LO-X7 CONTROLLER MANUAL

Read and understand controller manual before using the laser machine.
Failure to follow operating instructions could result in death or serious injury.

Table of Contents

What's Included with the LO-X7?

- **Mounting brackets for DSP(2)**

- **USB 2.0 Extension cable (1)**

- **USB cable/ ethernet plug to mount on side of Laser Machine. (1)**

- **Motion Control Cables (2)**

LO-X7 DSP Control Panel

Figure 4

DSP Controller AWC-708
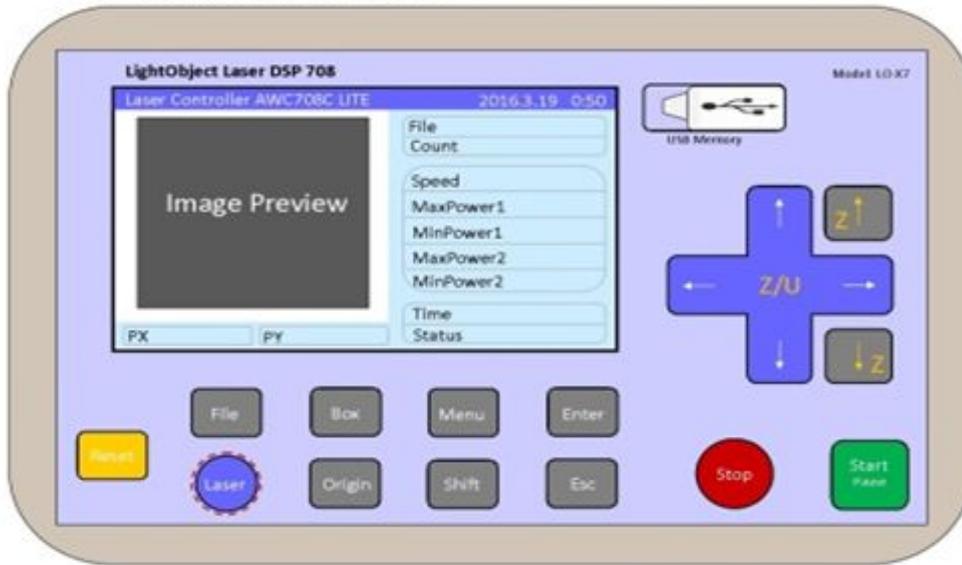
Start Pause — Begins or pauses the project being done on the laser machine.

Stop — Stops the task being processed and the machine from working.

Laser — Tests the laser before starting the project.

Z/U — Z/U control settings, allows you to move the z and u axis up and down.

File — Opens up saved files or any connected devices (USB)

Esc — Esc/Exits out of current setting and returns back to last page.

Menu — Enters into the main menu and opens up the display settings.

Enter — Enters into the interface and applies settings.

Reset — Resets the x, y, and z back to normal and applies any changes made to settings while moving back to home.

Origin — Sets the starting position on the x and y axis as the point to return (Home).

↓z ↑z — Moves the z axis up and down and changes the numbers for setting options.

Box — Shows an invisible box preview of the dimensions of the project without any lasers.

Controls the movement of the laser tip and allows for movement within the display

LO-X7 Main Screen / Menu Settings

LCD Display Main Screen

File
Count

Speed
MaxPower1
MinPower1
MaxPower2
MinPower2

Time
Status

Pressing the **enter** button on the control panel in the home screen will allow users to be able to change the parameters of each of the options by moving the up and down arrow keys.

Main Menu	2016.3.10 1:00
01.	UDisk Files
02.	Origin Manage
03.	Jog Control
04.	Cut Box
05.	Axes Control
06.	Motion Parameters Settings
07.	Common Parameters Settings
08.	Network Settings
09.	Language
10.	System Version

The buttons used when accessing Main Menu include the
   z↑ and z↓ to increase/decrease the parameters (numbers).
   ↑↓ arrow keys to move up and down in the list.
   Enter to go into the selected setting.
   Esc to return back. Press multiple times to go back home.

1. **UDisk Files:**

   Documents that were imported from the USB or computer that were saved on the machine.

2. **Origin Manage:**

   Saved location for origins.

Origin Manage	
01.	Origin1 Manage
02.	Origin2 Manage
03.	Origin3 Manage
04.	Origin4 Manage

3. **Jog Control:**

   Jog Distance(mm): increments with each push

   XY Jog: left, right, forward, back.

   Z Jog: up and down

Jog Control
Jog Distance (mm)
XY Jog
Z Jog
U Jog

4. **Cut Box:**

   Cuts a square layout using the parameters inputted.

Cut Box	
Start Cutting Box	
Blank Distance (mm)	010.0

5. <u>Axes Control:</u>

The setting that resets the Z-axis and U-axis.

Axes Control
To reset Z axis
To reset U axis

6. <u>Motion Parameters Settings:</u>

Adjustments for the speed of the laser. Cut Speed & Engraving Speed.(Cut Jerk)

Motion Parameters Settings
Space Speed (mm/s)
Cut Jerk (mm/s3)
Space Jerk (mm/s3)
Min Acc (mm/s2)
Cut Acc (mm/s2)
Space Acc (mm/s2)
Engrave Acc (mm/s2)
Start Speed (mm/s)
Speed Factor

7. Common Parameters Setting

- Work Mode
- Common Parameters
- Axis Speed Parameters
- Rotate Engraving & Cutting

Common Parameters Settings

01. Work Mode
02. Common Parameters
03. Axis Speed Parameters
04. Rotate Engraving & Cutting

(01)Work mode:

Adjustments for origin and feeding modes.

Work Mode

Go Origin After Reset	Open
Origin Mode	Key Origin
GoBack Position	Current Origin
Count Mode	Count Per work
Feeding Mode	Delay After Feeding

(02)Common Parameters:

Settings for keypad speed, box speed, and blow delay.

Common Parameters

AutoFocus Distance (mm)
KeyMove' Speed (mm/s)
RunBox' Speed (mm/s)
CutBox' Speed (mm/s)
Blow Open Delay (s)
Blow Close Delay (s)

(03)Axis Speed Parameters:

Home and work speed adjustments for the laser for the X,Y,Z,U,V, and W axis.

Axis Speed Parameters
Z Work Speed (mm/s)
U Work Speed (mm/s)
V Work Speed (mm/s)
W Work Speed (mm/s)
XY Home Speed (mm/s)
Z Home Speed (mm/s)
U Home Speed (mm/s)
V Home Speed (mm/s)
W Home Speed (mm/s)

(04)Rotate Engraving & Cutting:

Settings when using the rotary for round objects.

Rorate Engraving & Cutting
Rotate Fun
Rotate Axis
Pulse Count Per Rotate
Current Diameter (mm)

7. **<u>Network Setting</u>**

The connection for the machine. Allow users to connect to the correct IP address according to the machine to computer.

Network Settings
IP Part1
IP Part2
IP Part3
IP Part4

8. **<u>Language</u>**

Allows the user to change different types of languages.

Language	
Language	English

9. **<u>System Version</u>**

Indicates the machine model number, version, and product ID.

System Version
Product Name
Product ID
Version
User Authorization Code
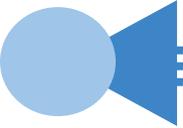
Introduction to LaserCAD v7 Software

<u>Introduction:</u>

This system controls the laser CNC machine by computer and completes machining tasks according to different settings from the user. The system consists of a control system, control panel and compatible software. This manual is an introduction on how to use the software to complete machining tasks.

The control system consists of hardware (control card) and software. Hardware includes one motion control card, one LCD Panel, four connection cables, and laser control software. Control system software(three versions: General Version (LaserCAD) ,CorelDraw based version, AutoCAD based version) and instruction manual are in the CD within the packaging box.

<u>*Operating System Requirements*</u>

⑴ Windows 2000, XP, Vista, Windows 7, 8, & 10)
⑵ Celeron 2.1Ghz or higher.
⑶ Minimum of 1Gb is suggested.

LaserCAD Installation

Installation

- *Find and open LaserCAD_V7.78B folder*

- *Double click on "Setup" and click the "Install" button*

- *After the installation is complete, click the "Install USB driver" button as well.*

- *Once that is completed, the message "FTDI CDM Drivers have been successfully installed" should appear.*

- *Your installation is now complete*
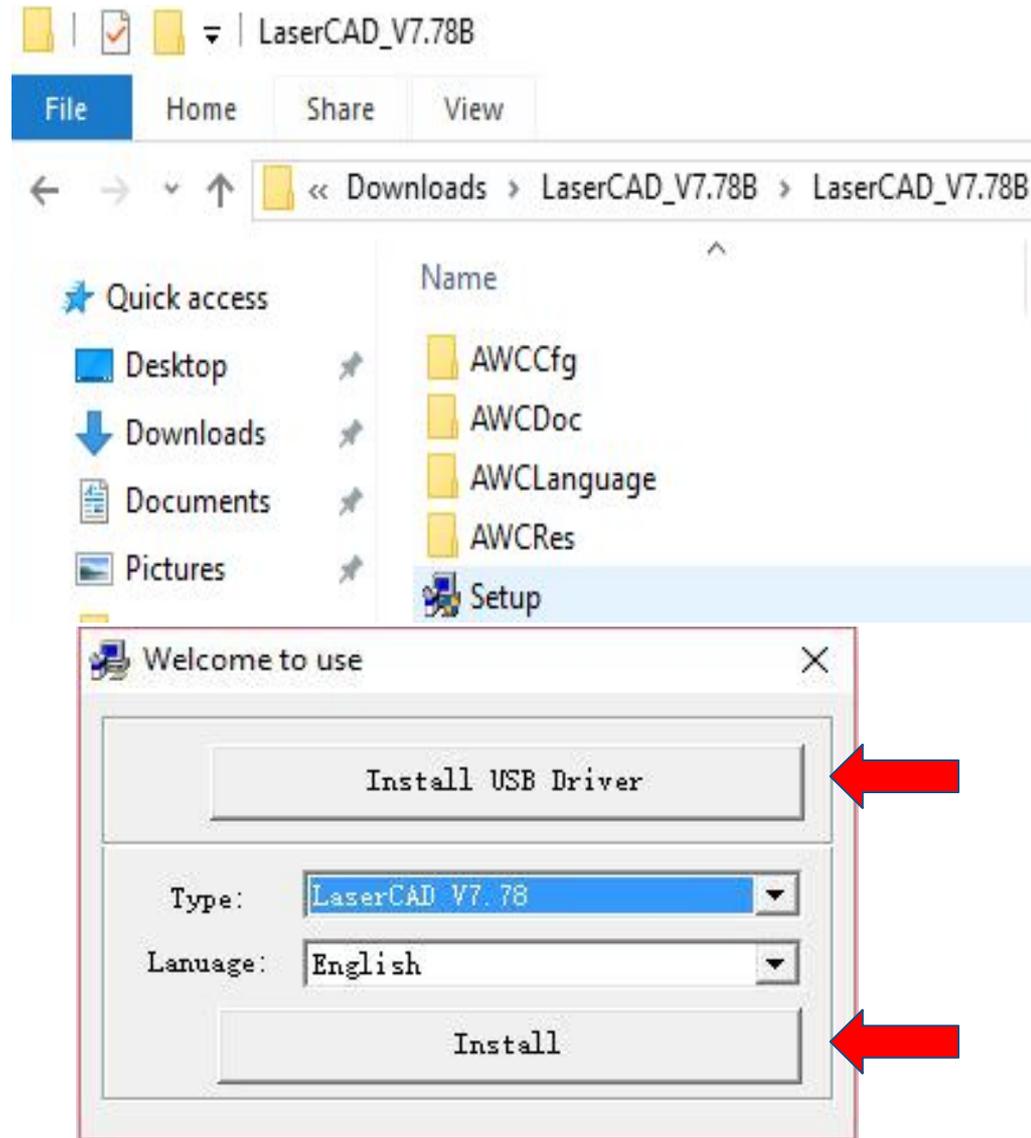
LaserCAD Main Interface
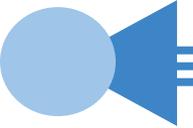
Menu Bar:

Menu Bar includes 7 sub-menus: File, Edit, Draw, Tool, Options, View and Help.

Toolbar:

There are some functions completed by command buttons in the Toolbar. Most of these functions are sorted from menu bar.

Object Bar:

Allows selecting object during operation and relevant properties during using tool. It can control the change of object by setting relevant properties in property bar.

Draw Bar:

With draw tool in draw bar, it makes operation more flexible and convenient.

Control Panel:

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

Align Bar:

Aligns multiple objects to perfect the layout of page.

Color Bar:

Changing different colors allow different options for each layer to be set.

LaserCAD V7.78.10 - Untitled
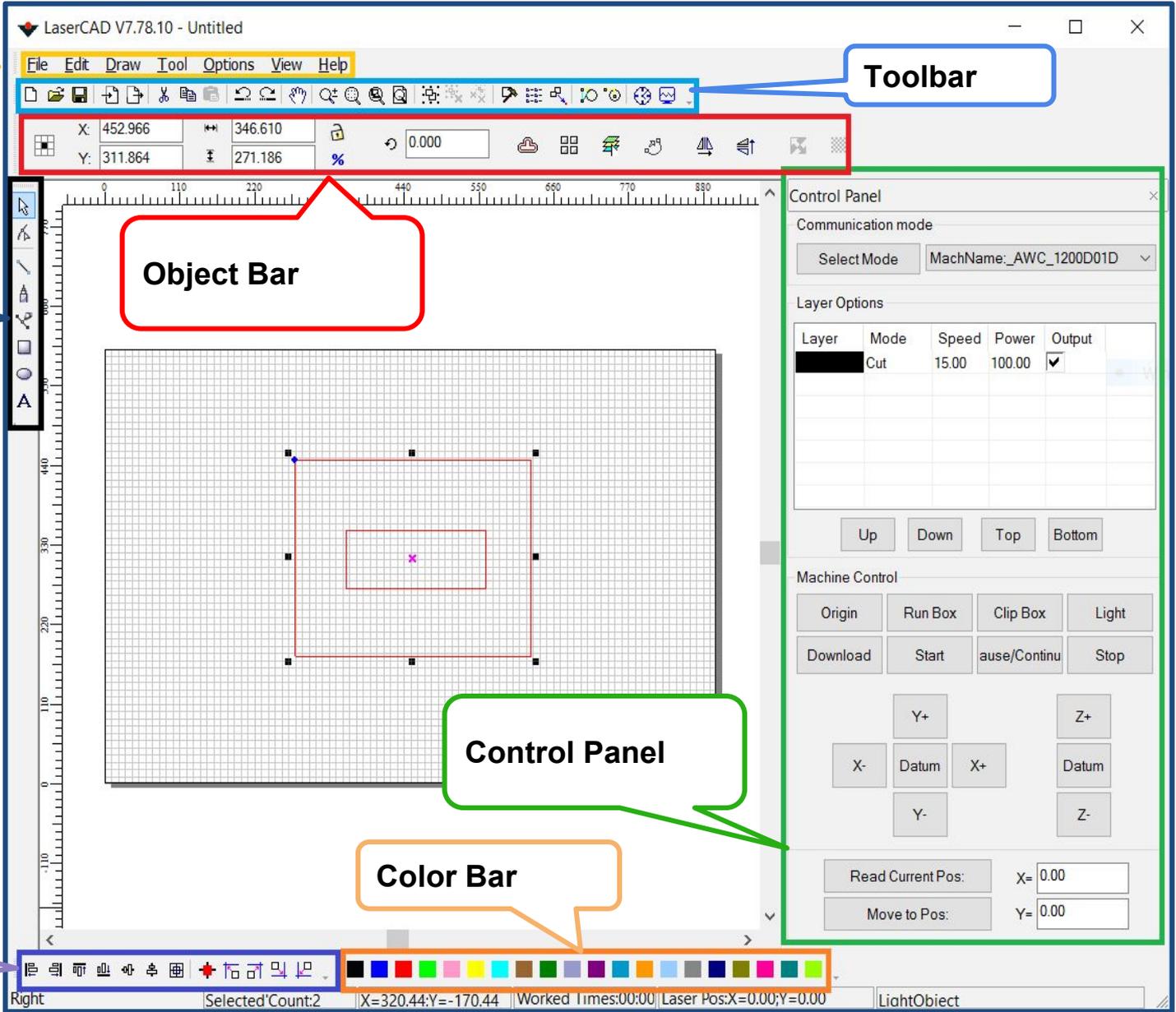
Menu Bar

Toolbar

Object Bar

Draw Bar

Control Panel

Color Bar

Align Bar

LaserCAD Quickstart

1. *Open LaserCAD*

2. *Open, draw, or import selected image onto LaserCAD that is going to be cut or engraved.*

3. *Connect the USB-C from the computer to the laser machine.*

4. *For the first time, to add and recognize the laser machine, press the "Select mode" button on the right side. Then click the "add" button for USB connection and then "Find Com."*

5. *Once this is done, press ⌦ located near the top of the screen to enter system options.*

6. *Enter the user parameters tab or manufacturer's parameters and click "READ."*

7. *Double click on the layer on the right and it will bring up the Layer Parameters.*

8. *In this page, the power and speed of the laser can be adjusted. The option to cut or engrave is available on this page.*

9. *After everything is set on the computer remember to "SAVE". Then, click on the Download button on the right side of LaserCAD > Download Document. This will send the project to the laser machine with the newly added settings.*

10. *After this is done, press "Reset" on the DSP controller to apply the new changes.*

11. *If everything on the display looks correct, try pressing "box" on the DSP controller to make sure that the dimensions of the image to be cut or engraved are correct.*

12. *If everything is set properly, press start to begin cutting or engraving the image.*

System Settings: Work Space

Nudge Offset:

Determines the distance that laser head moves when the arrow buttons are pressed on control panel.

Paste Offset:

*Offset distance when copying the offset distance of selected object.*

Language:

Determines language used.

Speed Unit:

Determines the units of measure used in machine.

Machine Zero:

Determines default origin of machine (Zero/Limit position). The setting must be exactly the same with the actual machine zero position, or the machined image could be reversed or flipped.
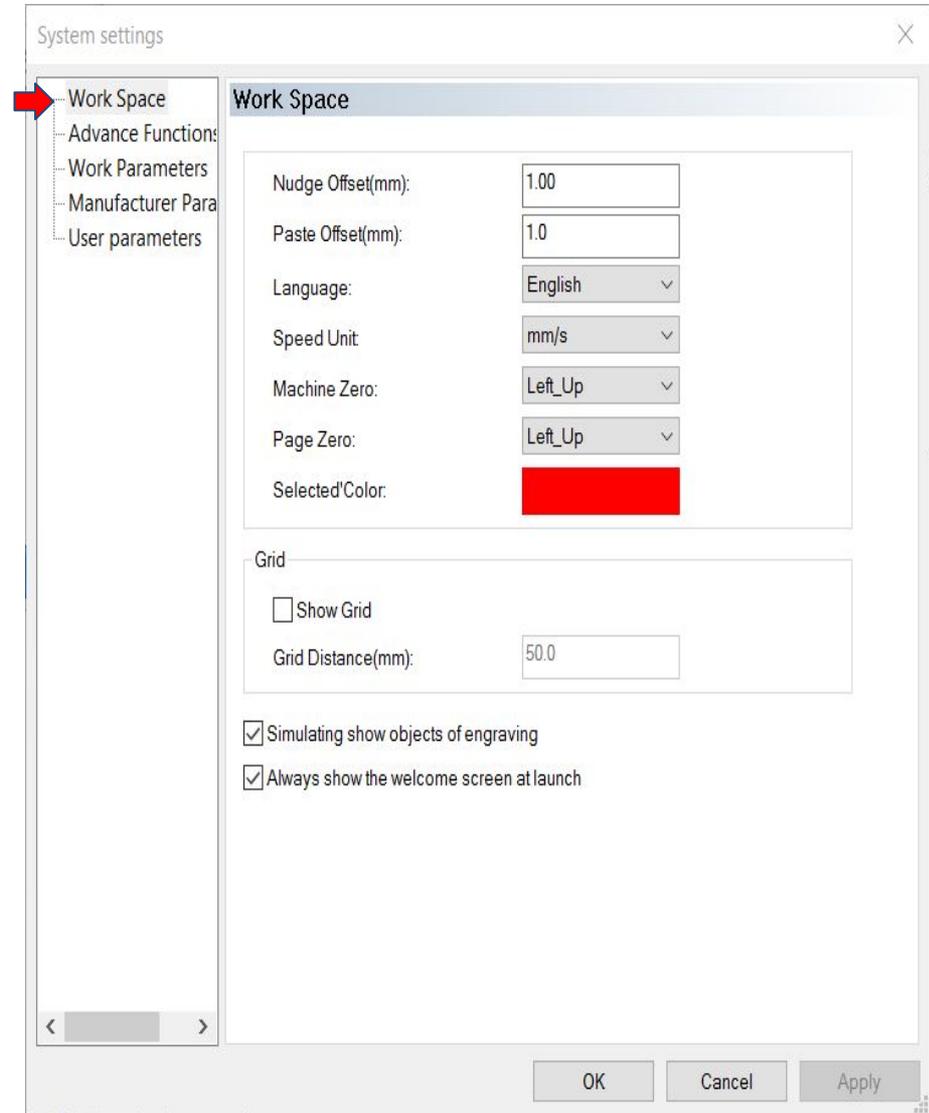
Selected Color:

Determines color of selected object.

Show Grid:

Toggle on or off to show grid on drawing area.

Grid Distance:

Adjusts the distance of the grid lines.

Simulating show objects of engraving:

System will simulate and show the engraving image. However, if the data volume of engraving image is too large, the system will render slowly when showing the view.

System Settings: Advance Functions

Only use this tab only when using the rotational function on the laser machine. This is only for engraving on round/circular objects.

__Enable Rotate Engrave:__ If selected, will make the outputting data of common engraving to be automatic.

__Rotate axis con(um):__ When setting x-axis as the rotation axis, engraving method must be [one-way vertical] or shifted to rotate engrave data for it to realize the function of rotating engraving. For [two-way vertical], set Rotate axis control to be value of X axes pulse unit. When setting Y-axis to be rotation axis, engraving method must be [one-way Horizontal] or [two-way Horizontal], set rotate axis control to be value of Y axes pulse unit.

__Step per rotate (pulse):__ Pulse numbers required from motor driver when rotation axes makes 1 cycle

__Current diameter__: Diameter of engraving objects.
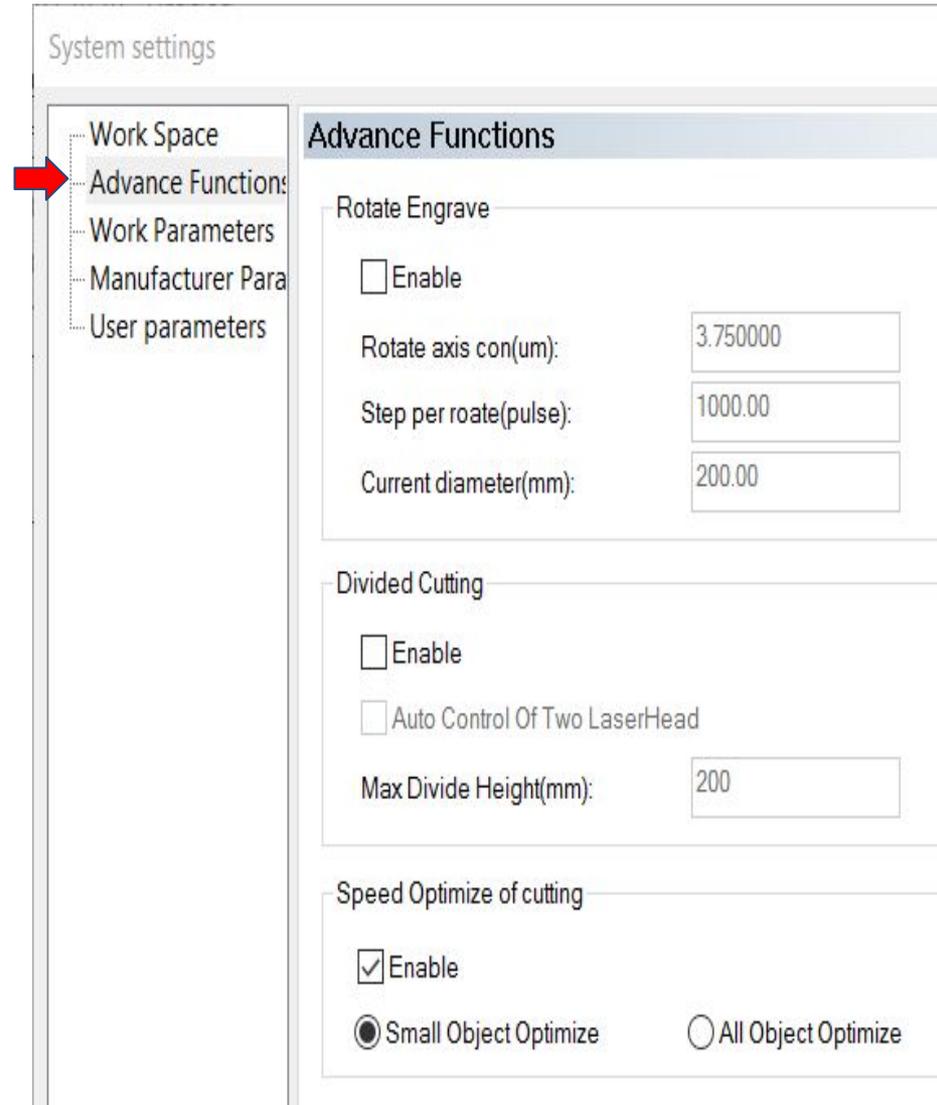
System settings

- Work Space
- → Advance Functions
- Work Parameters
- Manufacturer Para
- User parameters

Advance Functions

Rotate Engrave

☐ Enable

Rotate axis con(um):   3.750000

Step per roate(pulse):   1000.00

Current diameter(mm):   200.00

Divided Cutting

☐ Enable

☐ Auto Control Of Two LaserHead

Max Divide Height(mm):   200

Speed Optimize of cutting

☑ Enable

◉ Small Object Optimize   ○ All Object Optimize

Curve Disperse: *Curve smoothness setting. The smaller values set will increase accuracy, but reduce the speed.*

Circle Speed: *The system will automatically recognize whether processing objects are circles. The speed limit, and the computation speed will affect the process speed. Generally, choose a small value for organic glass cutting. For other cutting, use the default value 0.10. According to the diameter of circle, use the current set speed limit to process the circle. If parameter is set properly, it will greatly improve the circle cutting quality.*

Click the add and delete and modify to set this parameter.

Engrave Reverse Offset: *When applying two-way engraving image, it may cause the edges of the scanned image not to be smooth due to mechanical return gap. This can be corrected by increasing reverse offset. The specific speed has the specific reverse clearance. Generally, the faster the speed is, the bigger the reverse clearance is. The reverse gap value can be positive or negative.*

System settings

Work Space
Advance Functions
Work Parameters
Manufacturer Para
User parameters

Work Parameters

Curve Disperse(mm): 0.100

Circle Speed

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

☐ Enable

Add

Delete

Modify

Engrave Reverse offset

Speed	Reverse Offset

☐ Enabel

Add

Delete

Modify

Cutting Backlash

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

OK   Cancel   App

*Click **READ** on this page before adjusting anything as shown on the right and save the settings.*

*The **Um/Pulse** for the X-axis and the y-axis will be the main settings that will be adjusted. This is where you adjust the dimensions of the image to the expected value. This will make your image more precise.*

***X/Y/Z/U**- Axis Parameter (Z axis: Elevating axis; U- axes: Feeding axis) (Refer to View 3-3-2) Click on [Z/U-Axis Options] to allow setting the parameter of Z axis and U axis*

***Pulse Unit:** When sending a pulse to the motor, the absolute distance moved by the corresponding axis (unit: um). If the pulse unit setting is not correct, the processed image size will be different from the actual size.*

***Pulse Edge:** Trigger edge when motor is rotated by motor driver. If the pulse edge setting is not correct, may lead to cutting error.*

***Datum:** Axis moving direction when reset。When the axial resetting movement direction is not consistent with the shaft limit switch, modify this parameter.*

Key Direction: *LCD Panel key movement direction. When the direction is different from movement, modify this parameter.*

Range: *Machine workbench range; the max movement distance of corresponding axis.*

Start Speed: *Start speed of axis from stationary state. The greater the value, the faster the speed, which causes longer pauses. Necessary to make reasonable adjustments according to the characteristics of task being done. The typical setting should be within 5 ~ 20 mm/s.*

Max Acceleration: *Acceleration when axis increases or decreases movement. Too big of a setting may lead to motor losing steps or dither; too small of a setting may cause slow acceleration and then slow processing speed for whole image. For axis with big resistance, such as Y axis corresponding with beams, typical setting should be within in 800～3000mm/s2 ; For axis with small resistance, such as X axis corresponding with carts, the typical setting should be within 10000 ～20000mm/s2;*

Max Speed: *The motor drive ability and resistance of moving axis decides the max speed that motion axis can reach. During engraving process, engraving speed can not surpass the max speed value corresponding with the engraving axis. During cutting process, the resultant speed can not surpass the min speed of X and Y axis. If speed setting is too large, controller will automatically limit the speed below max speed for safety.*

IO Function Switch

Water Protect: *The water protection ports of AWC708 control panel are Laser1.Protect and Laser2.Protect. When Water Protect is selected, system will apply real-time monitoring water protection signal of the 2 ports. If any of the port signals gets too high of a level, processing job will be suspended, and laser will be closed. Meanwhile "Water protect" will be shown on LCD Panel.*
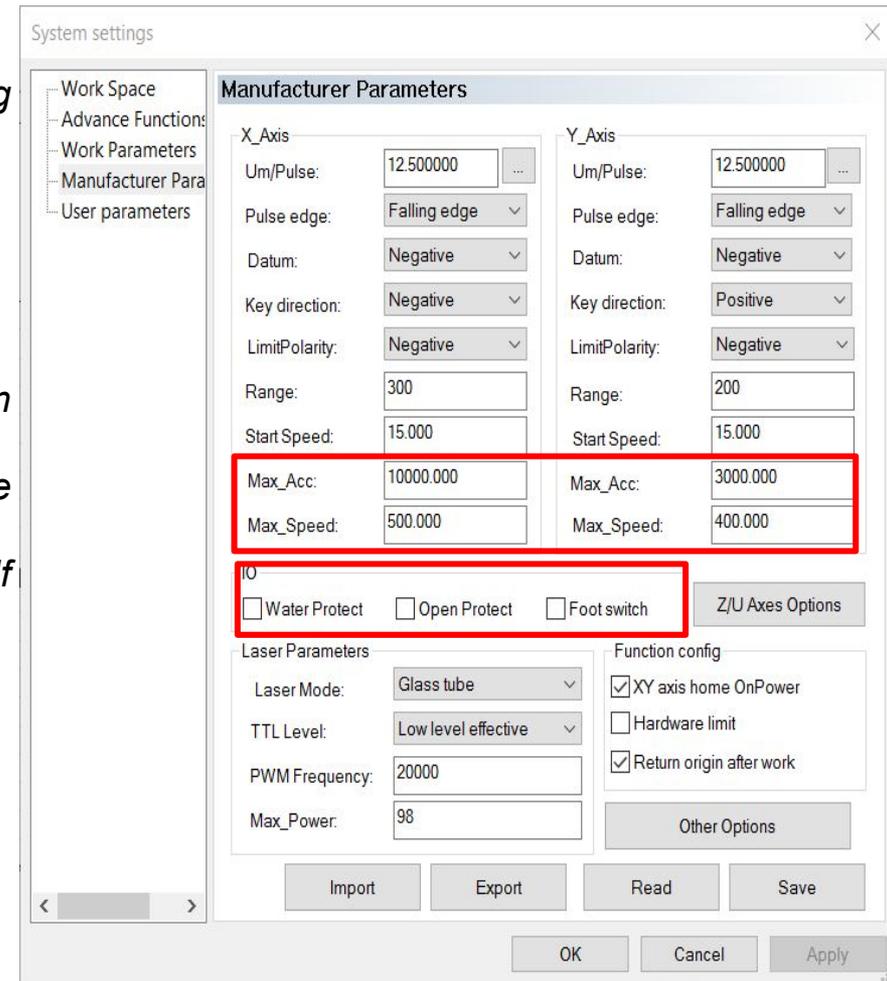
Open Protect: *The open protect port of AWC708 control panel is IN1. When [Open protect] is selected, system will apply real-time monitoring protection signal of the port. If the port signal comes to be too low of a level, processing job will be suspended; when the port signal comes to a higher level, suspended job will resume.*

Foot Switch: *The foot switch port of AWC708 control panel is IN2. When Foot Switch is selected, system will apply real-time monitoring protection signal of the port. If the port signal changes from a high level to a low level, the processing job will be suspended or suspended job will resume.*

Laser Parameters

Laser Mode: *Choose the parameters according to the external laser. The current lasers are mainly 3 kinds: domestic glass tube, RF laser (don't need burning pulse) and radio frequency laser (needs burning pulse).*

TTL Level: *Choose the parameters according to external laser power supply switch signals, AWC708 laser switch signals corresponds with Laser1.TTL and Laser2.TTL. If [Low level effective] is selected, when laser is on, the system will output the two signals for low level; when laser is off, the system will output the two signals for high level. If [High level effective] is selected, when laser is on, the system will output the two signals for high level; when laser is off, the system will output the two signals for low level.*

PWM Frequency: *Pulse frequency of control signal used by external laser. General setting will be within 20000~80000. If setting is too small, it will lead to unbalanced power with "Heavy Point" appearing during processing.*

Max Power: *Limit power value that can be set for laser, namely during operation. The power set by user cannot be above this value.*

Function configuration

XY axis home On Power: *If selected, when machine starts, X axis and Y axis will run reset movement simultaneously (Shall select the option normally)*

Z axis home On Power: *If selected, when machine starts, Z axis will run reset movement (Shall not select the option normally)*

U axis home On Power: *If selected, when machine starts, U axis will run reset movement.(Shall not select the option normally)*

U axis for feeding: *If selected, start U axis feeding function. If it's not selected, U axis feeding function will not work. (Shall select the option normally)*

Hardware limit: *If selected, system will apply real-time monitoring on limit signal according to the direction of the movement. When detecting a limit signal as low level, ongoing work will suspend, and "Reach limit!" will be displayed on the LED.*

Return origin after work: *If selected, system will return to origin after job completes. Not selected, system will stay in place after job completes.*

Import: *allows import manufacturer's complete setting parameter files. Click Import and then locate the file and open.*

Export: *allows copying the current parameter settings. Click export and then locate the file and open. The exported parameter can be used to modify the current main board parameter through AWC708 main board U disk port.*

Read: *shows the current settings of the parameters on the machine. Click read and save the software interface settings into control panel RAM, and give control panel correct settings.*

Save: *sends the parameter settings to the laser machine. If you do not click save after setting the parameters, the settings will not be in applied.*

System Settings: User Parameters

Space Speed: *During work, the max operation speed of laser head when laser off. The value range of this parameter is limited to Axis [Max Speed] of manufacturer parameter, shall not be bigger than max speed of the manufacture parameter.*

Start Speed: *Start speed during processing, the value range of this parameter is limited to Axis. Start Speed of manufacturer parameter, shall not be bigger than max speed of the manufacture parameter.*

Speed Factor: *Factor determining the turn speed in work. The bigger the factor is, the faster the work-speed is. Then bigger dither accordingly. Value range between 0~5, normally set at 2.*

Space Jerk: *Speed of acceleration during space process. The bigger the value is, the faster the space is; results in a bigger dither accordingly. Value range is between 10000~60000 normally.*

Cut Jerk: *Speed of acceleration during cutting process. The bigger the value is, the faster the cutting is; results in a bigger dither accordingly. Value range is between 5000~50000 normally.*

<u>Cut Jerk:</u> *Speed of acceleration during cutting process. The bigger the value is, the faster the cutting is; results in a bigger dither accordingly. Value range is between 5000~50000 normally.*

<u>Min Acc.</u>: *Min acceleration of axis movement during processing.*

<u>Cut Acc.:</u> *Max acceleration of laser head movement during processing when laser on. Normally set below 1500.*

<u>Space Acc.</u>: *Max acceleration of laser head movement during processing when laser off. Normally set below 2000.*

<u>Engrave Acc.:</u> *Max acceleration of laser head movement during processing when engraving. Normally set above 8000. Too small a setting will lead to too long of a distance before initial speed accelerates to engraving speed, causing a failed engraving because of out-of-range.*

<u>Open & Save Files</u>

The files used by the software is PWJ format. The pwj5 file saves the image information, all layer parameters, and all image elements processing sequence. By saving all imported image data as pwj5 format, it will make it easier for the image processing..

Work control parameters

Space_Speed:	100	Min_Acc:	50
Start_Speed:	5	Cut_Acc:	200
Speed_Factor:	2.00	Space_Acc:	800
Space_Jerk:	12000	Engrave_Acc:	10000
Cut_Jerk::	8000		

Instant recovery: | Slower Params ∨

Work control parameters

Space_Speed:	200	Min_Acc:	100
Start_Speed:	10	Cut_Acc:	1500
Speed_Factor:	2.00	Space_Acc:	2000
Space_Jerk:	40000	Engrave_Acc:	10000
Cut_Jerk::	25000		

Instant recovery: | Noraml Params ∨

Work control parameters

Space_Speed:	300	Min_Acc:	100
Start_Speed:	10	Cut_Acc:	1500
Speed_Factor:	2.00	Space_Acc:	2000
Space_Jerk:	50000	Engrave_Acc:	10000
Cut_Jerk::	40000		

Instant recovery: | Faster Params ∨

Import and Export Files

As the file format used in this software is PWJ5, importing is required when you need to make or edit image. There are different formats for importing and exporting images so that it can apply to the software. Supported importing formats are DXF, AI, PLT, DST, DSB and so on; Supported exporting format is: PLT.

Import file: *Click [Import] option or (Ctrl+I) in [File] menu and open dialog box as below, Select corresponding file and click [Open]*

> **[Unite Lines]:** *Apply unite lines setting when importing the image. (Introduction of [Unite Lines], please refer to 3.13.5)*
>
> **[DST/PLT Auto Smooth]:** *Apply auto smooth setting when importing the image. (Introduction of [Auto Smooth] please refer to 3.13.3)*
>
> **[Auto Order]:** *Apply auto order setting when importing the image. (Introduction of [Auto Order], please refer to 3.13.2)*
>
> **[PLT Unit]:** *Indicate the dimension of one unit in PLT file, different values make different importing image dimensions.*
>
> **[Reserve the current document]:** *Upload data of imported file while keeping the original image data. So after importing, the image includes both the original data and the imported file data.*
>
> **[Preview]:** *Previews the file image when selecting the file.*

Export File: *Click [Export] option or (Ctrl+E) in [File] menu, and open dialog box as below, Input file name and click [Save].*

How to Create Basic Graphics:

*Draw a **straight line**: Click [line] option in [Draw] menu, or click. Drag the mouse on screen to draw any line. Press "Ctrl" key and drag the mouse at the same time to draw horizontal line.*

*Draw a **polyline:** Click [Polyline] option in [Draw] menu, or click . Drag the mouse on screen to draw any line.*

*Draw a **Bezier:** Click [Bezier] option in [Draw] menu, or click. Drag the mouse on screen to draw Bezier.*

*Draw a **Rectangle:** Click [Rectangle] option in [Draw] menu, or click.Drag the mouse on screen to draw rectangle at any size. Press "Ctrl" key and drag the mouse at the same time to draw square.*

*Draw an **Ellipse:** Click [Ellipse] option in [Draw] menu, or click. Drag the mouse on screen to draw ellipse at any size. Press "Ctrl" key and drag the mouse at the same time to draw circle.*

*Edit a **text** : Click [Text] option in [Draw] menu, or click. Double click on the left mouse button, and open dialog box as shown:*

Choose font, input or select font size, input text and then click [OK].

Selecting Objects

During the process of drawing and editing a graphic, you first need to select an object. When an object is selected, there is a mark "X" in the center of the object, 8 control points around and profile color as "color of selected object."

Click "select" or "draw" in the menu bar, or click [cursor icon] *on toolbar, to switch to "Select". Now you can select object.*

The following are 5 ways of selecting objects.

1. *Click【Select all】of【edit】in menu (shortcut key Ctrl+A) to select all objects.*
2. *Click to select single object.*

3. ***Box Selection**: Press the mouse and drag, all contacted objects will be selected.*
4. *Add/Deselect selected objects : **Add object**: Select the first object, then press "Shift" then click or box select the objects you want to add. **Deselect object:** Press "Shift" then click or box select objects already selected, then the objects will be deleted.*

1. *Click on* *in object operations bar and open the window to select by color layers. Then click "ok" to select all within those colors.*

Select By Color			
Pen	Color		OK
0	(blue)		
1	(black)		Cancel
2	(red)		

Box Selection: *Press the mouse and drag, all contacted objects will be selected.*

Add/Deselect selected objects :

Add object: *Select the first object, then press "Shift" then click or box select the objects you want to add.*

Deselect object: *Press "Shift" then click or box select objects already selected, then the objects will be deleted.*

Object color: *allows users to click on any color in the layer bar to change object color. This makes it easier for those who want to cut/engrave only certain parts of an image.*
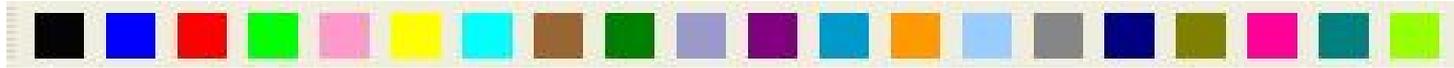
Object Transforming: *is the operations to change the object's position, direction, size and such, and will not change the shape of the object and its character.*

Mirror: *Mirror means flipping objects horizontally or vertically by clicking*   *, will flip object horizontally. To flip the object vertically, click the*   *button.*

Tilting and rotating objects is very simple.

◆   *Rotating Objects: there are 2 ways to rotate the object:*
1. *Click* ↻ 0.00 *, and input rotate angle in* 0.00 *then click to complete rotation.*
2. *Click* � *and double click objects needed tilting or rotating, then get into rotating/tilting editing mode. At this mode, control points around objects changes to rotation control arrow   and tilting control arrow shown as below*
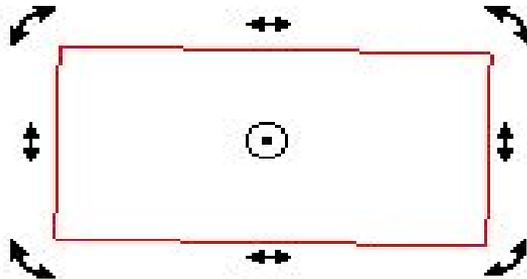
Move mouse to control arrow, and move control point along arrow direction; during movement, profile line generates and rotate as below: Release mouse when rotating to correct position, then rotation is complete.

Object Size: Most simple operation to zoom or change the size of objects is also using   ,click the object, and move the control points around objects. The operation is simple, direct but with low accuracy. Click   ut horizontal size value and vertical size value in the text box, and then   press "Enter", and object size is changed。

↔	50.456
↕	41.035

Click   to   then the horizontal (vertical) value will change accordingly when vertical (horizontal) value is changed.

Position relative: *shows the position of laser head relative to figure.*

To access this, first click the "options" on the toolbar. Then click on Position relative. Following are diagram with different positions of laser head relative to figure (cross point of two red lines instead of laser head):
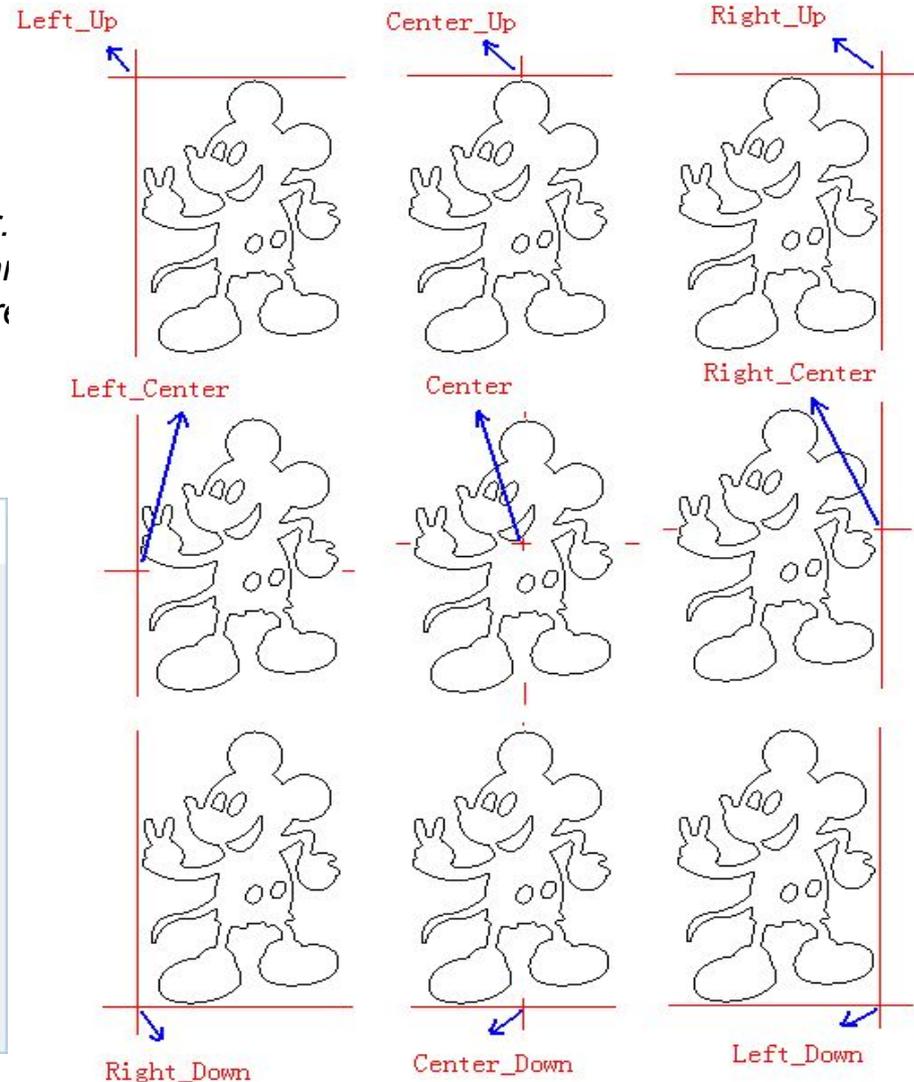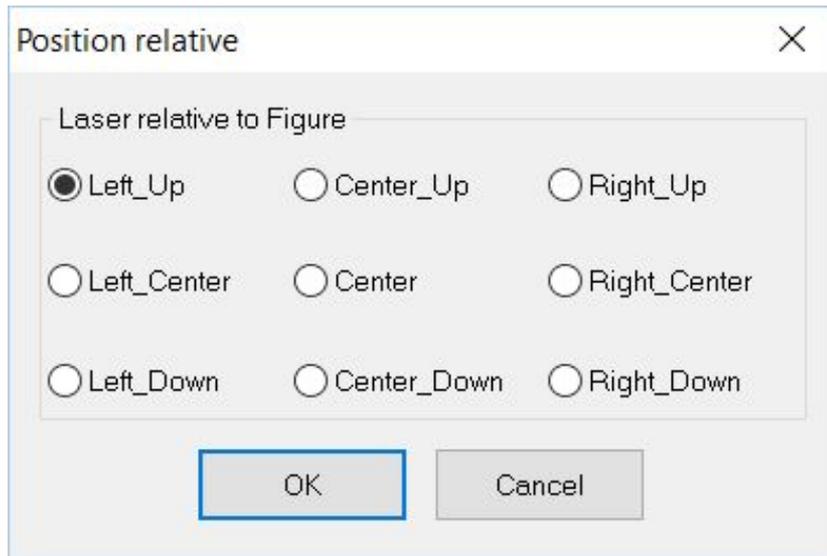
Click Options, then array output options.

Cell width(X): *Original size of datum*

Cell height(Y): *Original size of datum*

Count: *Rows and columns of datum to be output.*

Offset: *Distance between every row or every column.*

Width: *Width of all datum after array.*

Height: *Height of all datum after array.*

Auto convert calculation: *According to the space, calculate the rows and columns needed automatically. Click Auto convert calculation*

Material width (X): *Width of material to be dealt with(default as width of workbench)*

Material height (Y): *Height of material to be dealt with(default as width of workbench)*

System will calculate the number of material to be dealt with according to material size.

Double Click on a layer to enter layer parameters.

Layer: *Indicates current layer need to be altered. Click left layer bar to switch to the layer need to be altered.*

Work mode: *Includes "cut","engrave","cut after engraving","hole", if current layer is BMP (like)it only includes "engrave"(It can be only used in engraving)。*

Select "cut" or "cut after engraving" in work mode, to enable cut parameters settings

Cut Parameters

Speed: *Working speed of laser head during cutting.*

Working Power: *Maximum power; To adjust the maximum value of laser power during processing*

Corner Power: *Minimum power; the lowest power value during variable motion. It's the power of (Make sure laser intensity constant during process by adjusting above two parameters).*

Overlap Length: *Due to tolerance with machine, probably it will happen that closed image can't be layer(Unit:%). It's the power of laser 1 of AWC708 control panel. Laser1 of AWC708 control panel. cut off. So this parameter can help to solve this problem. But this parameter should not be too large. Suggest adjusting precision of machine to solve this problem.*

Engraving Parameters:

Speed: *Scanning speed during engraving.*

Working power: *Adjust size of laser power during processing layer.(Unit: %)*

Engrave gap: *Gap between scanning line.*

Engrave mode: *Includes "X_swing", "X_ unilateralism", "Y_swing", "Y_unilateralism"*

> **X_swing:** *Laser head releases laser to scan image back and forth in horizontal direction.*

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

> **Y_swing:** *Laser head releases laser to scan image back and forth in vertical direction.*

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

Engrave Parameters

| Laser1 | Laser2 | Laser3 | Laser4 |

|	
Power(%):	15.00
Speed:	120.00
Scan gap(mm):	0.10000
Engrave Mode:	X_swing
VertWiden(mm):	0.00
HoriWiden(mm):	0.00
BMP Optimize:	● Yes ○ No
	...

Hole Parameters...

Pen Parameters...

Grade Engrave: *Select "Yes",【Grade length】and【Min. Power】are valid. Grade engraves is shown to the right.*

Grade Length: *Shows the "grade" in the graphic.*

Min. Power: *Minimum value of laser power during adjusting grade engraves. This value confirms the depth of grade. 【working power】confirms depth of engraving*
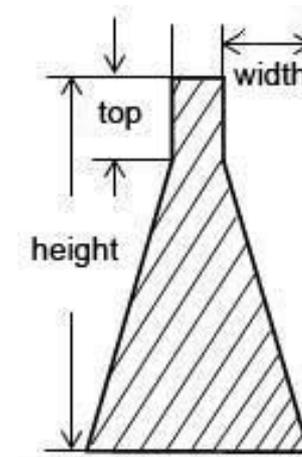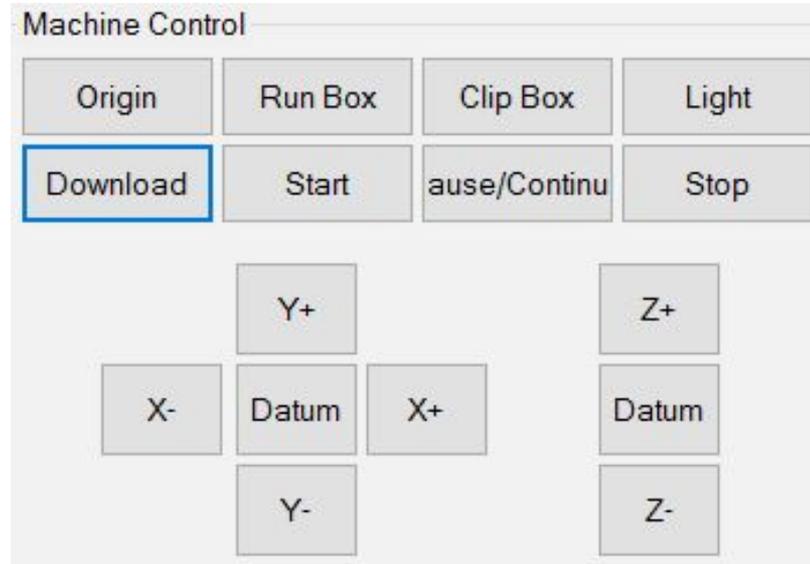
Machine control is to finish downloading of Image, starting & processing and for some simple machine operation control.

Origin: *set the current laser head position as origin*

Start: *start work for the current selected file in control panel*

Use/continue: *click 【Use/continue】 to suspend or continue the work.*

Stop: *stops machine from working.*

Run box: *laser head will run rectangle shape according to the size of file data. The option is mainly used to confirm the placed position of parts to be processed*

**Clip box:** *cut completed part from working material*

Light: *press/Release [Light] to turn on or turn off the laser.*

Datum: *Click the button, laser head(or z-axes) will move to machine origin slowly, when reach the limit position of machine, will move quickly to located position. This can get rid of cumulative errors, and shall apply for one time before starting work normally.*

[X-] [X+] [Y-] [Y+] [Z-] [Z+] : *Moves laser head(or Z-axes)。 Press the button, laser head (or Z-axis) starts to move; Release the button, laser head(or Z-axis) stops moving.*
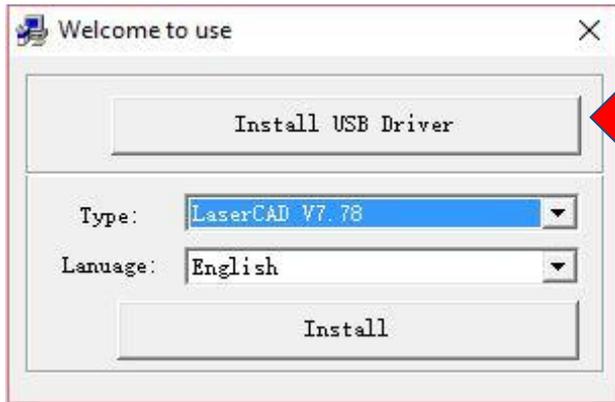
For the USB connection mode to work, the USB Driver has to be installed. This can be found in the setup when installing LaserCAD.
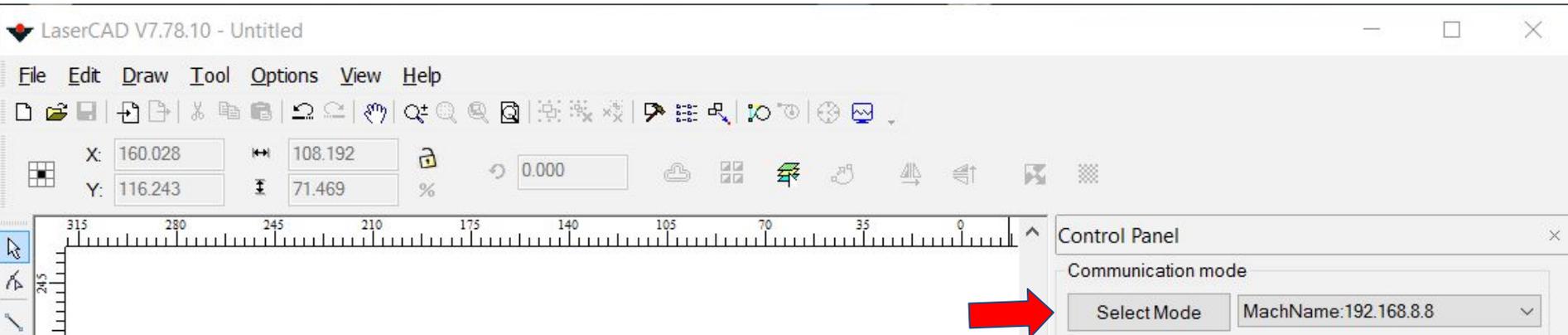
To connect your computer to the laser machine, be sure that the USB-PC is plugged in first. Then on the right side of LaserCAD, press "Select Mode"

The window below will appear. Then, click the "Add" button

Select Mode   ✕

⦿ USB Mode   [Add] [Delete] [Modify]

	DeviceName	COM
✔	MachName	3
	MachName	13
	MachName	21
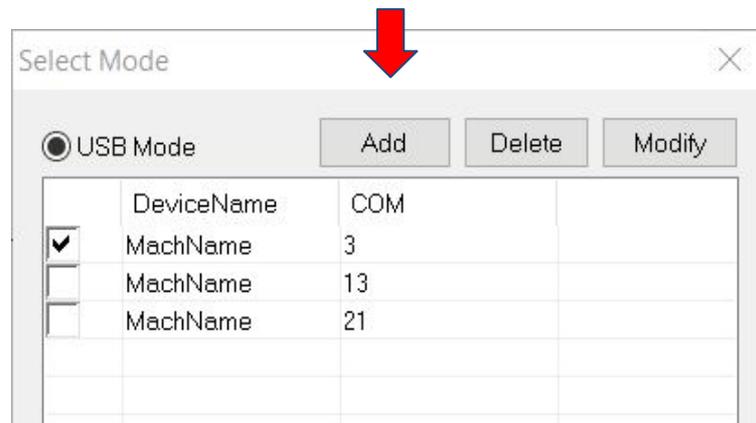
In this next window, you can change the device name and press "FindCom" to find the laser machine. After that is done, press ok and your computer is connected to the laser.

USB Com   ✕

DeviceName: MachName

USB COM: 3   [FindCom]

[OK]   [Cancel]
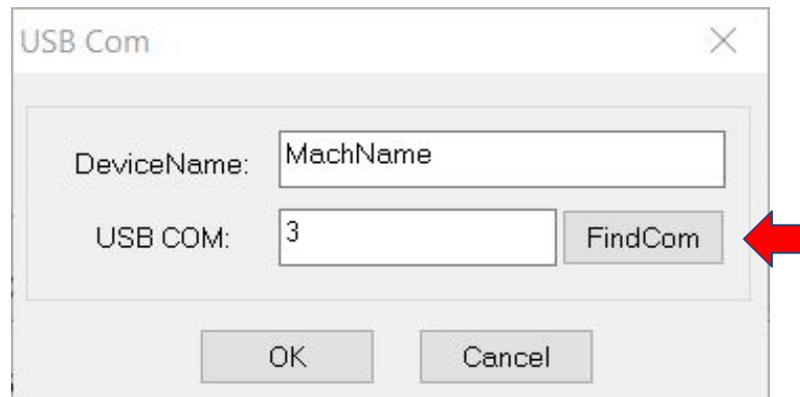
To connect your machine to the computer using an ethernet cable, you first have to find out the ip address for the computer.

NOTE: The Ethernet Connection Mode only works for the LO-X7 DSP Display.

Be sure to plug in the ethernet cable to the laser machine and to have the display of the machine on when setting the connection up.

*The IP can be found by first opening the **command prompt.***

- *To do this, go into the search bar for windows and type in cmd.*
- *After that is done, a window like below should appear.*
- *Then in the command prompt, type in " **ipconfig /all** "*

-

```
Ethernet adapter Ethernet:

   Connection-specific DNS Suffix   . :
   Description . . . . . . . . . . . :
   Physical Address. . . . . . . . . :
   DHCP Enabled. . . . . . . . . . . :
   Autoconfiguration Enabled . . . . :
   Autoconfiguration IPv4 Address. . :     192.168.10.13
   Subnet Mask . . . . . . . . . . . :
   Default Gateway . . . . . . . . . :
   NetBIOS over Tcpip. . . . . . . . :
```

- *This should then bring up a list of information.*
- *Look for the Ethernet adapter's IP Address and write down the first three set of number. (ex: 192.168.10.XX)*
- *Then take that IP address and enter that into LaserCAD and into the Network Settings for the Laser Machine DSP. (Shown below)*

In LaserCAD, on the control panel for

Communication Mode on the right side,

press select mode to enter into this

window.

Click on Network Mode and double click on the MachName with IP to change the IP address.
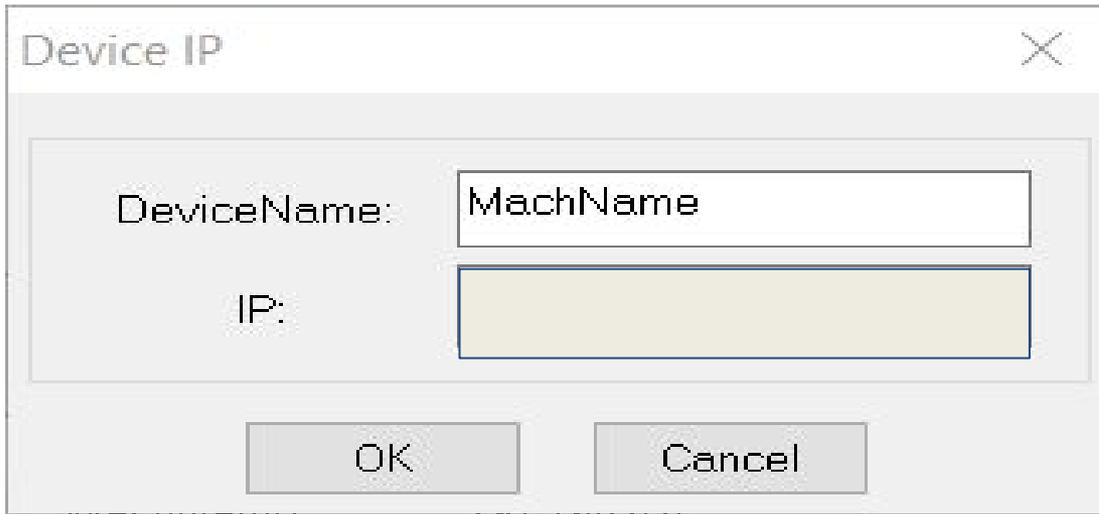
Set the IP address to what was recorded in the previous step with all the first three sets of the numbers the same. (192.168.10.xx) After that is set, check the box and LaserCAD is set.

Now All that is left to set is the DSP Laser Machine Network Settings.

Main Menu	2016.3.10 1:00
01.	UDisk Files
02.	Origin Manage
03.	Jog Control
04.	Cut Box
05.	Axes Control
06.	Motion Parameters Settings
07.	Common Parameters Settings
08.	Network Settings
09.	Language
10.	System Version

To change the IP on the DSP Control Panel on your laser machine, first press the "MENU" button to enter this page.

Then using the ↑ and ↓ keys, go down to #8, the Network Settings and press "ENTER"

This will then bring up the options shown below.

Network Settings	
IP Part1	192
IP Part2	168
IP Part3	10
IP Part4	11

Once on this page, change the IP to what the computer's ethernet IP address that was recorded earlier. (The first three parts of the IP must be the same as the IP on the computer)

This can be done by using the Z↑ and Z↓ buttons to change the numbers.

The ↑↓ keys will allow you to move to the different IP Parts

*Once that is all done, **be sure to click "Enter" so that the new network settings are saved.***

Download current file data (image data of software) to the machine

Current documents options: *means the options of document to be downloaded to main board.*

Name: *document name to be downloaded to main board*

Work Times: *the amount of times you want the task to be done. System will repeat the task of downloaded document automatically when started.*

Repeat Delays: *Delay time after 1 task when applying multiple tasks.*

Press [...] *for advance options for feed length.*

**Feed Length:** *Moving distance of feeding axis (Z-axes) after each task completed.*

Document Data Optimize: *Will optimize settings of the current document.*

Download Document ✕

Memory Document

Num...	Document Name

Refresh | Work
Delete | All Delete
Download UFile | Format

Current Document options

Name: panda
Work times: 1
Repeat Delay(s): 0
[...]

Document Data Optimize
☐ Auto Group Engrave
☐ Gap Optimize
☐ GoCenter Mode
☑ Re-Order Objects [...]

Save Document to UFile

Download Document

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

Line Cut Mode: *this option is to avoid power "repeated point" during corner cutting, and effective to material cutting such as adhesive material. This will affect the work efficiency, so generally the option is not selected.*

Re-order Objects: *System will apply [Automatic Order] to document data when this option is selected.*

CorelDraw / AutoCAD Based Software
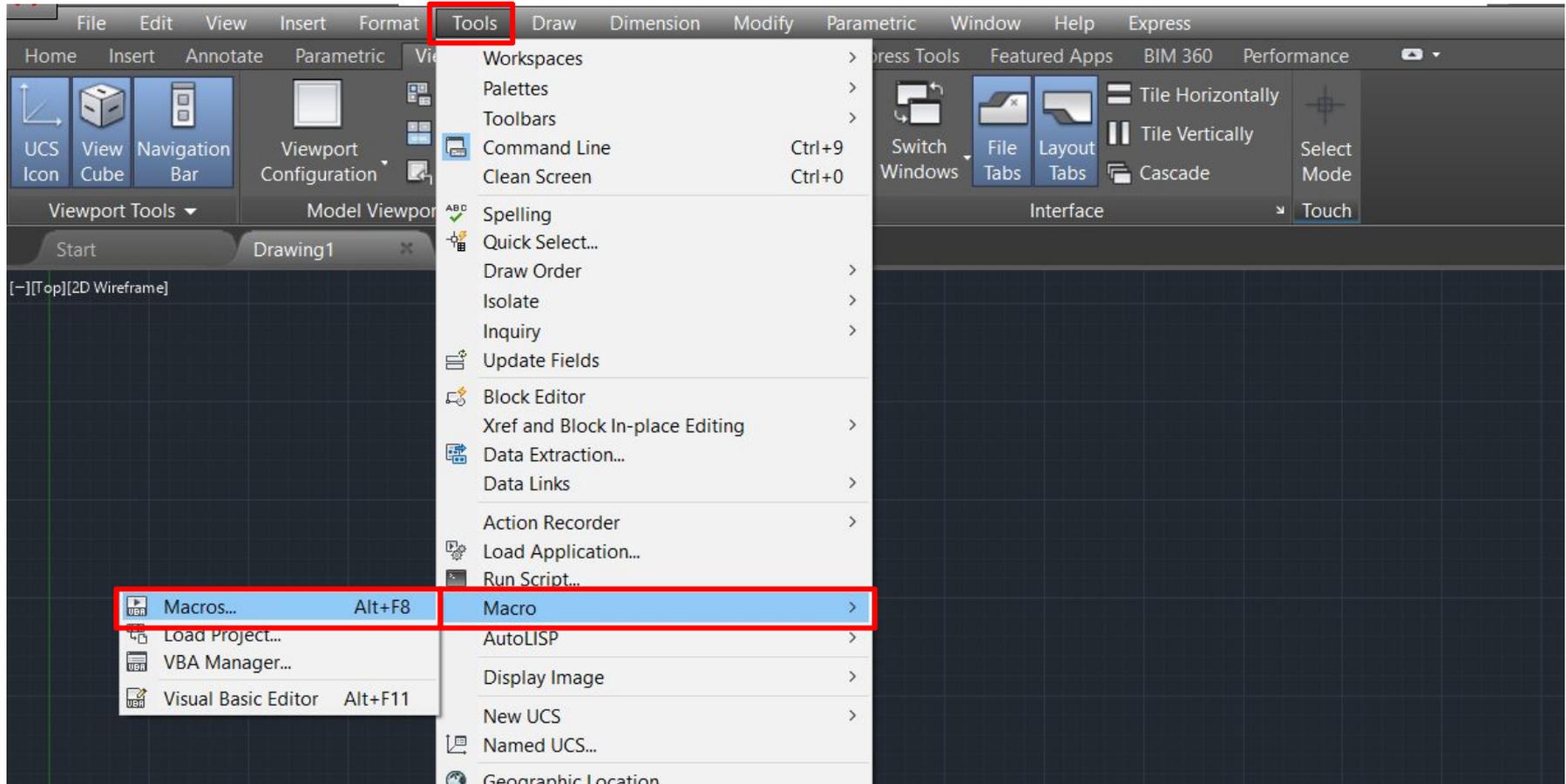
For manual download of AWCLaserCut Tool, Click Menu > Tools > Macros> Run Macro or Macro..

Note: Only supports AutoCAD versions 2004-2008 / CorelDraw x6

After Run Macro is selected, this window below will appear.
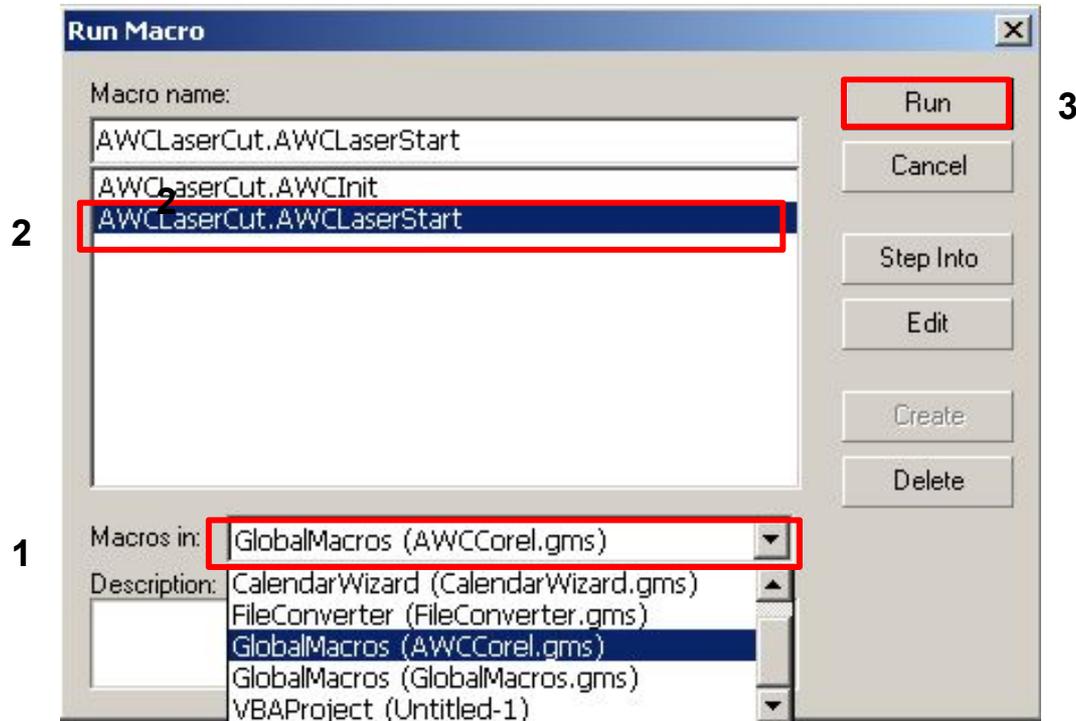
1 *For [Macros in:] select the **AWCCorel.gms / AWCAutoCAD.gms** option.*
2 *Then in the [Macro name:] above, select **AWCLaserCut.AWCInit***
3 *Once that is done, click [Run] and the **AWCLaserCut** tool will be added.*

These tools will be added that can be dragged into the toolbar by using the mouse.

 Press this to transfer from Coreldraw/AutoCAD to LaserCAD
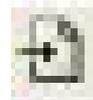
 Press this to import/export DST/DSB files

If these tools disappear all of a sudden, users can right click on the toolbar and select the AWCLaserCut Tool again to appear.

LO-X7 01-2016

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