LaserGRBL
Operation Manual of Software
（Installation and Usage）

■ **Security Statements**

Before starting laser engraving, please read this safety guide carefully. It mentions situations requiring special attention, including warnings of unsafe behaviors which can cause damage to your property or even endanger your personal safety.

■ **Laser Safety**

Lasers device use laser products. The power of laser device is high, which can cause eye injuries and burn the skin.

When using laser engraving machine, it is recommended that you wear laser protective glasses

Avoid skin exposure to laser beams, especially at short range.

Adolescents must have parental supervision during their usage of the product.

Do not touch the laser engraving module when the machine is power on.

■ **Fire Safety**

Because the substrates burn off during cutting, a high-intensity laser beam will generate extremely high temperatures and a lot of heat. Some materials will catch fire during cutting, causing gas and smoke inside the machine.

When a laser beam shines on the material, a small flame usually appears here. It will move with the laser and will not remain lit as the laser passes by.

Do not leave the machine unattended during engraving.

Make sure to remove debris, chips and flammable materials from the laser cutting machine after use.

Always keep a fire extinguisher handy for normal use.

Safety of smoke or air pollutants

When the laser engraving machine is used, smoke, steam, particles, and probably toxic (plastics and other combustible materials) are generated from the materials. These smoke or air pollutants can be hazardous to health.

■ **Material Safety**

Do not carve materials with unknown properties.

recommended materials:

Wood, bamboo, leather, plastic, fabric, paper, non-transparent acrylic, glass, metal with surface treatment (e.g. electroplating, oxidation).

not recommended materials:

Not common metals (such as titanium), gemstones, transparent materials, reflective materials, etc.
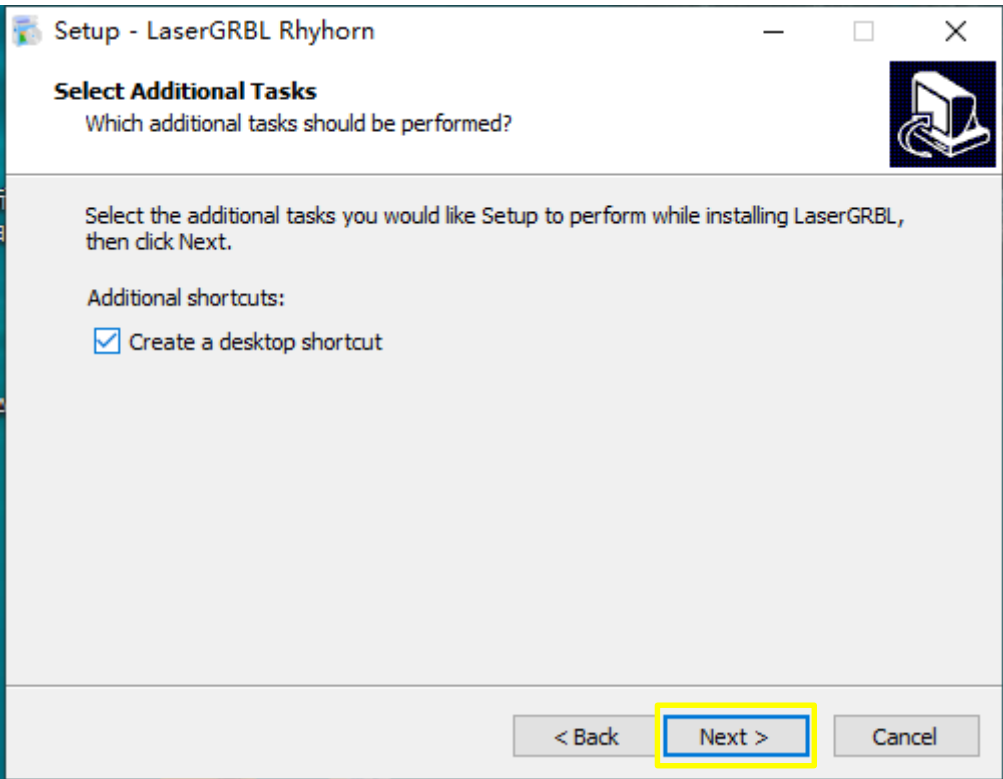
1. Software Downloading

LaserGRBL is one of the most popular DIY laser engraving software, which can be downloaded in LaserGRBL website http://lasergrbl.com/download/(The installation package is also available on the TF card from the manufacturer or USB flash disk). Brief introduction: LaserGRBL is an open source, easy-to-use and powerful software. Unfortunately, LaserGRBL only supports Windows system (Win XP/Win 7 / Win 8 / XP/Win 10).
For Mac users, you can also choose LightBurn, which is also a very good engraving software, but it's not free. The software also supports Windows system.
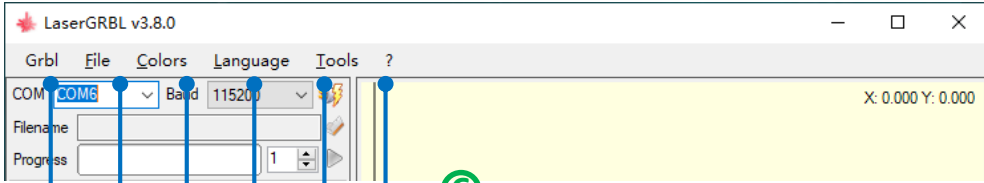Note: The engraving machine needs to be connected with the computer during engraving, and the software of the engraving machine cannot be turned off.

2. Software Installation

Double click the software installation package to start the software installation and click Next until the installation is complete.
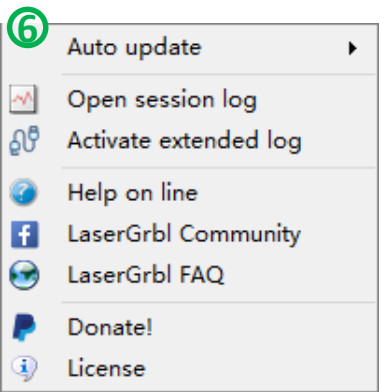
3. Introduction of Menu Bar

LaserGRBL v3.8.0

Grbl File Colors Language Tools ?

COM COM6   Baud 115200

Filename

Progress   1

X: 0.000 Y: 0.000

⑥ version updates, online help

⑤ tools < driver installation, burn firmware >

④ language switch

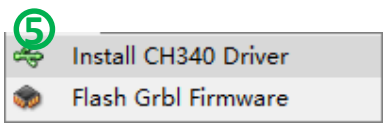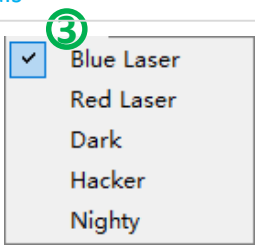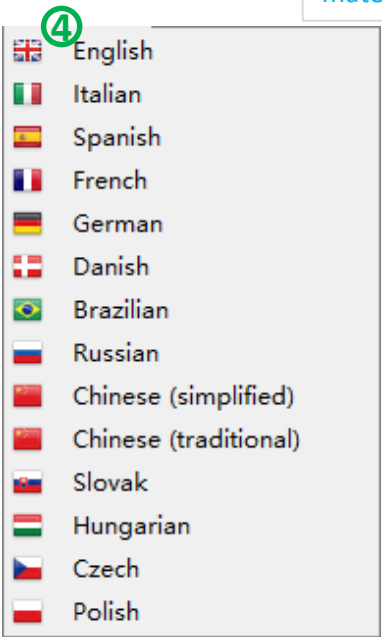③ software displays color configuration

② load file, transfer G code, save G code

① Grbl < configuration (machine parameters), settings (software), shortcuts, material parameters >

①

- Connect
- Reset
- Unlock
- Grbl Configuration
- Settings
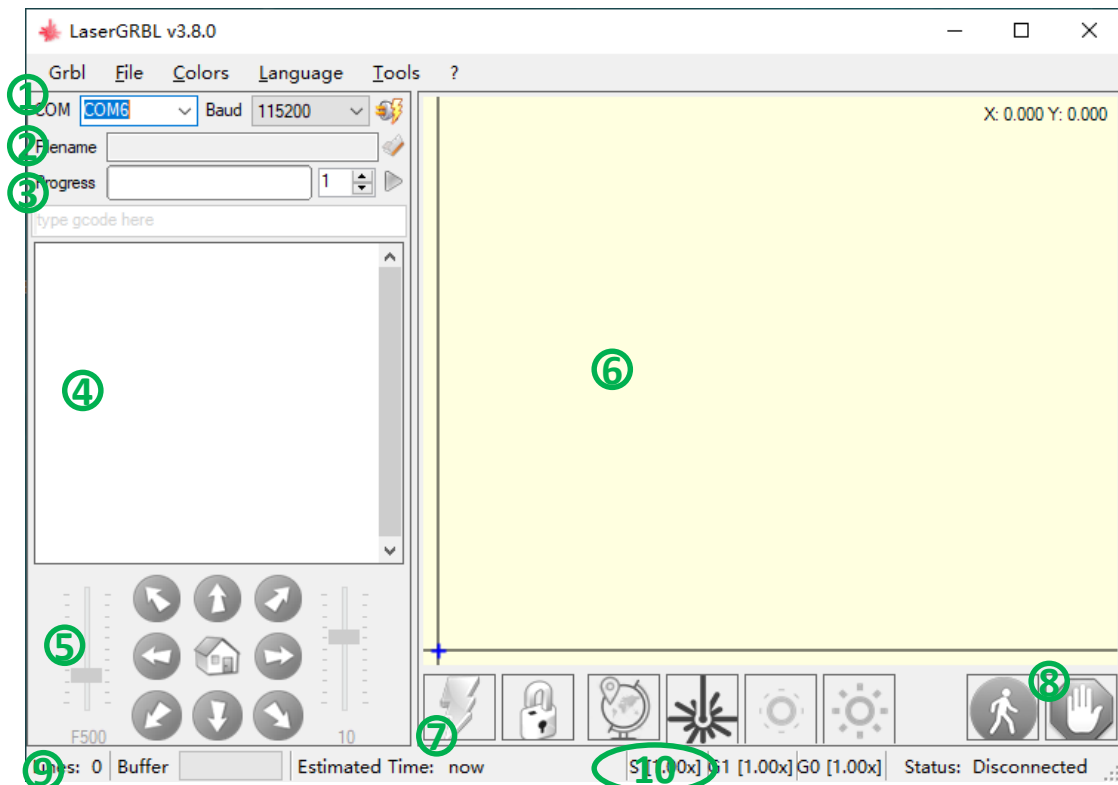- Material DB
- Hotkeys
- Exit
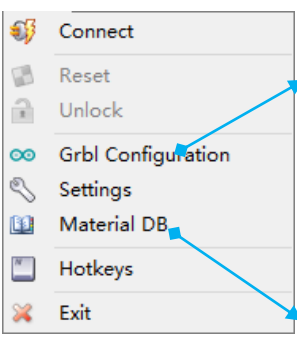
Configure machine firmware parameters (motor speed, direction, acceleration, etc.)

Set the material parameter table, power and speed according to commonly used materials

②

- Open File
- Append File
- Reload Last File
- Quick Save
- Save (Advanced Options)
- Send To Machine
- Send From Position
- Syncro Start/Hold/Resume

④

- English
- Italian
- Spanish
- French
- German
- Danish
- Brazilian
- Russian
- Chinese (simplified)
- Chinese (traditional)
- Slovak
- Hungarian
- Czech
- Polish

③

- ✓ Blue Laser
- Red Laser
- Dark
- Hacker
- Nighty

⑤

- Install CH340 Driver
- Flash Grbl Firmware

⑥

- Auto update ▶
- Open session log
- Activate extended log
- Help on line
- LaserGrbl Community
- LaserGrbl FAQ
- Donate!
- License

4. Interface Introduction

User Interface of LaserGRBL

1. Connection Control: Here you can select the serial port and the appropriate baud rate connection according to the GRBL firmware configuration.

2. File Control: It shows the name of the loading file and the progress of the engraving process. The green "Play" button will start executing the program.

3. Manual Command: You can input any G code line here, and then press "Input". Commands are queued to command queues.

4. Command Log and Command Return Code: display the re-sent command and its execution status and errors.

5. Jogging Control: Manual laser positioning is allowed. The left vertical slider controls the moving speed, and the right slider controls the step size.

6. Engraving Preview: This area shows the preview of the final work. During engraving, a small blue cross will display the current laser position at run time.

7. Grbl Reset/Locate/Unlock: This button submits soft reset, location and unlocking commands to the grbl board. On the right side of the unlock button, you can add some user-defined buttons.

8. Source Maintain and Restore: This button can suspend and restore program execution and send source maintain or restore commands to the grbl board.

9. Line Counting and Time Prediction: LaserGRBL can estimate execution time of program based on actual speed and work schedule.

10. Coverage of Control State: Display and change the actual speed and power coverage. Coverage is a new function in grbl V1.1 and is not supported in older versions.

5. Add Custom Button

LaserGRBL supports custom button. Right-click the button area to add new custom buttons.

It is recommended to use the custom button set by the manufacturer, which can be obtained from the TF card of the manufacturer (USB flash disk).
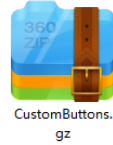

Figure 5.1 Installation Package for Custom Button

How to load into software:

In LaserGRBL software, right-click the mouse in the blank space next to button at the bottom (as shown in figure 5.2) - > import custom button, and then select the package for custom button obtained before and the custom button zip can be imported. Press (Y) until no window pops up to complete the installation of the custom button.
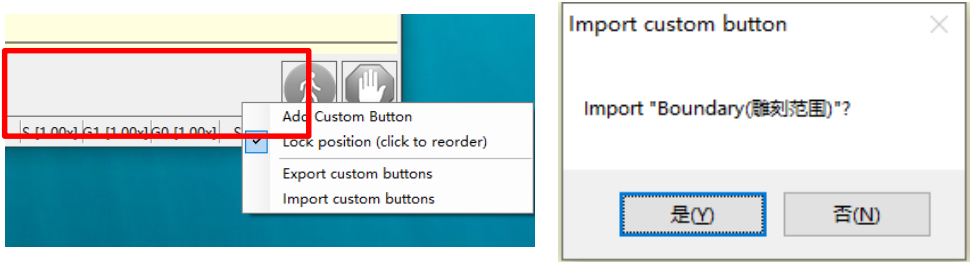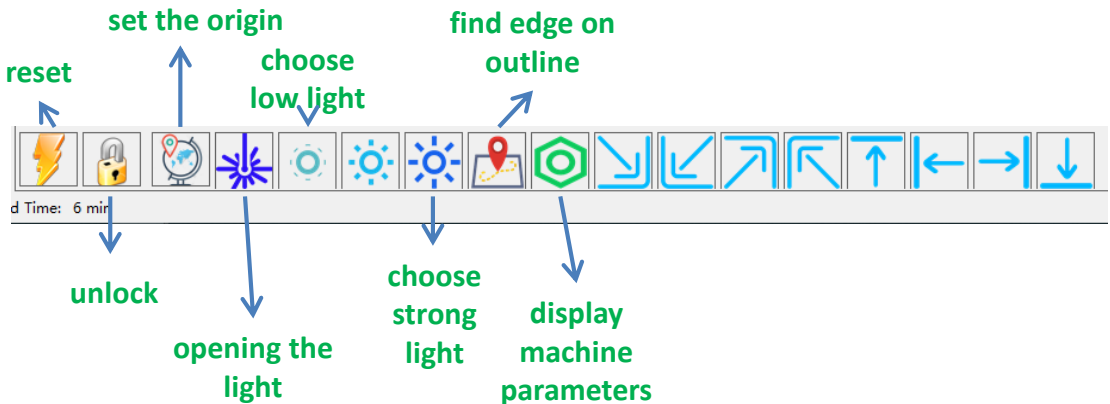

Figure 5.2 How to add

Introduction of button function

Shenzhen Two Trees Technology Co.,Ltd.

6. Connect Laser Engraving Machine

6.1 Connect the laser engraving machine with the computer installed with LaserGRBL software by using USB data cable.

6.2 Plug in the laser engraving machine.

6.3 Open the LaserGRBL software on the computer.

6.4 Select the correct port number and baud rate in the software - 115200, figure 6.4 (in general, the COM needn't be chosen manually, but if you have multiple serial devices, you'll need to select them manually when connecting to the computer. The port of the laser engraving machine can be found in the Device Manager on Windows. An easier way is to try each port number displayed).

6.5 Click the lightning connection sign in the software. When the lightning sign turns into red X and the direction sign is lit up, the connection is successful. (Figure 6.5)
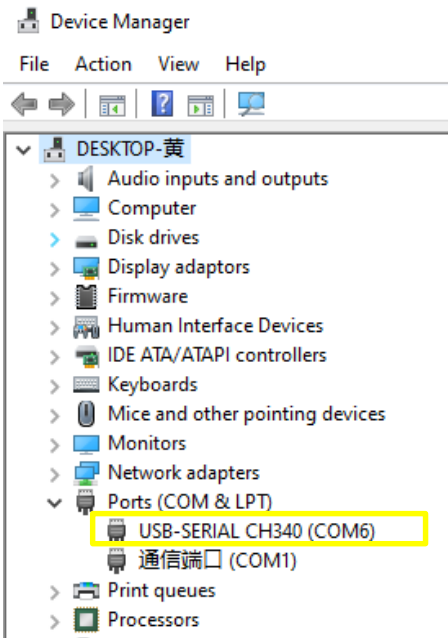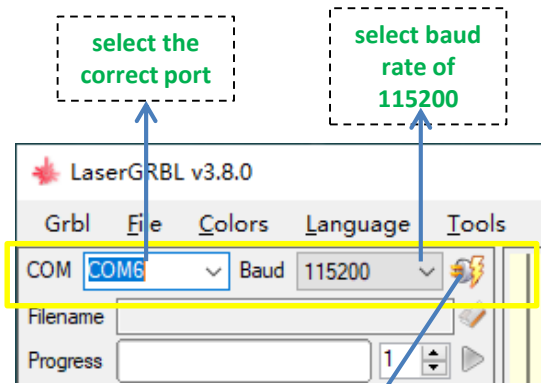
Figure 6.2

select the correct port

select baud rate of 115200

lightning connection sign

Figure 6.4

Figure 6.5

connection is successful
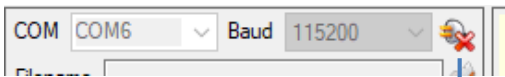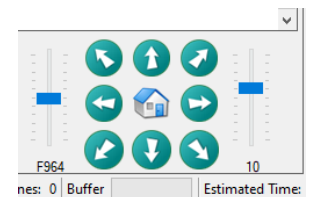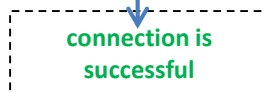
Note: If the correct port does not appear in the port bar

Method 1. Click the "Tools" on menu bar to install the ch340 driver (this function is not available in some versions of the software);

Method 2. Copy file of "CH340SER.EXE" from TF card (USB flash disk) to computer and install;

7. Configuration of Machine Parameters

It is recommended to import the configuration file. nc which is configurated by the manufacturer. The document can be obtained from the TF card(USB flash disk) from the manufacturer and copied to the computer.

7.1. Click "Grbl Configuration" under the menu bar of "Grbl" to enter the configuration interface, as shown in figure 7.1.

7.2. Click the "Import" button to enter the file selection interface, select configuration file. nc, and click "Open".

7.3. The import status is displayed in the lower left corner, and "configuration is imported successfully" will be displayed if the import succeeds.

Figure 7.1

click to enter the configuration interface

Figure 7.2

click "import" and select the .NC configuration file

import status
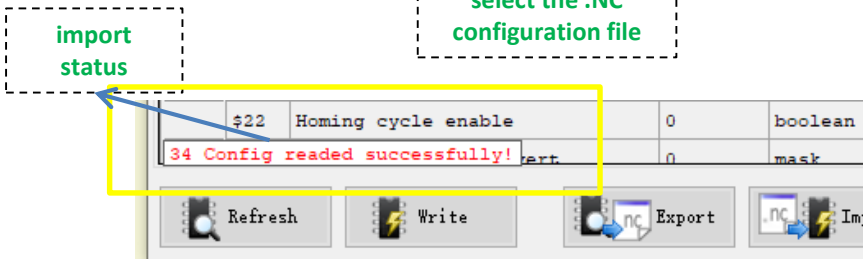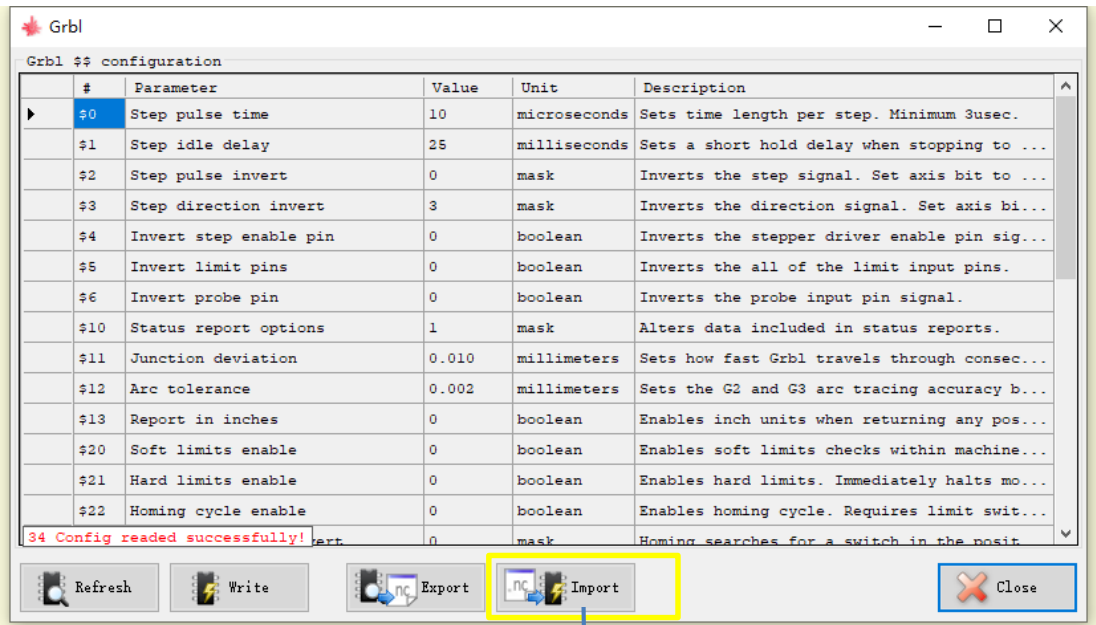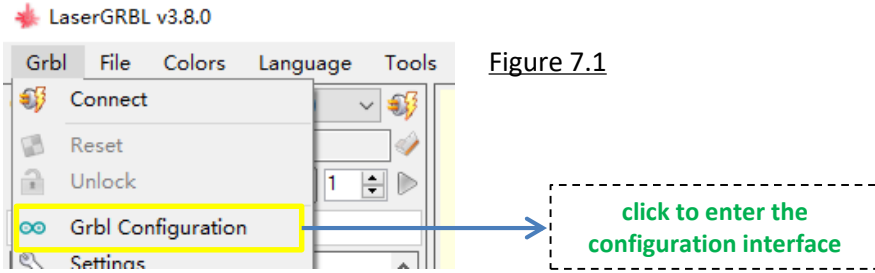
Figure 7.3

Note: GRBL software must be connected to the engraving machine when importing the configuration.

8. Load Engraving File

8.1. Click "file" and "open file" in turn, as shown in figure 8.1, and then select the graph you want to engrave. Currently, LaserGRBL supports files in the formats of NC, BMP, JPG, PNG, DXF, etc.
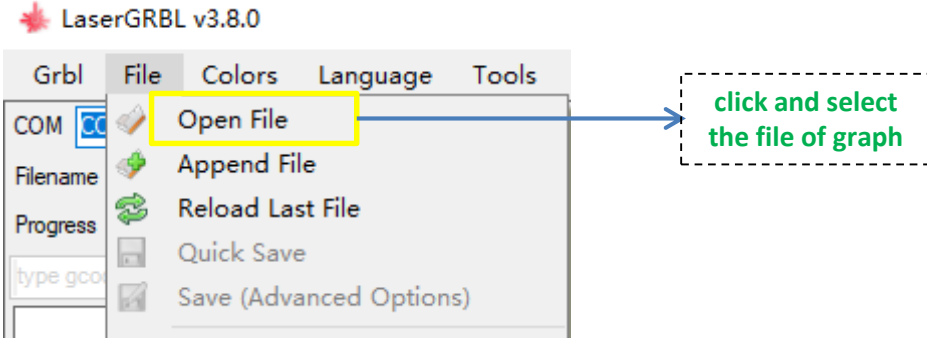

Figure 8.1

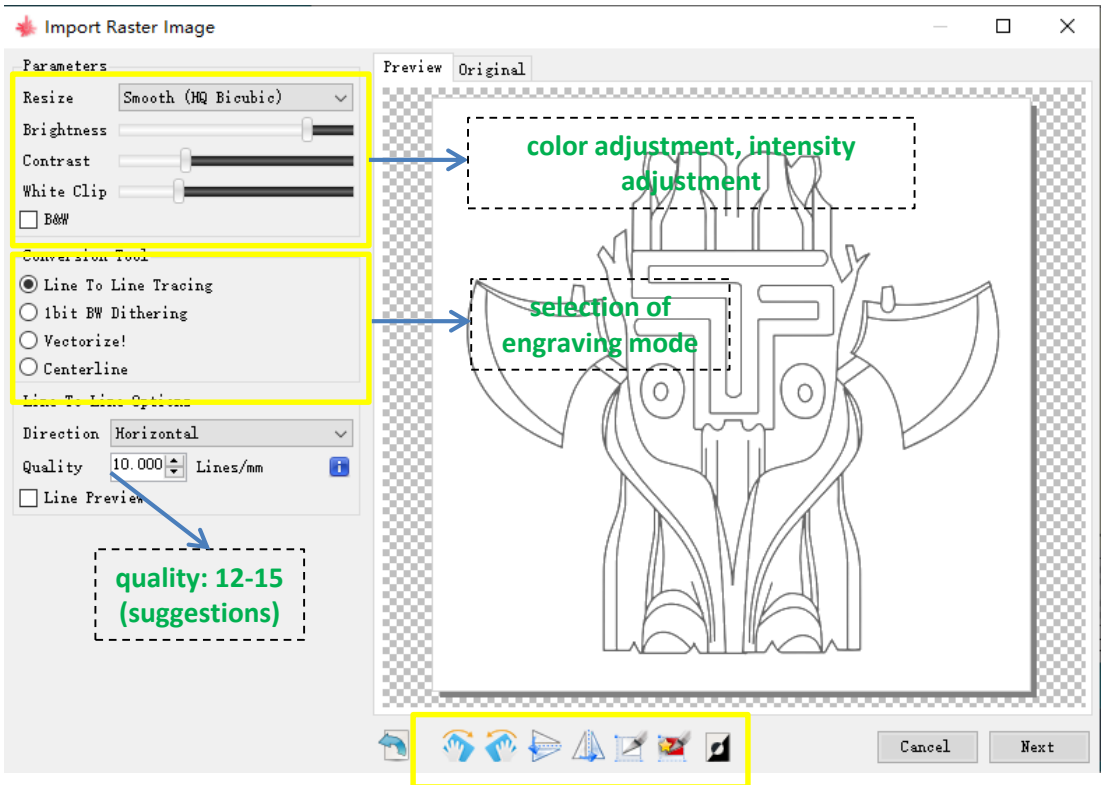8.2. Set picture parameters, engraving mode and engraving quality.

Figure 8.2

8.2.1 LaserGRBL can adjust the sharpness, brightness, contrast, highlight and other properties of the target graph. We can preview window effect during adjustment, and adjust the effect to your satisfaction.

8.2.2 In the engraving mode, "line-to-line tracking" and "1bit shaking" can usually be selected;"1bit shaking" is more suitable for carving grayscale graph. Please select the engraving mode of "vector diagram" or "center line" if you need cutting.

8.2.3 Engraving quality essentially refers to the line width of laser scanning. This parameter mainly depends on the size of the laser spot of the engraving machine; The recommended engraving quality range is 12-15. Different materials have different reactions to laser irradiation, so the specific value depends on the specific engraving material.

8.2.4 At the bottom of the preview window, the graph can also be rotated, mirrored, cut and so on.

After completing the above settings, click next to enter the settings of engraving speed, engraving energy, and engraving size

8.3 Set engraving speed, engraving energy, and engraving size

The default engraving speed is 1000 and can be adjusted as required

setting of energy value. improper energy will affect the engraving effect

enter the size of the graph you want to engrave

8.3.1 The recommended engraving speed is 1000, which is considered to be a suitable value after repeated experiments. Of course, you can increase or decrease this speed according to your preference. A faster engraving speed will save time but lead to the decline in the engraving effect. Slower speed is the opposite.

8.3.2 In laser mode, there are two instructions: M3 and M4. M4 instruction is recommended for engraving in "1bit jitter" mode, and M3 instruction is recommended for other cases. If you have only M3 instruction on the laser, please check whether the laser mode is used in the GRBL configuration. Please refer to the official instructions of LaserGRBL for GRBL configuration.

8.3.3 Choice of engraving energy. Choose different energies according to different materials.

8.3.4 Finally, set the size you want to engrave, click the "create" button to complete the setting of all engraving parameters.

9. Adjustment of Laser Focal Length

The effect of engraving or cutting depends largely on whether the laser is focused and the spot energy is concentrated.

There are two different types of laser devices, the laser of variable focal length and fixed-focus laser (different models)

- Adjustment method of laser focal length for the laser device of variable focal length: adjust the height of the spot by rotating the bottom knob of the laser device, and observe whether the spot is focused (wear a protective lens) while rotating. If the focal length is correct and the energy at the spot is concentrated, the change of the spot can be observed. Figure is 9.1
- Adjustment method of laser focal length for fixed-focus laser device: If the fixed focus of the laser device is 20mm, then the distance of the object to be engraved from the bottom of the laser device needs to be adjusted 20mm. The distance can be adjusted through the fixed focus block and transmission device. Figure is 9.2
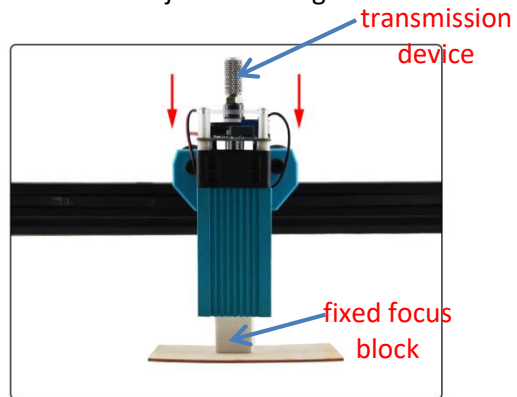

Figure 9.1
knob of variable focal length

transmission device

fixed focus block

Figure 9.2

10. Position (set the origin)

The purpose of position: Enables the engraving pattern to be engraved in the correct position on the object to be engraved.

10.1. By clicking the direction button (figure 10.1), move the X\Y axis and position the laser device to the appropriate position of the object to be engraved.

10.2. Click the button "Set the origin G92" to set the origin position (i.e., the lower left position of the pattern outline), as shown in figure 10.2.

10.3. Click the button "boundary engraving range" (figure 10.3), the laser device of the engraving machine will automatically turn on the low light, and find edges according to the set engraving size of pattern.

Used to observe whether the current origin position is appropriate; If not, move the laser head again and reset the origin to the appropriate position.
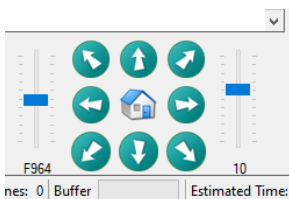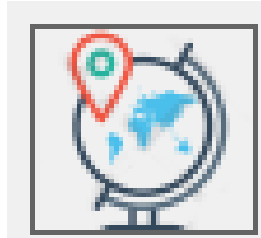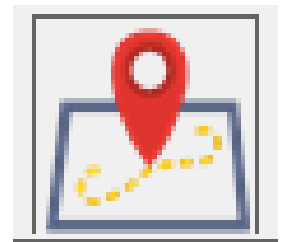

Figure 10.1

Figure 10.2

Figure 10.3

Shenzhen Two Trees Technology Co.,Ltd.

11、 Start, stop, run, pause, power and speed adjustment

11.1 Start: Click the triangle green button of "Run Program" in GRBL software (figure 11.1). The G code produced by GRBL will be continuously transmitted to the control board of the engraving machine. (Engraving process should keep connected)

11.2 Stop: If you want to stop halfway, click the square red button of "Stop Program" in GRBL software (figure 11.2) to end the program.

11.3. If you want to pause, please click the hand button of "Pause" at the bottom right corner of the software interface (figure 11.3). If you want to continue engraving after the pause, please click the "Run" button.

11.4 During operation, power and speed can be adjusted according to demand (figure 11.4).
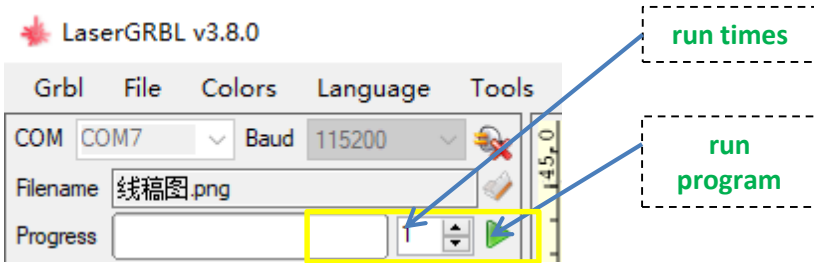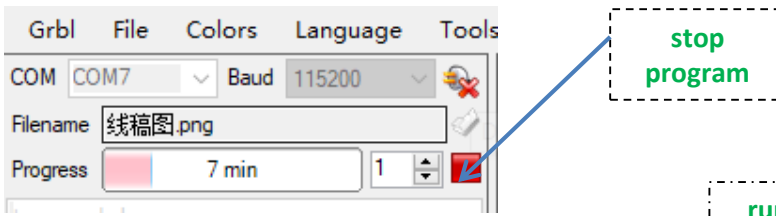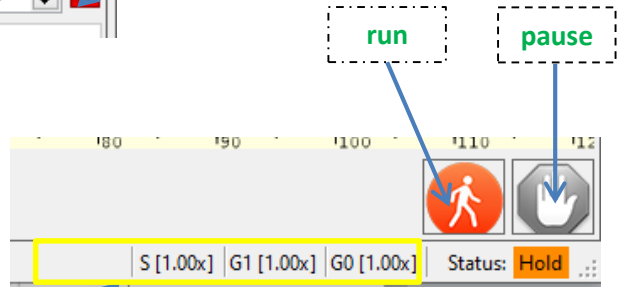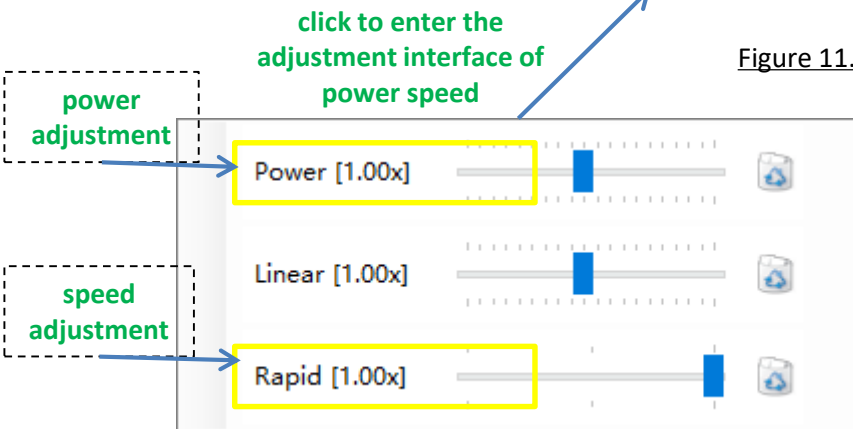
Figure 11.1

Figure 11.2

Figure 11.3

12. Frequently Asked Questions and Solutions (FAQ)

FAQ	Possible Causes	Solutions
LaserGRBL software cannot connect to the laser engraving machine	1、Multiple laserGRBL software are opened repeatedly at the same time (the port is occupied)	Close other laserGRBL software that is opened repeatedly
	2、Other 3D printer software, such as Cura, is open at the same time (the port is occupied））	Close other software
	3、wrong selection of port	Reselect the correct port
	4、wrong selection of baud rate	Baud rate selection：115200
	5、Whether the data line is connected or damaged	Check whether the data line is reliable
	6、problem of computer USB port	Use other USB ports for testing
	7、The driver on computer is not installed correctly	Refer to the software instructions to reinstall the driver
	8、The control board firmware is not set correctly	Refresh firmware
The laser device does not emit light	1、connection error of control board port	Refer to the installation instructions to check that the installation is correct
	2、the connecting line is broken	Check if the terminal is fallen or broken
	3、control board firmware is abnormal	Refresh firmware
The engraving effect is not obvious	1、The setting value of energy S in LaserGRBL software is too small	check item $30 in the grbl configuration for the value of maximum spindle speed。
	2、the focal length is wrong	readjust the focal length
	3、the engraving speed is too fast	Descending engraving speed
The engraving straight line is not straight, ghosting, staggered floor	1、The belt of each shaft is not tensioned	Re-tensioning the belt
	2、The fastener (screw, etc.) is not tightened	Check the condition of the fasteners
	3、Transmission parts get stuck or loose and shake	Adjust the eccentric nut around the drive position
	4、Laser device is not fixed tight and shaking	Check laser device
	5、The motor drive voltage is not suitable	Adjust the motor driving voltage 0.8-1.4V