D 3.2

4.2.4 Edit Vertex

Click right mouse button on vertex will pop-up menu, and select Edit Vertex. User can assign a new coordinates in X, Y, and Z axis direction. Fig.4.2.04.

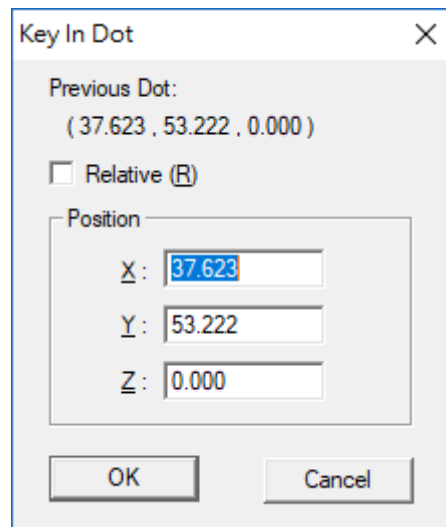


Fig. 4.2.05

4.2.5 Curve to Line

Select "Curve to Line" function; the curve has been transferred to a line segment and lost its control points like Fig.4.2.04.

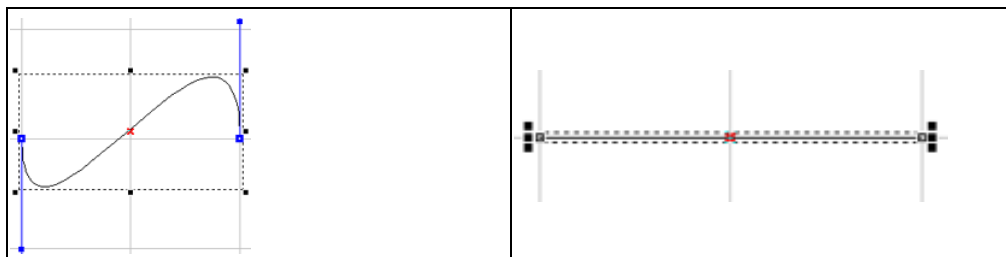


Fig. 4.2.06

4.2.6 Line to Curve

Select "Line to Curve" function; the line segment has been transferred to a curve and its control points appeared like 4.2.05.

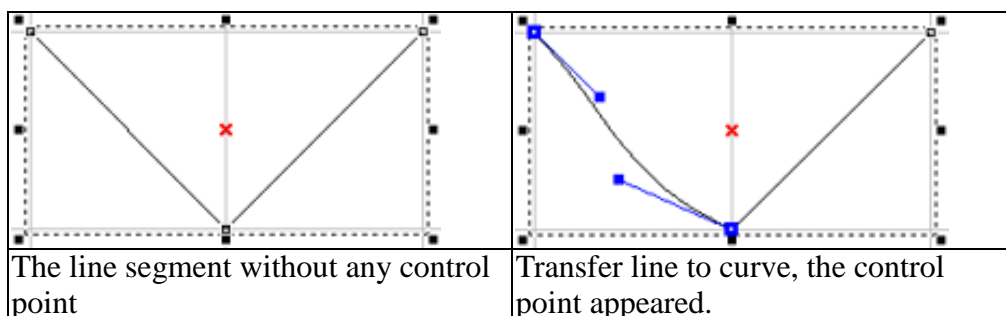


Fig. 4.2.07

MM3D 3.2

4.2.7 Arc to Curve

To use this function, users must first create an object and transfer the object to curve, and then click right button of the mouse to select the “Arc to Curve” function. This function allows users to add more vertexes to the curve like Fig.4.2.06.

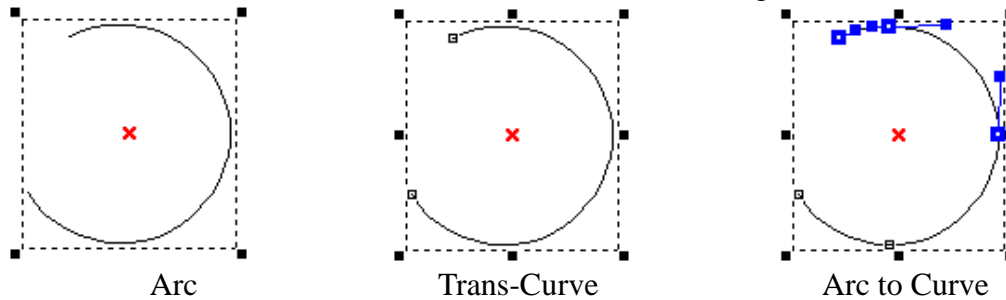


Fig. 4.2.08

4.2.8 Cusp

The control points of the curve were smooth at the beginning; select “Cusp” function on the popup menu; the two sides of control points become independent like Fig.4.2.07.

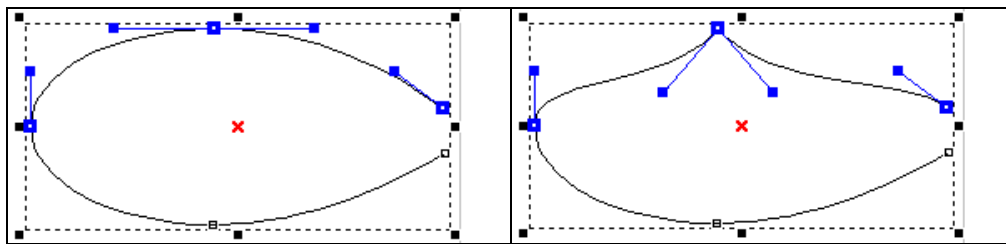


Fig. 4.2.09

4.2.9 Smooth

The control points of the curve were cusp at the beginning; select “Smooth” function on the popup menu; the two sides of control points become smooth and dependent on each other like Fig.4.2.08.

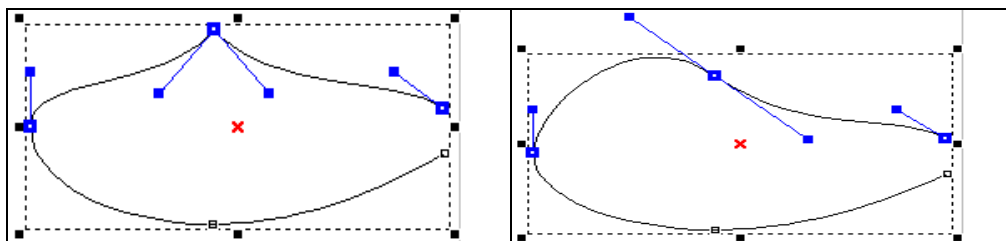


Fig. 4.2.10

4.2.10 Symmetrical

The control point was smooth but not symmetrical; select “Symmetrical” function on the popup menu and move one of the control point; the other side of control point will move symmetrically like Fig.4.2.09.

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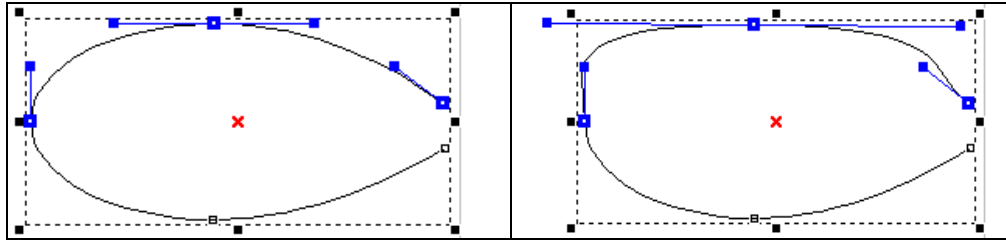


Fig. 4.2.11

4.3 Show Mark Order of a General Object

If the “Show Order” function in View Menu is activated, select a general object, and click the right button of the mouse, users will see a popup menu like Fig.4.3.01.

Cut(T)	Ctrl+X
Copy(C)	Ctrl+C
Paste(P)	Ctrl+V
Delete(D)	Del
Top(T)	
Undermost(U)	
Upper(U)	
Lower(L)	
In Front Of(I)...	
In Back Of(B)...	
Reverse(R)	
Shortest Horizontal(H)	
Shortest Vertical(V)	
Shortest Distance(I)	
Array Copy(A)...	
Property Table(P)...	
Dimension Bar(B)	F3
✓ Object Browser(O)	F2

Fig. 4.3.01

MM3D 3.2

4.4 Show Mark Order of a Curve

If the “Show Order” function in View Menu is activated, select a curve users drew or the curve transferred from objects, and users will see the popup menu like Fig.4.4.01 when clicking the right button of the mouse.

Cut(T)	Ctrl+X
Copy(C)	Ctrl+C
Paste(P)	Ctrl+V
Delete(D)	Del
Top(T)	
Undermost(U)	
Upper(U)	
Lower(L)	
In Front Of(I)...	
In Back Of(B)...	
Reverse(R)	
Shortest Horizontal(H)	
Shortest Vertical(V)	
Shortest Distance(I)	
Add Vertex(A)	
Del Vertex(X)	
Curve To Line(L)	
Line To Curve(I)	
Arc To Curve(R)	
Cusp(U)	
Smooth(S)	
Symmetrical(Y)	
Array Copy(A)...	
Property Table(P)...	
Dimension Bar(B)	F3
✓ Object Browser(O)	F2

Fig. 4.4.01

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5. Hot Key

File Menu	
Ctrl + N	Create a new document
Ctrl + O	Open an existing document
Ctrl + S	Save the current document using the existing file name
Ctrl + I	Import
Ctrl + P	Print
Edit Menu	
Ctrl + Y	Replace a cancelled action
Ctrl + Z	Cancel un unwanted action
Ctrl + X	Remove the selected object and place it in the clipboard
Ctrl + C	Duplicate the selected object and place it in the clipboard
Ctrl + V	Place the data on the clipboard on to the document
DEL	Delete the selected object
Ctrl + K	Combine
Ctrl + B	Break
Ctrl + M	Group
Ctrl + Q	UnGroup
Ctrl + H	Mirror Horizontal
Ctrl + L	Mirror Vertical
Ctrl + E	Baseline
Ctrl + D	Split
Ctrl + U	Transfer to a curve
Ctrl + A	Trimming
Ctrl + G	Welding
Ctrl + W	Contour
Execute Menu	
F5	Marking
F6	Quick Mark
F7	Dry Run
F10	Close Dialogue Box of Marking, Quick Mark, and Dry Run
Others	

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F1	Open HELP
F2	Open the Object Browser
Shift+F2	Move the Object Browser to the lower left corner
F3	Open the Dimension Bar
F4	Open the User Level dialogue box
Ctrl + F4	Close the current file
Ctrl + F6	Switch to another opened file
Ctrl	1. Force the angle of a line segment to be 15°when drawing a line, and force the width equal to the height when drawing an arc, circle, or rectangle. 2. The XY axis of the object will be adjusted simultaneously
Ctrl + T	Open the Property Table
Shift	The center of a circle or rectangle will be the center of the initial axis The XY axis of the object will be adjusted simultaneously
Tab	Select object by marking order
C	When you are drawing lines, arcs, and curves, press C key will make the continuous segments become a closed loop.
X/Y	Set the start point or end point of the object

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Appendix A: Config.ini

Config.ini is a setting file in the directory of C:\Program Files\MM3D. In general situation, user does not have to modify this file unless some special cases. If you need to modify this file, just simply open the file, change the settings, save the file, and then restart the MM3D program. The more detail description will be listed as below:

[ENV]	System Environment Parameters
MachineChk= 0	Automation (0:Disable, 1:Enable)
MachineChk_ShowMessage=1	Show error message (0: Disable, 1: Enable)
VariablePolyDelay= 0	The Mid Point Delay time will be changed in accordance with angle (0: Disable, 1: Enable)
AutoTextMode=1	Auto Text Mode (0: Disable, 1: Enable)
Jump_Min_Delay=0.0	Delay time for Jump (ms)
Jump_Limit_Length=0	Limited movement (mm)
MarkThreadEnable=1	Enable the Mark Thread (0: Disable, 1: Enable)
[Rotary]	Rotary Axis Parameters
Enable=1	Enable (0: Disable, 1: Enable)
Calibration=1	Calibration (0: Disable, 1: Enable)
Ring=1	Ring Text (0: Disable, 1: Enable)
Cylinder=1	Cylinder (0: Disable, 1: Enable)
MotorSetup=1	Motor Setup (0: Disable, 1: Enable)
[MultiMarking]	Auto Marking Parameters
Enable=1	Enable (0: Disable, 1: Enable)
Delay=0	Delay Time (sec)
[LogFile]	Log File Parameters
Enable=0	Enable (0: Disable, 1: Enable)
KeepRow=10	Log Rows
LogMarkDialog=1	Log Mark Dialogue (0: Disable, 1: Enable)
StartTime=0	Log Start Time (0: Disable, 1: Enable)
Path=	Log Path
[Application]	Application related parameters
ShowLaserPanel=0	Show Laser Panel (0: Disable, 1: Enable) 
ShowHatch=1	Show Hatch function (0: Disable, 1: Enable)
[SEGMENT]	Break a circle into lines
CHORDPXL	Setting how a circle will be broken into multiple lines. The smaller the value, the shorter the line. On the other hand, will take longer time to process a circle. Arc-Text will not be affected by this value. Default value is 10000.
[IO_INPUT]	Input point related parameters
INPUT01= 01,01	Input No.= Display Name, Description (See below figure)

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INPUT16= 16,16	Input No.= Display Name, Description (See below figure)
[IO_OUTPUT]	Output point related parameters
OUTPUT01= 01, 01	Output No.= Display Name, Description (See below figure)
OUTPUT15= ME, Mark End	Output No.= Display Name, Description (See below figure)
[MarkAndPrint]	Mark & Print Parameters
Enable=0	Enable (0: Disable, 1: Enable)
FeedUp=0	Rows for moving ahead
FeedDown=10	Rows for moving follow-up
BarcodeHeight=130	Barcode Height (cm)
PrintAndCut=0	Print & Cut (0: Disable, 1: Enable)
[SignalRule]	Signal Parameters (refer to section 2.2.1)
Active_PR_MR=1	Program Ready/Mark Ready signal (0: Active Low, 1: Active High)
Active_ReadyStart=1	Ready for Start signal (0: Active Low, 1: Active High)
Active_ME=1	Mark End Signal (0: Active Low, 1: Active High)
Active_Shutter=1	Shutter Signal (0: Active Low, 1: Active High)
Active_Lamp=1	Lamp Signal (0: Active Low, 1: Active High)
Active_Align=1	Align Signal (0: Active Low, 1: Active High)
PR2MR=0	Change Program Ready Signal to Mark Ready Signal (0: Program Ready, 1: Mark Ready)
MarkEndPulseTime = 0	MarkEnd Signal keep high (sec) (0: default setting, means no pulse)
[MarkParmList]	Mark Parameters List
CurPath=E:\Program Files\MM3D\MarkParam	Current Path
[VERSION]	Version Parameters
Version=1000	Version

The Planning of Input/Output Point:

Open the MM3D software, go to the Property Table and select “Driver” label and then click the “I/O Test” button will see the figure as below:

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The default setting about IO in Config.ini:

[IO_INPUT]

INPUT01= 01,01

INPUT02= 02,02

.....

INPUT15= 15,15

INPUT16= 16,16

[IO_OUTPUT]

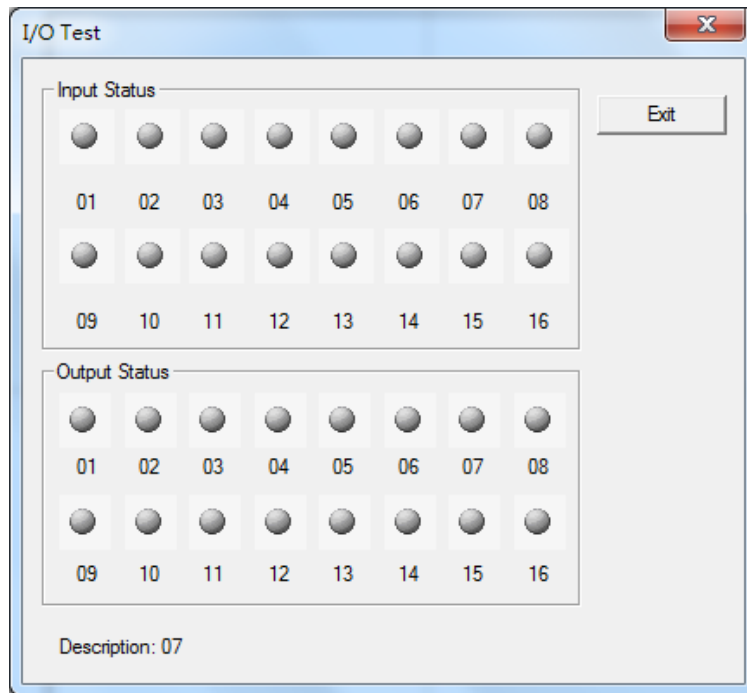
OUTPUT01= 01,01

OUTPUT02= 02,02

.....

OUTPUT15= 15,15

OUTPUT16= 16,16



Change the setting as below in Config.ini will see the right figure:

[IO_INPUT]

INPUT01= 01,01

.....

INPUT15= Start,Start

INPUT16= Stop,Stop

[IO_OUTPUT]

OUTPUT01= 01,01

.....

OUTPUT14=

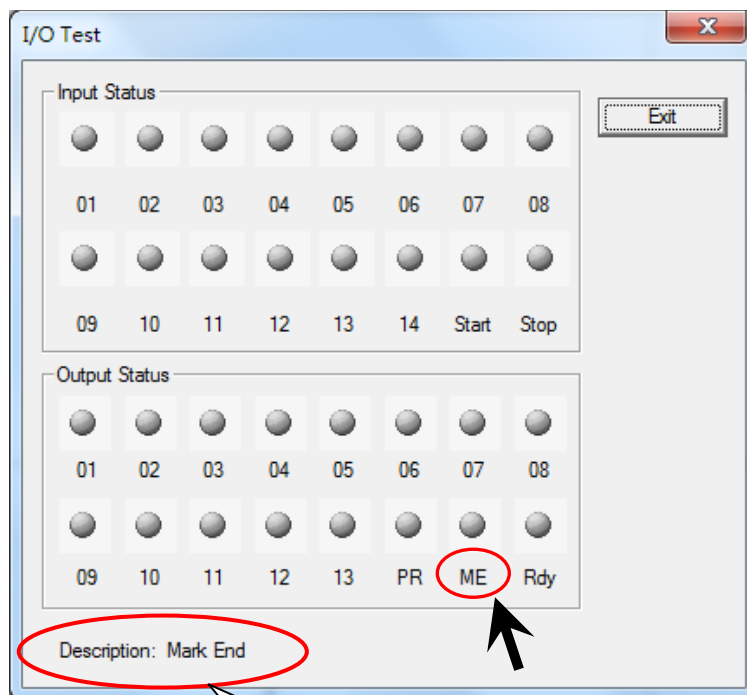
PR,Program Ready

OUTPUT15=

ME,Mark End

OUTPUT16=

RdySt,Ready for Start



When mouse move to the position of I/O name (see arrow point), its description