

L5 laser marking machine user manual

V1.3



catalogue

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I. Introduction

1.1 Technical parameters

| order number | Parameter name | parameter |
|--------------|-----------------------------|---|
| 1 | display mode | 5 inch capacitive touch screen |
| 2 | operating system | Embedded Linux operating system |
| 3 | machine language | Chinese, English, Persian, Spanish, Korean, Vietnamese and so on can be customized according to needs |
| 4 | power supply mode | DC12V15A adapter |
| 5 | Overall power consumption | About 100W |
| 6 | laser power | 2W |
| 7 | Laser life | 8,000 working hours |
| 8 | work pattern | Pump the laser at the end |
| 9 | laser wave length | 1064±1nm |
| 10 | cooling-down method | forced air cooling |
| 11 | Preview instructions | Built-in red light |
| 12 | Focal length indicator | Dual red focus |
| 13 | Preview instructions | Built-in red box with content preview |
| 14 | print range | 70*70mm |
| 15 | Print content | Text, numbers, symbols, pictures, QR codes, barcodes, dates, serial numbers |
| 16 | Suitable for materials | Metal (gold, silver, copper, alloy, zinc), acrylic, plastic, leather |
| 17 | machine weight | 3.9kg (excluding adapter) |
| 18 | working temperature | 0~+40 |
| 19 | Storage ambient temperature | -10~60°C |

1.2 Safety information

This machine must not be used for non-designated purposes or materials and should only be operated, maintained, and repaired by personnel familiar with the machine and its related fields. The laser beam is hazardous due to its reflectivity, conductivity, and the potential to produce harmful or flammable smoke. We do not assume any responsibility for any damage or harm caused by improper use of this machine. Operators must use the machine according to its designated purpose, other instructions in the manual, and all applicable local and national laws and regulations. During use, it is important to follow the operating procedures and precautions, and to use the correct methods for operation and maintenance, which can ensure optimal printing results and enhance work efficiency.

1.2.1 Material safety instructions

This machine can be used safely with the following materials: metal (gold, silver, copper, alloy, zinc), acrylic, plastic, leather

The machine cannot use the following materials or any materials including:

- (1) Artificial leather containing hexavalent chromium (Cr) contains toxic fumes.
- (2) A toxic smoke.
- (3) Beryllium oxide, which contains toxic fumes.
- (4) Bromine, which contains toxic fumes.
- (5) Chlorine, including polyvinyl butyral (PVB) and polyvinyl chloride (PVC, Vinyl, Cintra, etc.), contains toxic fumes.
- (6) Fluorine, including polytetrafluoroethylene (Teflon, PTFE, etc.), contains toxic fumes.
- (7) Iodine contains toxic fumes.
- (8) Phenolic resins, including various forms of epoxy resins, contain toxic fumes.

1.2.2 Laser safety instructions



This machine uses a visible level 4 laser, which is the strongest and most dangerous laser available to the public. If not used carefully, it may cause serious property damage and personal injury, including but not

limited to the following:

- (1) Laser easily burns nearby combustible materials. Do not leave potentially combustible, flammable, explosive or corrosive materials near where they may be exposed to direct or reflected laser beams.
- (2) Some materials may produce radiation or harmful gases during processing, and direct exposure to the laser can cause physical damage, including severe burns and irreparable eye damage.
- (3) Ensure that there are no air pollutants in the area, as these may cause serious risks such as reflection and combustion.
- (4) Use this machine only as described in the materials section of this manual. Relevant printing Settings and engraving processes must be adjusted appropriately for specific materials.

1.2.3 Instructions for safe use of machines

- (1) It is strictly prohibited to have any object unrelated to the machine and with total reflection or diffuse reflection around the machine to prevent the laser from being reflected to the human body or inflammable objects. In case of emergency, press the emergency stop switch immediately and cut off the main power supply.
- (2) The environment of the machine should be dry, pollution-free, vibration-free, strong electric, strong magnetic and other interference and influence.
- (3) The machine should be kept away from electrical equipment that is sensitive to electromagnetic interference, which may cause electromagnetic interference to it.
- (4) The laser is a wind-cooled laser, the working environment (room temperature) temperature is 0-40 degrees Celsius, the working environment humidity is 10-95%.
- (5) When marking, the operator must wear laser protective goggles and protective gloves of corresponding wavelength, and no part of the body can touch the marking area.
- (6) During operation, it is necessary to ensure adequate ventilation to avoid the dust, smoke and smell generated during marking to cause harm to the body.

Hardware introduction

2.1 Main structure



Figure 2.1 Laser machine in action

body :

- ① Host —— This includes the laser, motherboard, and display.
- ② Height lifting bracket —— supports the laser print head for quick height adjustment.
- ③ Power adapter —— provides power for the whole machine.
- ④ Pedal switch —— Print trigger switch.

2.2 Laser machine control



Figure 2.2, control keys

- ① Power switch: press the button to turn on or off the machine.
- ② Focus switch: Press this switch if the two red lights do not coincide on the printed object, turn the lifting bracket handle to make the two coincide is the best printing focal length (the red light focal length has been adjusted when factory).
- ③ Trigger button: When the laser machine software is in "preview" or "print" state, press the trigger button and start printing immediately.

Three software use

3.1, Main interface

The main interface of the machine is shown in Figure 3.1.1 below.

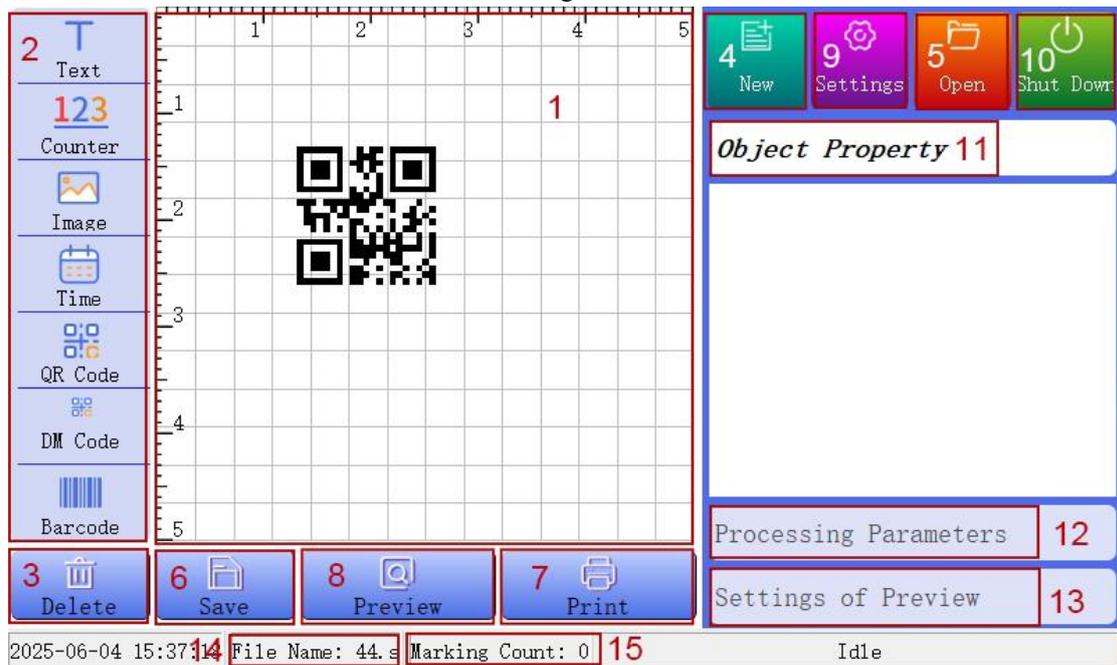


Figure 3.1.1 Main interface

1—— Information preview area: In this area, you can see the information content that is currently loaded and ready to be printed. Dragging the area left and right can view the information content outside the display area.

2—— Print content option: Click this button to add the print content and display it in the information preview area.

3—— Delete button: Click this button to delete the selected information after selecting the information in the preview area.

4—— Create a new file: Click this button to close the file you are currently editing and create a new file. If the file you are currently editing is not saved, the software will prompt you whether to save the file.

- 5—— Open file: Click this button to select the print file saved in the machine.
- 6—— Save file: "Save" to save the drawing being drawn as the current file name.
- 7—— Print button: print the current drawing in the information preview area.
- 8—— Print preview: Click this button to display the outline or range of information that needs to be printed.
- 9—— System Settings: Click this button to enter the system Settings interface, in which you can manage system language, system time, font, version and log.
- 10—— Shutdown button: When you need to turn off the machine, please click this button first. After the screen is turned off, press the power switch button on the right side of the host to shut down.
- 11—— Object attributes: This area displays the relevant attributes of the information to be edited.
- 12—— Processing parameters: The laser intensity, speed, pen change delay, marking accuracy and fidelity can be set and viewed in this area. See 3.5 Printing parameter Settings for details.
- 13—— Preview Settings: This area can be used to set the form of the print preview.
- 14—— File name: This area displays the name of the file currently loaded.
- 15—— Marking count: display the total number of marks made by the machine.

3.2 Editing

This chapter introduces the basic operation information of the job editor, including the following topics:

How to create a new print file

How to edit and print information

How to delete/copy files

3.2.1 How to create a new print file



After clicking on  the main interface, the software will close the file you are currently editing and create a new one. As shown in Figure 3.2.1.1.

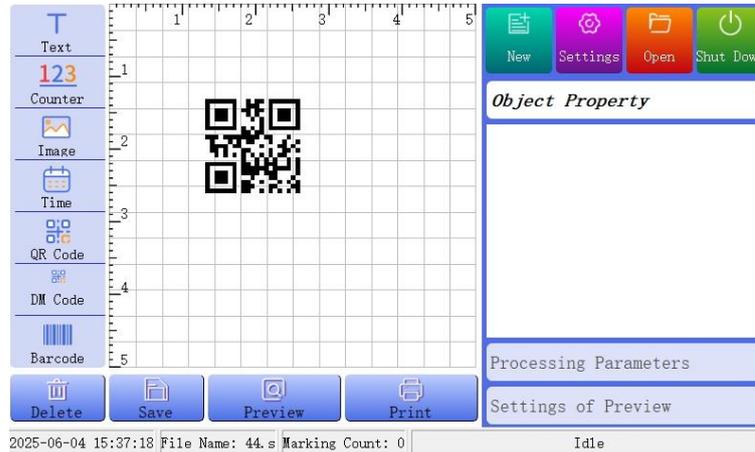


Figure 3.2.1.1 File editing interface

In the file editing interface, you can edit the print information. The print information can contain "text", "serial number", "time", "picture", "QR code", "DM code", "barcode".

3.2.2 Text editing

① If you need to print Chinese characters (CN), English (EN), numbers, symbols and other content, please click the "Text" button in the "Information Button Area", and a default text entry will appear in the "Information Editing Area". As shown in Figure 3.2.2.1.

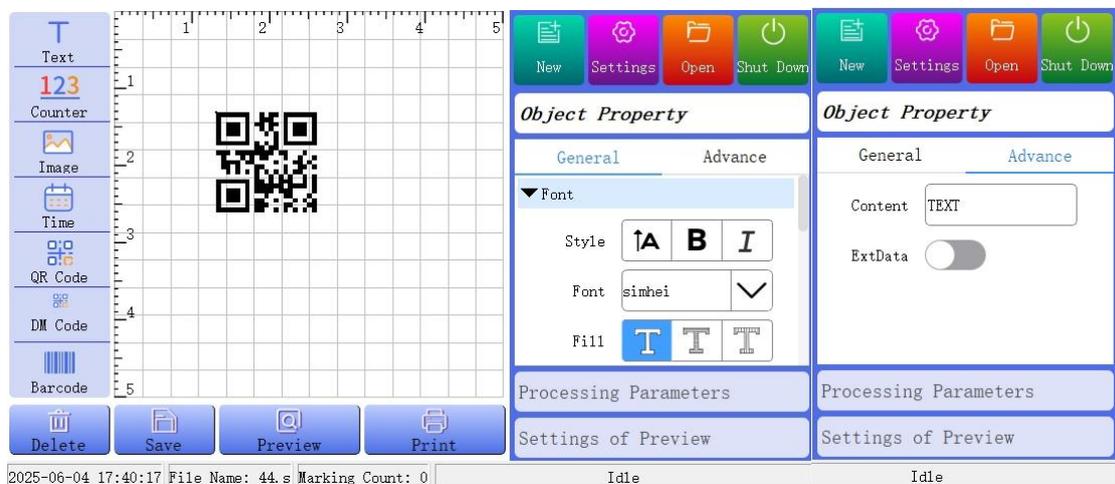


Figure 3.2.2.1 Text editing

② Select this item, click the "Content" edit box of "Object Properties", and enter the required information. In the "Object Properties area", adjust the position, font, height, width, size, spacing, Angle, external properties (see 3.2.9 for details) of the text item.

③ Click the Style  bar button to set styles for text (in sequence, vertical alignment, bold, and italic). See Figure 3.2.2.2.

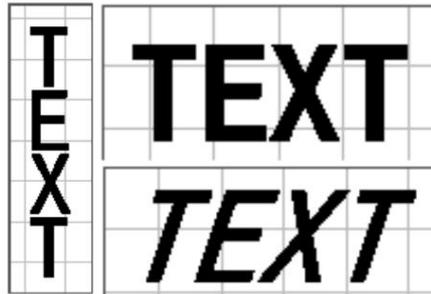


Figure 3.2.2.2 Style Settings

④ Click the Fill bar button to set the fill mode and print mode of entity printing (in sequence: no fill, horizontal fill, vertical fill). At the same time, you can set the print fill interval, as shown in Figure 3.2.2.3.

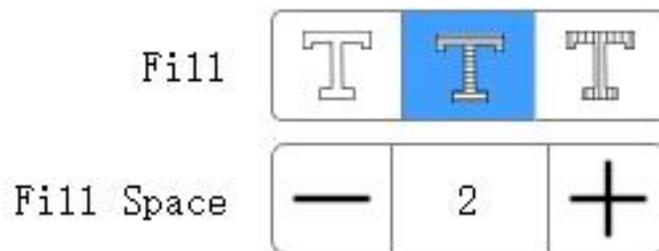


Figure 3.2.2.3 Filling Settings

No fill: The font is not filled.

Horizontal fill: The fill line is always filled horizontally.

Vertical fill: The fill line is always filled vertically.

Solid filling: When the filling interval is 1, it is solid filling.

Fill spacing: refers to the distance between adjacent lines of fill lines. The larger the value, the wider the spacing between adjacent fill lines.

Note: The filling effect also affects the printing mode (horizontal filling is horizontal printing, vertical as well)

The filling effect is shown in Figure 3.2.2.4.

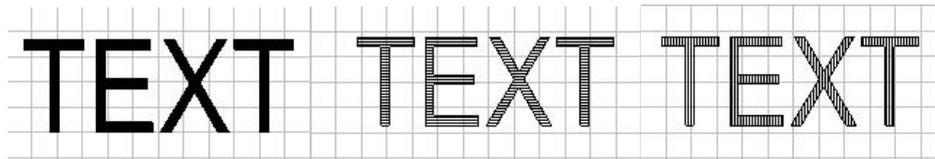


Figure 3.2.2.4 Filling effect

(The left figure is solid filling, the middle figure is horizontal filling, and the right figure is vertical filling)

Arc-shaped text: Set the arc-shaped style text, click "arc-shaped text" to expand the corresponding four control parameters: "StartAngle", "EndAngle", "X Radius", "Y Radius", as shown in Figure 3.2.2.5.

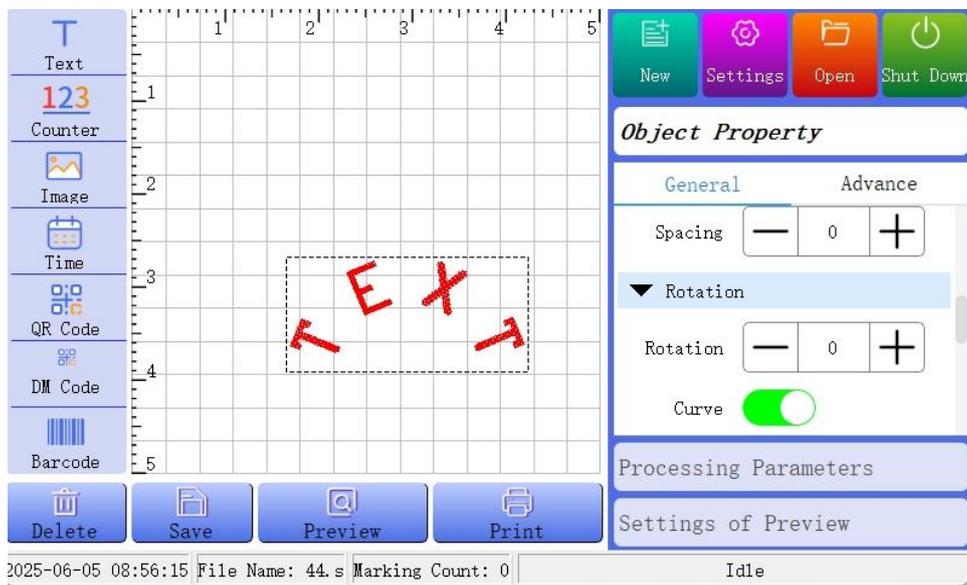


Figure 3.2.2.5 Arc text Settings

The starting Angle (StartAngle) and ending Angle (EndAngle) indicate the starting and ending positions of the curved text. The diagram shows that the starting Angle is -180° and the ending Angle is 0° .

X Radius (X) and Y Radius (Y) represent the length in horizontal and vertical directions respectively. The same value indicates a circle, while different values indicate an ellipse.

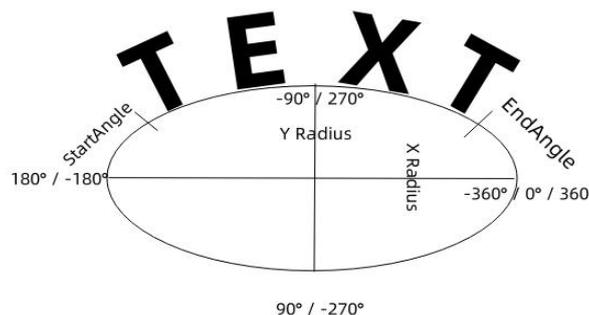


Figure 3.2.2.6, arc text parameter meaning

3.2.3, serial number editing

If you need to print a variable serial number, the count in the printed information will automatically update without any human intervention. Click the 'Serial Number' button, and a default serial number entry will appear in the 'Information Editing Area.' Select this serial number entry and adjust its position, font, and size in the 'Object Properties Area.' As shown in Figure 3.2.3.1.

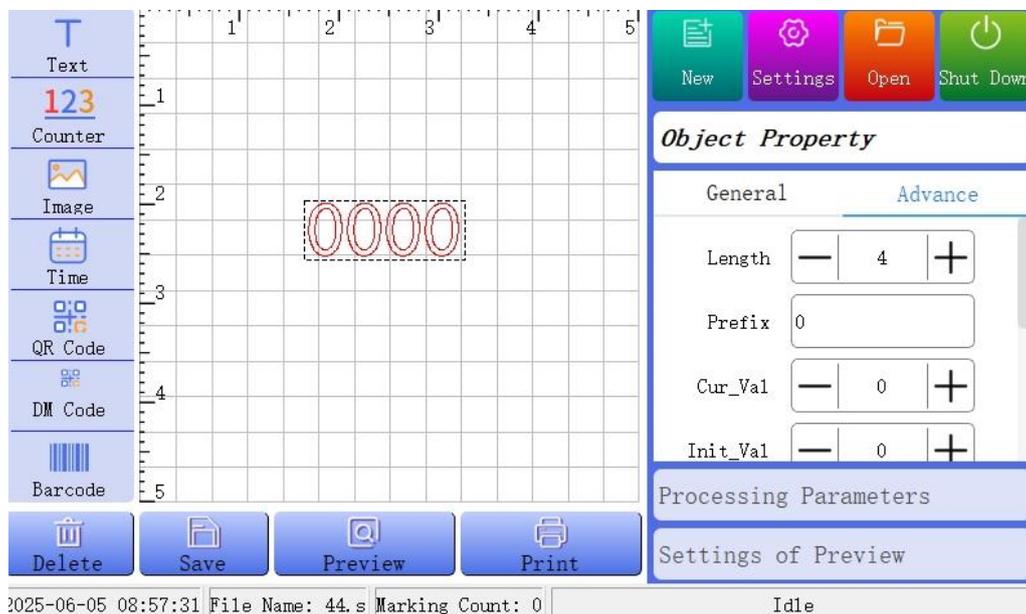


Figure 3.2.3.1 Serial number editing

The serial number can be selected with different fixed numbers (the high bit is filled with 0) or natural numbers. You can set the initial value, step value, current value, and end value of the counter in "Object Properties".

3.2.4 Time editing

The time format text is suitable for printing labels such as the generation date and the valid date. You can also customize the time format and set the valid date (the final print time is the current date + the valid date), as shown in Figure 3.2.4.1.

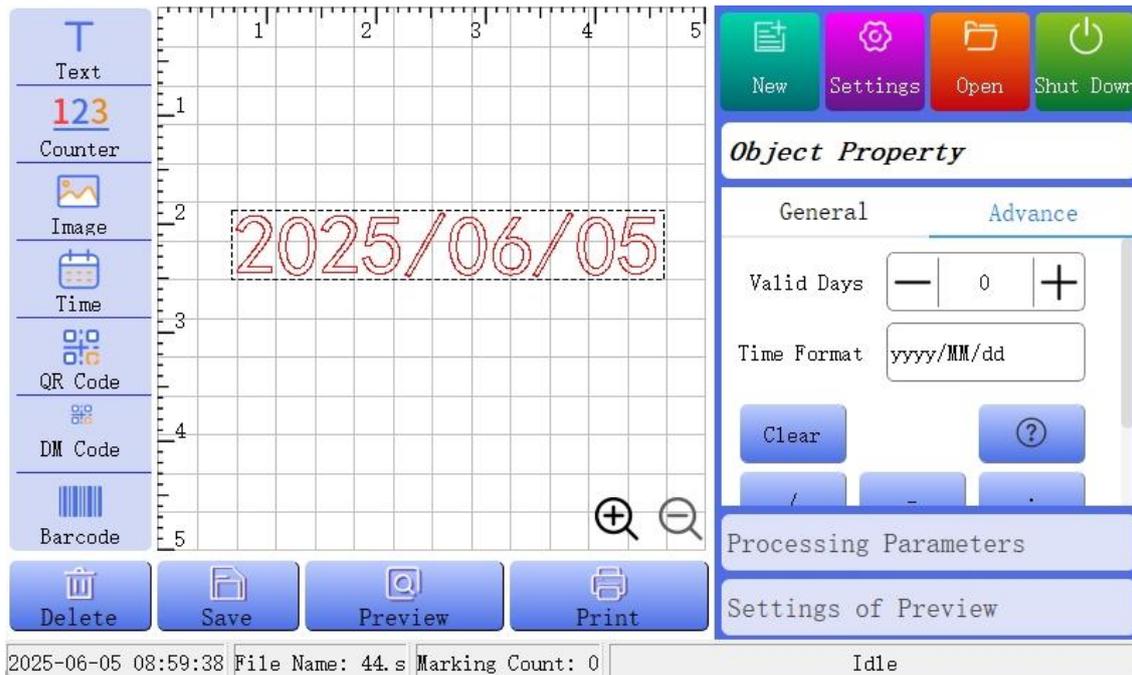


Figure 3.2.4.1 Time editing

3.2.5 Image editing

- ① To print the image, click the "Image" button in the "Information Button Area". A default

IMAGE item will appear in the "Information Edit Area". You can click  the "Object Properties" button to select the image file you want to print and adjust the height and width.

Insert the U disk, click "Images" → "Select Image" → "U disk" → select a file → "Copy to Local" → "Local File" (the file you copied to local in the previous step) → "OK". A white window will display the selected image. Set the format as needed to complete the process. The image editing interface is shown in Figure 3.2.5.1.

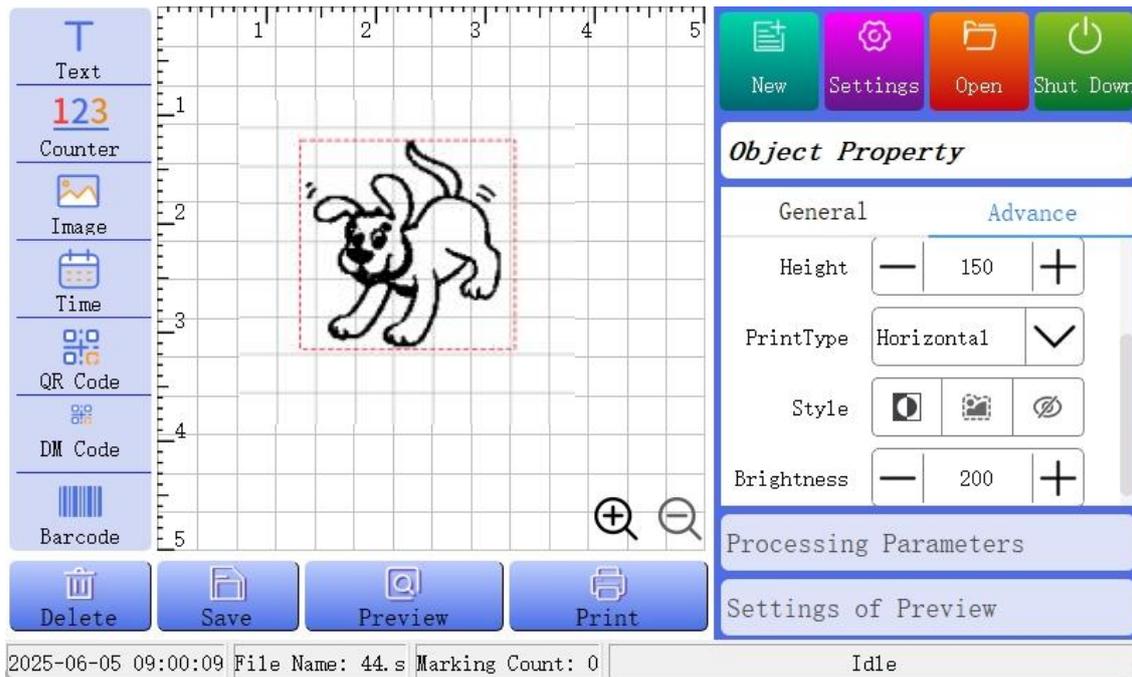


Figure 3.2.5.1 Image editing

② Click the Style  bar button to set the image style (in turn, reverse color, outline, and visual grayscale). The effect of the style setting is shown in Figure 3.2.5.2.

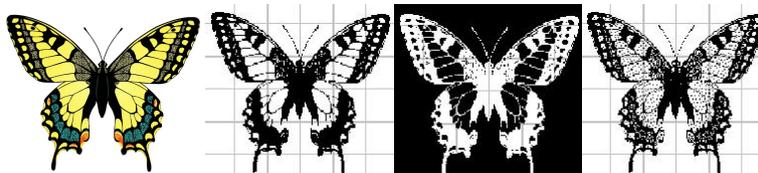


Figure 3.2.5.2 Image style

(The styles from left to right are original, no style, reverse color, outline, and visual grayscale)

3.2.6, QR code editing

To print the QR code, click the "QR Code" button in the "Information Button Area". A default QR code entry will appear in the "Information Edit Area". You can modify the QR code generation rules by adjusting the object properties.

Content: The text data stored in the QR code.

Zoom: The zoom size of the QR code, the larger the value, the larger the size.

Error correction rate: According to the error correction rate ratio, the QR code can still be scanned normally even if it is blocked.

Version: The higher the version, the more content can be stored in the QR code, and the denser

the matrix.

Printing mode: The laser can be set to print the QR code vertically or horizontally.

Reverse color: Reverse the color block of the QR code and add a black border, which is suitable for white on black material.

External data: Generate QR code by referring to external text file or serial port data. See 3.2.9 for details.

The QR code editing interface is shown in Figure 3.2.6.1

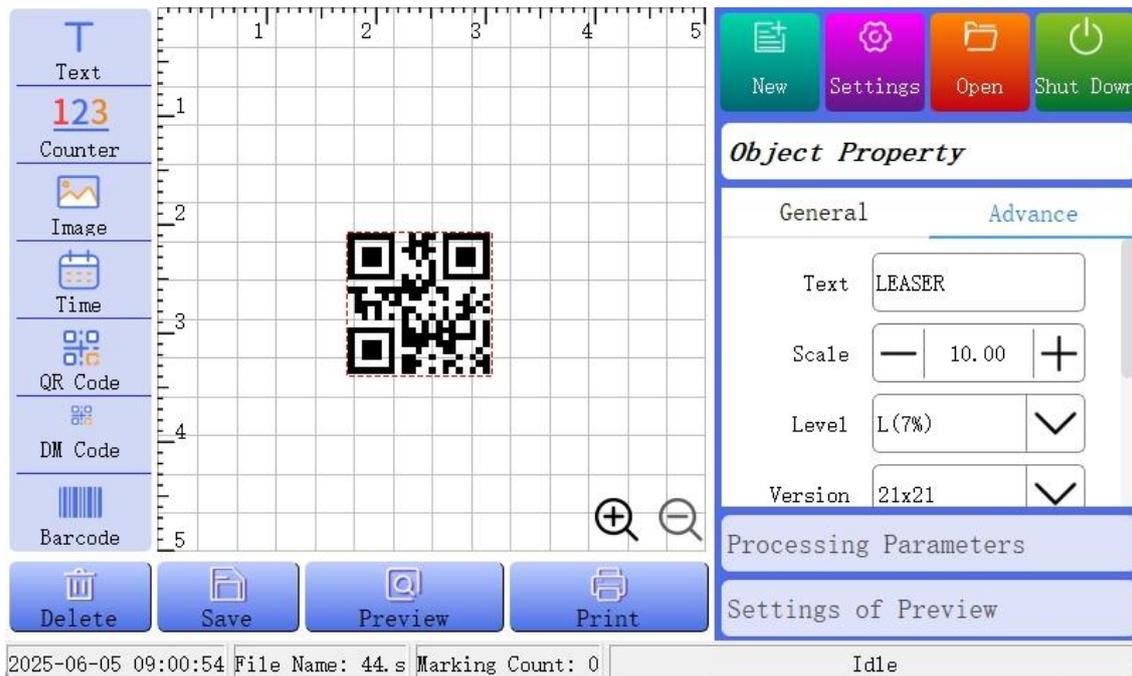


Figure 3.2.6.1 QR code editing

3.2.7 DM code editing

To print the DM code, click the "DM Code" button in the "Information Button Area". A default DM code entry will appear in the "Information Edit Area". You can modify the DM code generation rules by adjusting the object properties.

Content: The text data content stored in the DM code.

Scaling: The scaling size of the DM code. The larger the value, the larger the size.

Type: The data format of the DM code to be printed.

Printing mode: The laser can be set to print the DM code vertically or horizontally.

Display content: Set whether to display data text content below the DM code.

Internal data: You can customize to generate a special format of data in the program. See 3.2.10 for details.

External data: Generate QR code by referring to external text file or serial port data. See 3.2.9 for details.

The DM code editing interface is shown in Figure 3.2.7.1.

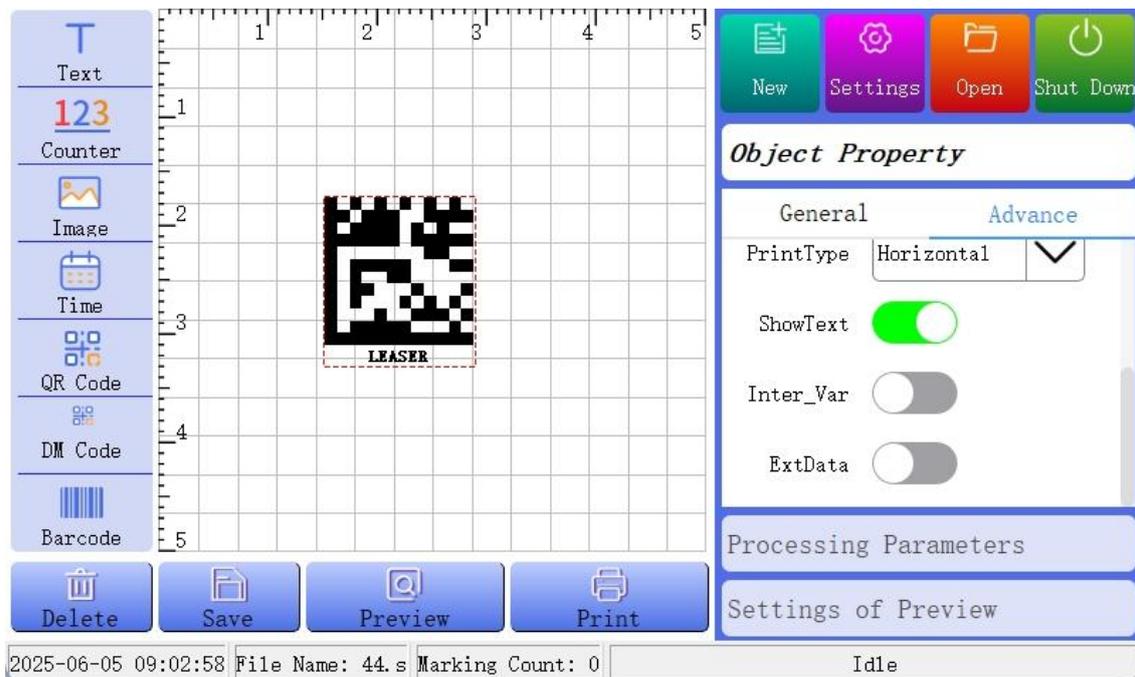


Figure 3.2.7.1 DM code editing

3.2.8, Barcode editing

To print the bar code, click the "Barcode" button in the "Information Button Area". A default bar code entry will appear in the "Information Edit Area". You can select the size of the bar code by selecting the width and height options, select different types of bar codes by selecting the bar code type options, and set whether to display the text content of the bar code.

It should be noted that different barcodes have their own definition specifications. If the edited content does not conform to the corresponding barcode specification, it may lead to incorrect display of the bar code. The bar code editing interface is shown in Figure 3.2.8.1.

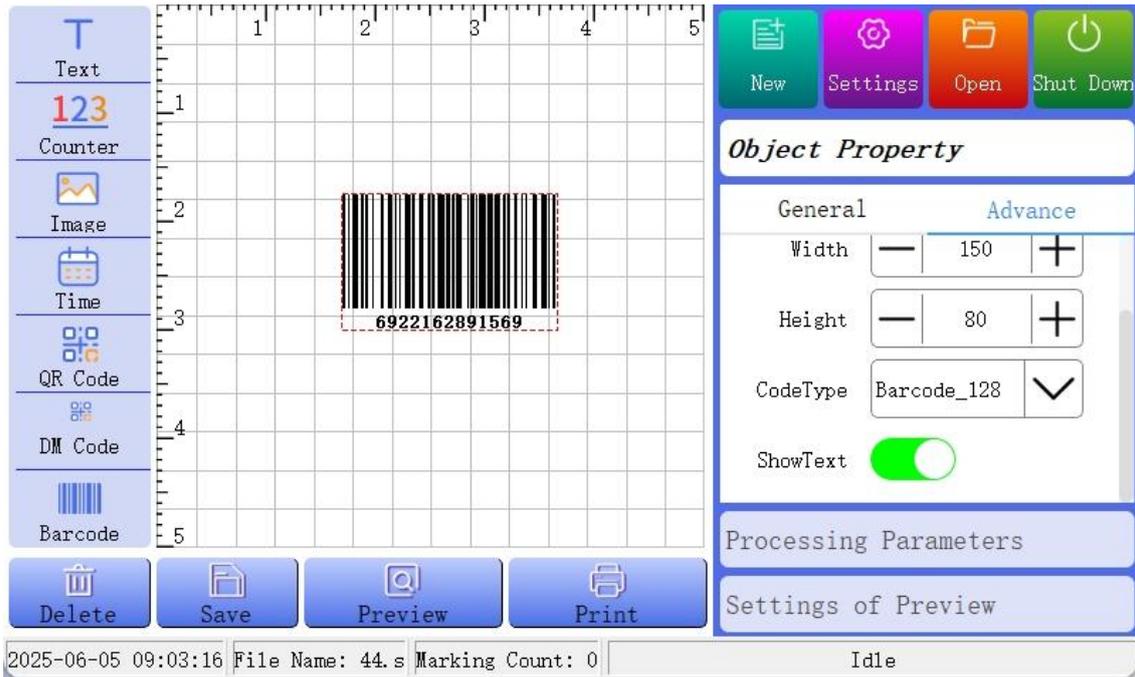


Figure 3.2.8.1 Barcode editing interface

3.2.9 External data

At present, the external data option can be enabled in the advanced properties of "text", "QR code" and "DM code". This property supports users to choose to use custom "text file" or "external serial port device" as variable data source to realize dynamic change effect of printing content.

- ① The user can click  to select a "text file" and set the start line, end line, current line, and whether to repeat to define the rules that can be changed to print the content. As shown in Figure 3.2.9.1.

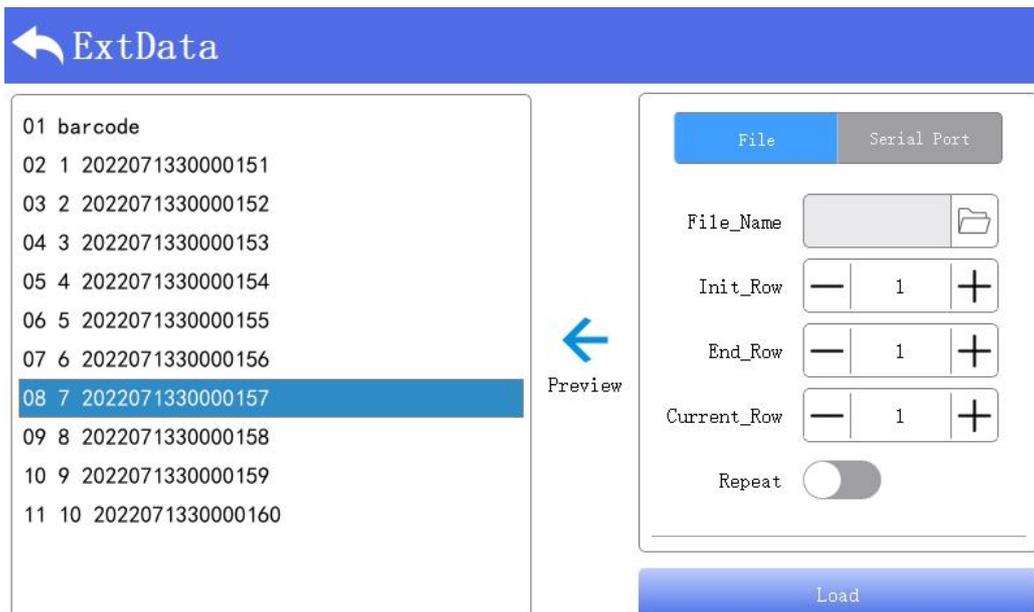


Figure 3.2.9.1 External file data

3.2.10 Internal data

At present, the internal data option can be opened in the advanced attribute of "DM code". This attribute supports users to choose to use custom "text", "serial number" and "date" to arrange and combine a random combination of data as a variable data source, so as to realize the dynamic change effect of printing content. As shown in Figure 3.2.10.1.

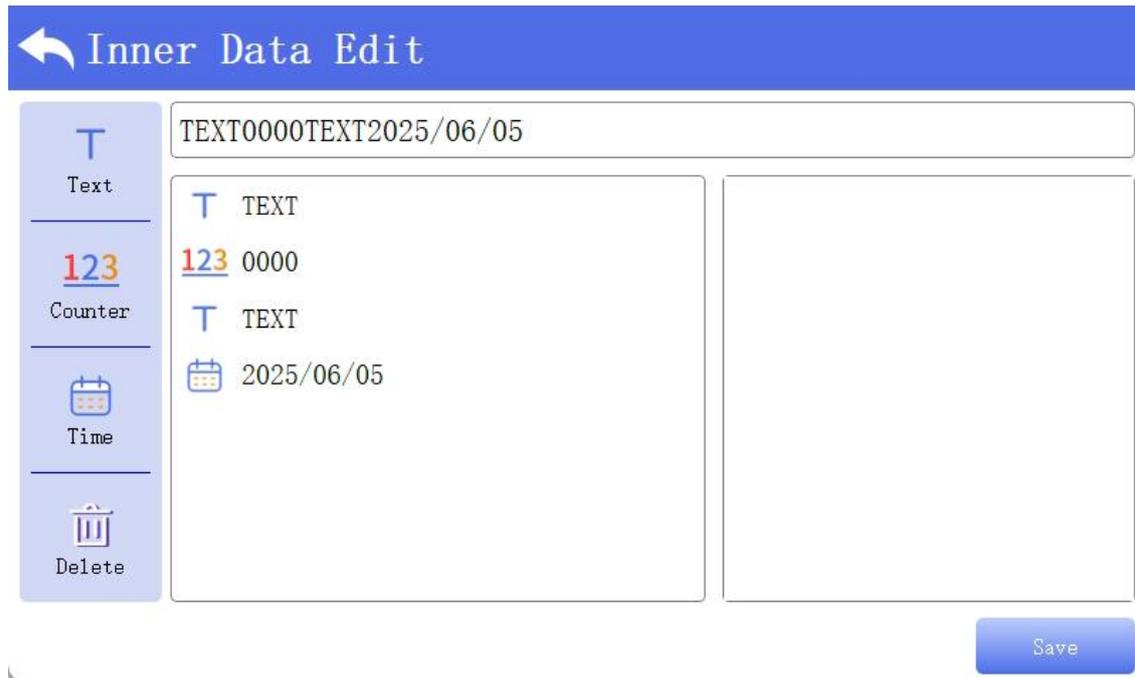


Figure 3.2.10.1 Internal data

3.3 How to edit and print information

- ① Touch the "New" button on the main screen to create a blank canvas.
- ② Edit the information you need to print on the canvas.
- ③ After the information is edited, click the "Save" button, enter the file name, and save the file on the local machine.

3.4 How to delete/copy files

Delete files: Click the "Open button" in the main interface to enter the file selection interface. As shown in the figure below, select the files you want to delete, and then click the "Delete" button to delete the files.

To copy files: In the file selection interface, click the "Local" button to display local files on the left. Select the file you wish to copy and then click the "Copy to USB" button to transfer the file to your USB drive. The process is the same for copying files from the USB drive back to your local system. See Figure 3.4 for the file selection interface.

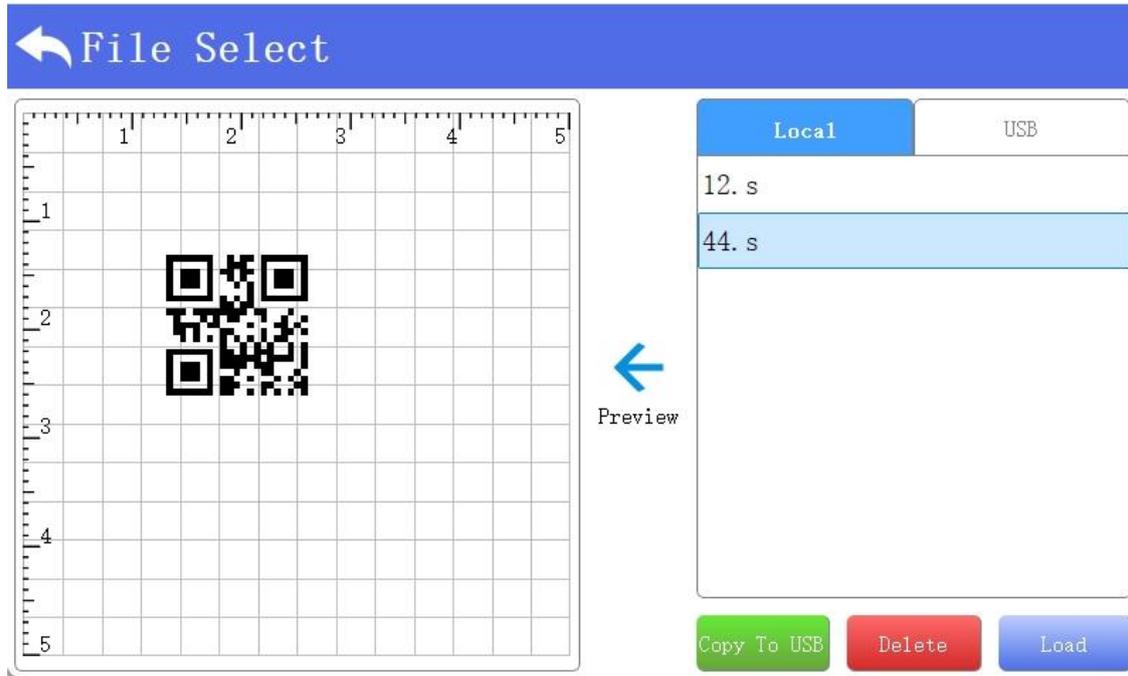


Figure 3.4 File selection interface

3.5 Print parameter Settings

Click "Processing parameters" on the main surface to open the processing parameters interface, as shown in Figure 3.5.

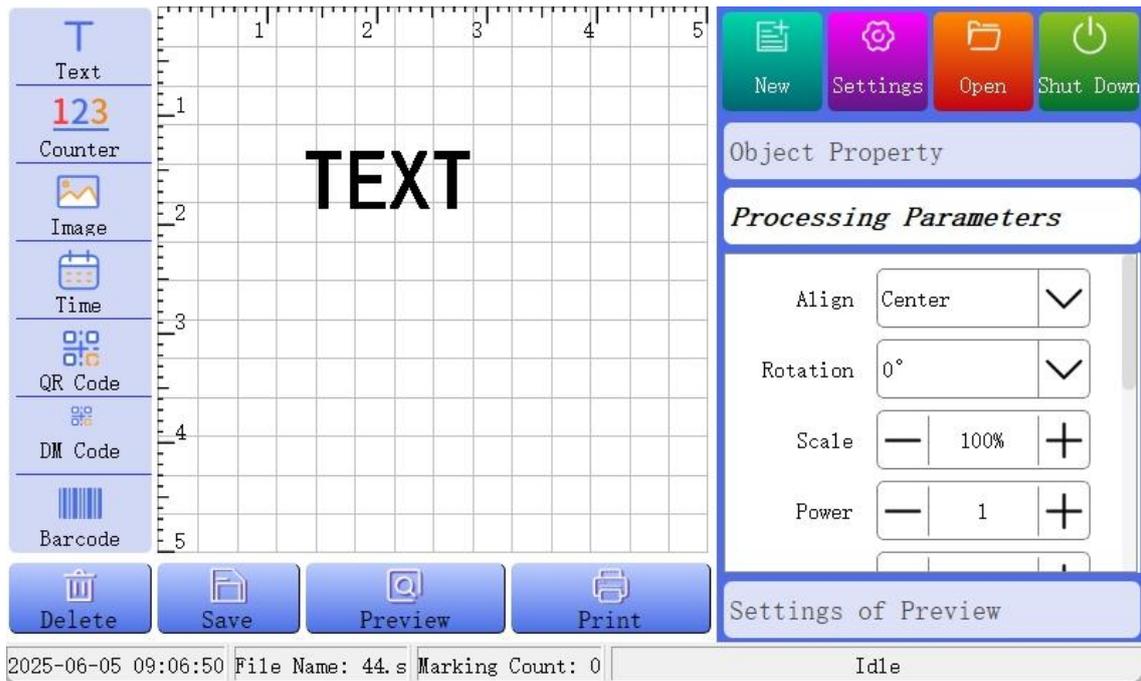


Figure 3.5 Processing parameter Settings

Align — Center means that the printed content is printed in the center no matter where it is on the canvas; Keep in place means that the display of the canvas is the same as the actual printing position;

Rotation — is the same as the Angle function in Object Properties.

Zoom — Print the content as a whole in proportion, which can be adjusted to millimeter level according to the size setting of the printed content.

Intensity — The laser is turned on during printing. The greater the value, the stronger the laser intensity.

Speed — refers to the speed of laser printing, the greater the value, the faster the printing speed.

Pen change delay — The machine divides the actual print content into multiple strokes for separate printing. There is a pause between each stroke, known as the pen change delay. This delay is used to adjust the spacing between strokes. It primarily addresses issues such as trailing and rough edges that can occur due to short pen change intervals (rapid switching of the light switch).

Marking accuracy — refers to the resolution of the print. The higher the printing accuracy, the

denser the laser engraving lines, which typically enhances print quality. However, this also increases the data processing load, slowing down the program's data processing speed. Additionally, it increases the laser impact on the marking points, leading to more severe damage and deeper color. When not necessary, the default marking accuracy is set to 2 (the lowest value).

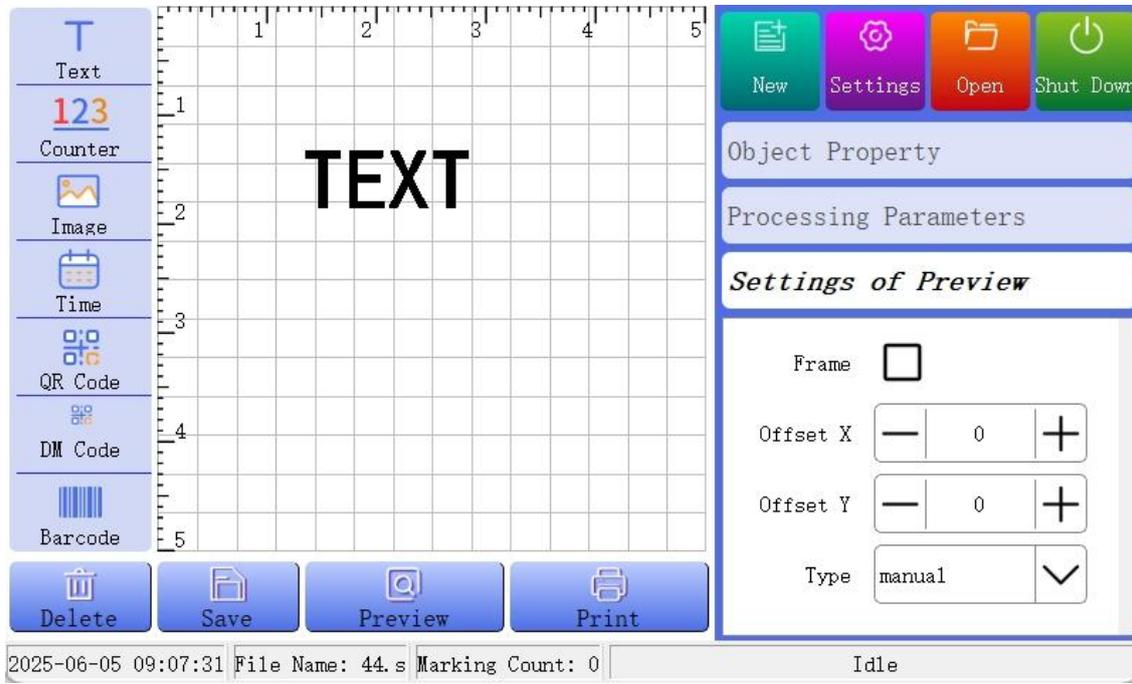
Fidelity — The lower the fidelity, the more edge pixels will be ignored by the program; conversely, more edge pixels will be retained. It is suitable for printing pictures. In the absence of necessity, the default fidelity is usually 1.

Repeat print — Set the number of times to print.

Print interval — The time interval between two adjacent prints (in seconds) when printing is repeated.

3.6 Preview Settings

Click "Preview Settings" on the main screen to open the



preview Settings interface, as shown in Figure 3.6

Figure 3.6, Preview Settings

Frame preview — Select the checkbox to enable the frame preview mode.

System Settings

Click the "Settings" button on the main interface to enter the system Settings interface, as shown in Figure 4.1.

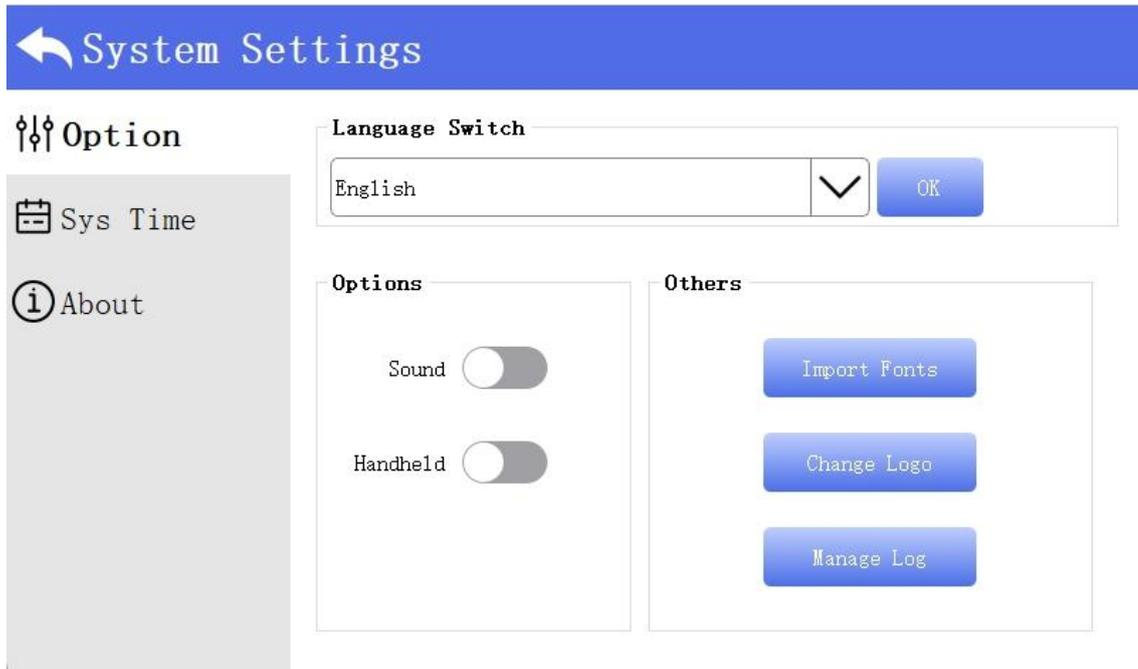


Figure 4.1 System Settings-System Options

System language —— Select the corresponding system language in the drop-down box of "System Language", and the system will automatically restart after switching. At present, the machine supports Chinese, English, Arabic, Vietnamese, Korean, Persian and so on.

Voice feedback —— After checking, the buzzer will sound "drip" to indicate each time after printing is completed.

Importing Font Library —— If the machine does not have the font you need, copy the required font to a USB drive and insert it into the machine. Click the 'Manage Fonts' button, select 'USB' in the pop-up menu, select the font file, and click 'Copy to Local'. The font will be successfully installed.

Change the boot screen —— To change the system boot screen, you need to provide pictures with resolution: 800*480 and format: png/bmp/jpg. Contact technical personnel for operation.

- (1) Create a new FiberLaser folder in the root directory of the U disk, open it and create a new logo folder;
- (2) Copy the boot screen file "zImage-myimx6a7" to the directory of X:\FiberLaser\logo on the U disk (X represents the disk name of the U disk in the computer, and the boot screen file name cannot be modified);
- (3) After starting up, plug in the U disk and set up the screen. Select "Options" and "Change the boot screen". After the prompt is successful, shut down (about half a minute later) and then start the screen to complete the change.

Manage logs — View system print logs for technicians to troubleshoot and maintain the machine.

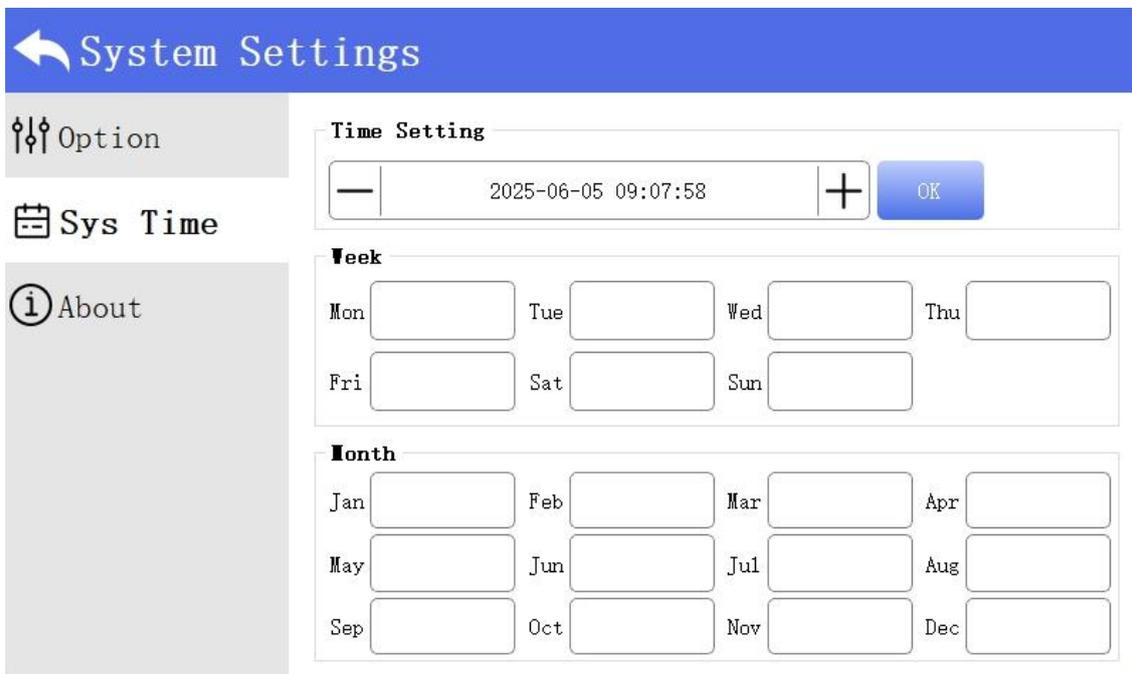


Figure 4.2 System Settings-System Time

System time — Click the required field in the "System Time" Settings column, and adjust the corresponding content through "+" and "-" respectively.

Custom date format — In the "Week" and "Month" Settings column, you can set a custom alias for the week and month, and display it in the "Date" print property through the "ND" and "NR" formats.



Figure 4.3 System Settings-About This Machine

The local version management includes "version upgrade" and "version rollback", as well as the firmware version, the specific version number of the software version, the total number of machine labels, and the reset button.