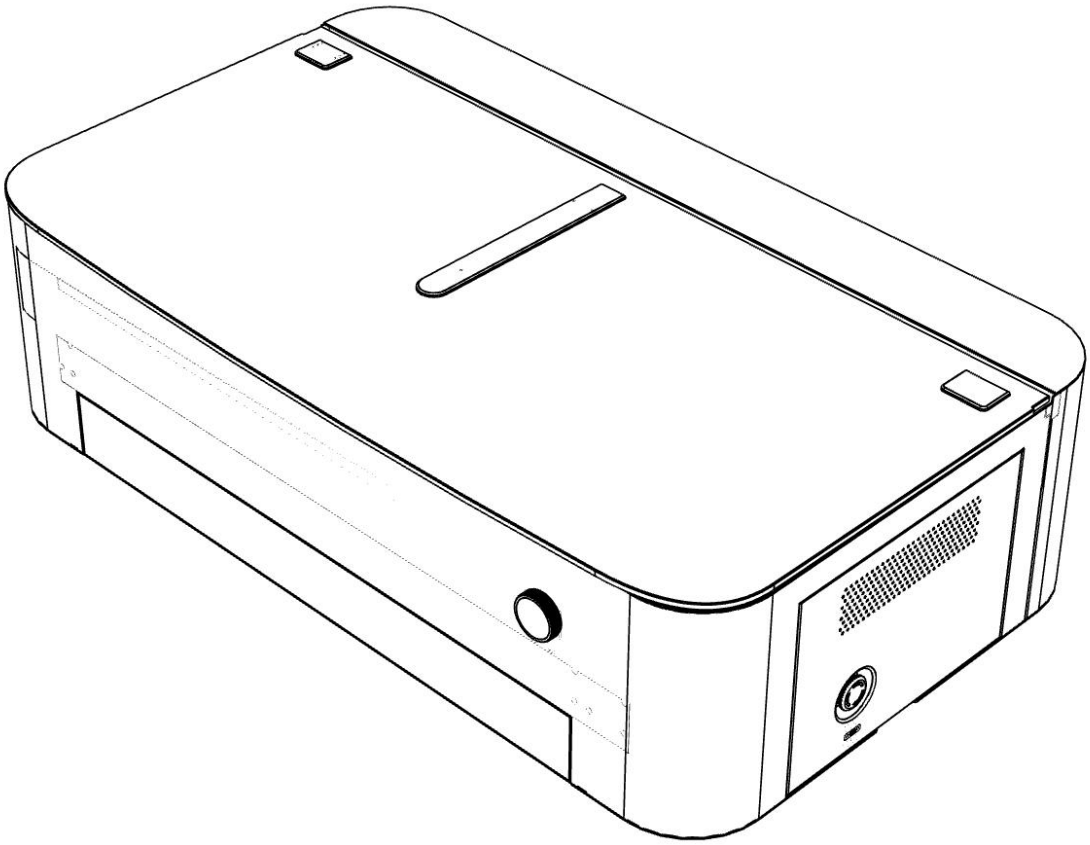
MEGA Laser Engraver

User Manual



Please read this manual carefully before using Mega. Following the instructions will help you complete the setup efficiently.

The entire setup process takes approximately 120 minutes.

CONTENTS

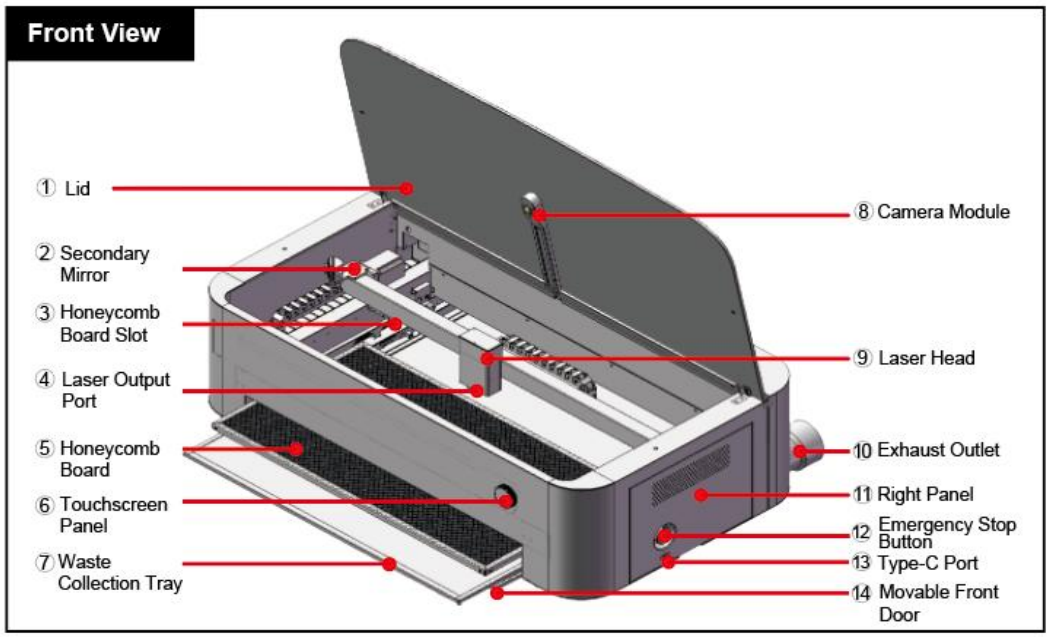
1. Preparations

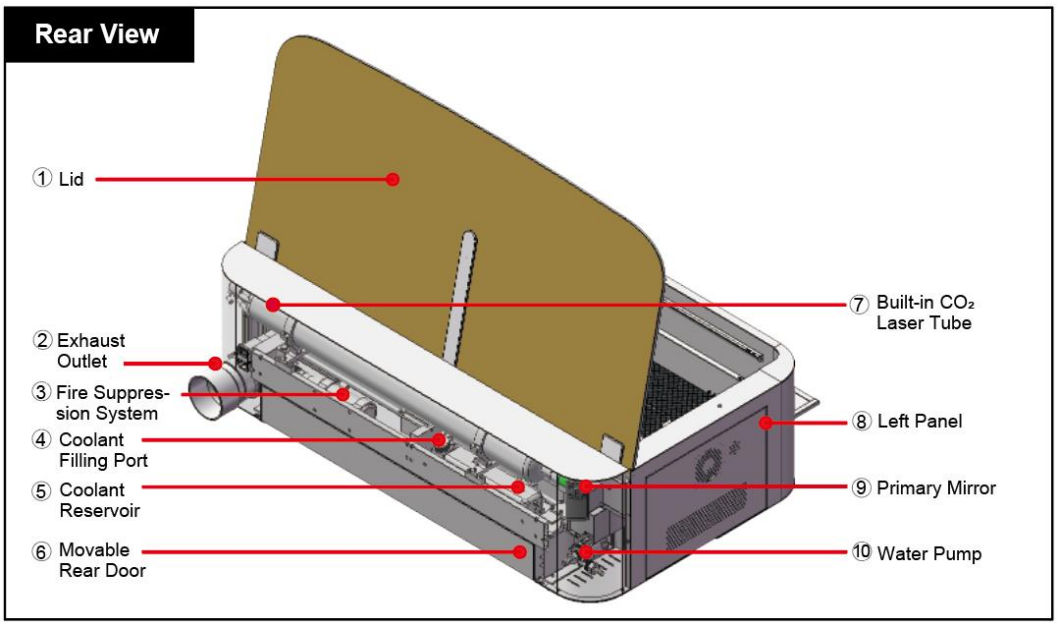
1.1 Inspect for Visible Damage

Before using Mega, check for any visible damage:

- Damage to the packaging
- Deformation of the machine's outer shell

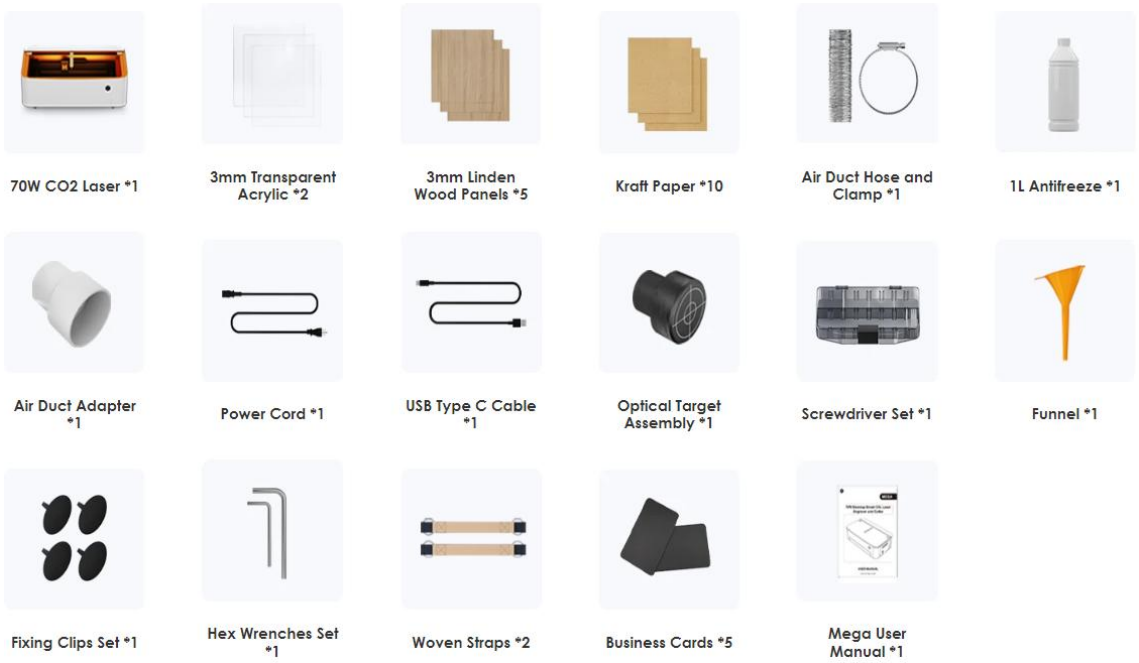
Below are the front and rear views of Mega:





1.2 Accessories Checklist

Upon opening the package, you should find the following accessories.



Please carefully check and if anything is missing, contact us at:
support@monportlaser.uk

1.3 Add Coolant

(Water Pump Must Be Turned On First, Then the Machine Turned Off)

Mega requires coolant (water or antifreeze) before use. Turn on the water pump first to allow circulation and prevent air from entering the system.

Use different coolant ratios depending on the temperature. Refer to the table below for details:

Annual Lowest Temperature in Your Region (°C)	Antifreeze Concentration (%)	Antifreeze (ml)	Purified Water (ml)
T > 0	0	0	1220
-10 ≤ T ≤ 0	20	244	976
-20 ≤ T ≤ -10	35	427	793
-30 ≤ T ≤ -20	45	549	671
-40 ≤ T ≤ -30	50	610	610
-50 ≤ T ≤ -40	60	732	488

Steps to Add Coolant:

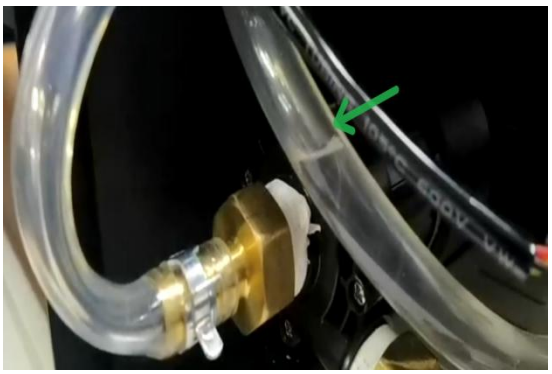
Step 1: The machine's back cover is not screwed in by default. Remove it as shown:

Important: If you accidentally disconnect the power cord while removing the cover, reconnect it as shown:

Step 2: Unscrew the water tank cap.

Step 3: Fill the tank until it's at least **two-thirds full**.

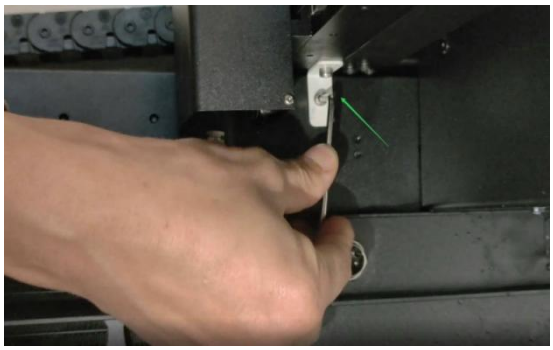
Step 4: Turn on the machine to activate the water pump. It will automatically circulate water through the pipe.



Important:
Ensure the liquid circulates properly.
Once the water pipe is filled, the water level in the tank will drop significantly. Refill the tank until it is again at least **two-thirds full**. The coolant setup is now complete.

1.4 Remove the X-Axis Fixing Bracket

Remove the fixing brackets on both sides of the machine.



1.5 Connect the Air Duct Hose

To ensure proper ventilation, we recommend installing the exhaust duct before using Mega.

Step 1: Gather the required parts: duct adapter, duct hose, and hose clamp.
Step 2: Insert the duct adapter into the machine.
Step 3: Attach the duct hose to the adapter.
Step 4: Secure the hose with the clamp.

1.6 Prepare a Windows PC

Important:
Due to compatibility issues with the Mac version of **M-Design Hub (MDH)**, we strongly recommend using a Windows laptop to operate the Mega engraving machine for optimal performance—especially for network configuration.

1.7 Ensure a Stable Network Connection

To ensure smooth operation, place the Mega engraving machine in an area with a strong and stable Wi-Fi signal. Many of its functions rely on Wi-Fi, and a poor connection may affect performance.

The Wi-Fi antenna is located on the side of the machine. For the best signal strength:

- Position the antenna-facing side toward your router.
- Avoid placing metal objects near the antenna, as they may interfere with the signal.

2. Network Configuration & Firmware Upgrade

To ensure the best user experience, we recommend upgrading your Mega engraving machine's firmware to the latest version before use.

2.1 Software Download & Installation

- Download the **M-Design Hub 1.2.0.**: https://github.com/Monport-Laser-Office/Monport-Design-Hub/releases
- Install following the on-screen instructions.

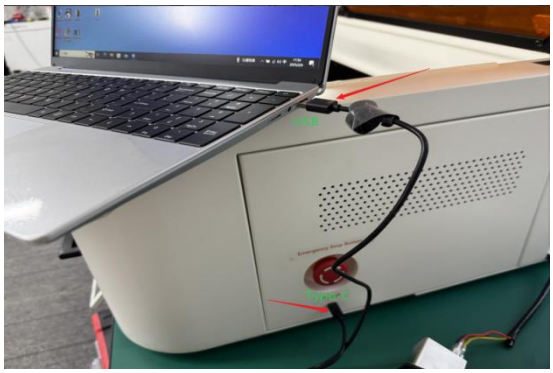
2.2 Configuring Mega's Network via MDH

- Before configuring the network, prepare a **USB-Type-C** data cable.
- Set up Wi-Fi using USB first.
- If no network is available, you can connect the machine directly via USB, but note that USB is slower and not recommended for long-term use.

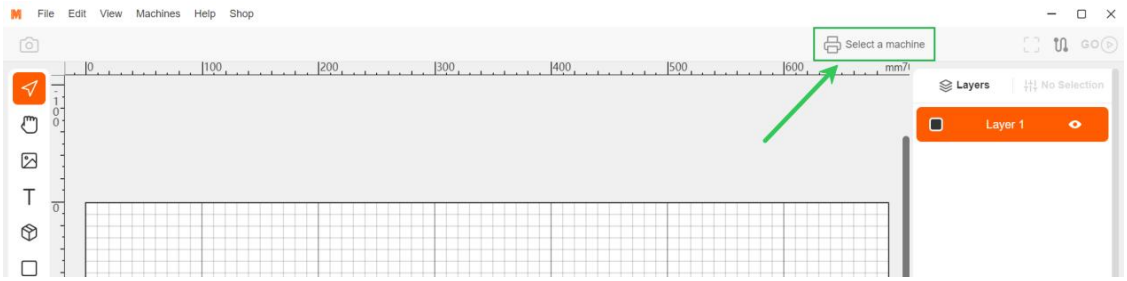
Step 1: Open M-Design Hub

Step 2: Connect the Device via USB

- Connect the Mega device to your computer via a USB-Type-C cable, then turn it on. The computer will automatically detect and connect to the device.



- Click **"Select a machine"**.

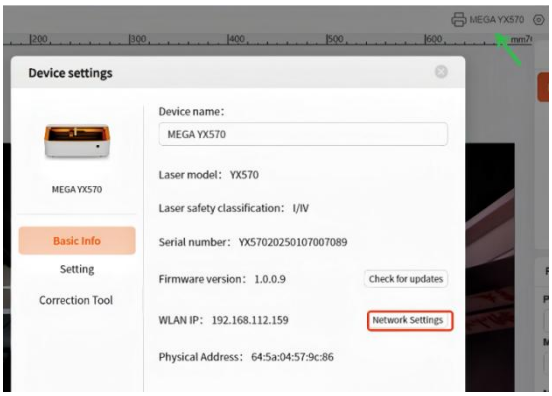


- You'll see your device name in the **"Connect device" > "USB"** page, indicating a successful USB connection.

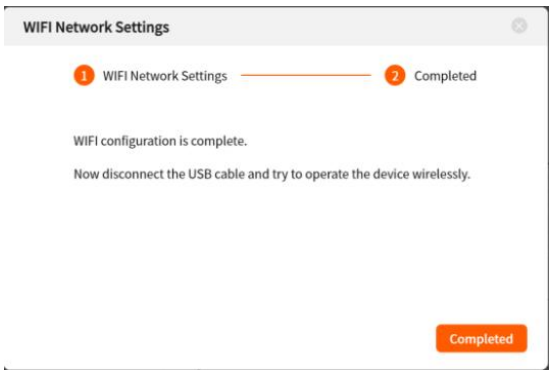
Important: If your device doesn't show up in the **USB Devices list** after plugging in the cable, contact our after-sales support at: **support@monportlaser.uk**

Step 3: Connect the Device via WiFi

- After a successful USB connection, your device name will appear at the top right of MDH. Click the **settings icon** beside it to go to **"Device Settings" > "Network Settings"**.



- Choose your Wi-Fi network from the list and enter the password to complete the WiFi setup.



- Once connected, click your device name to go to the **"Connect Device"** page, select **"WIFI"** to view the device and its IP address.

- You can now disconnect the USB cable and use Wi-Fi for future connections.

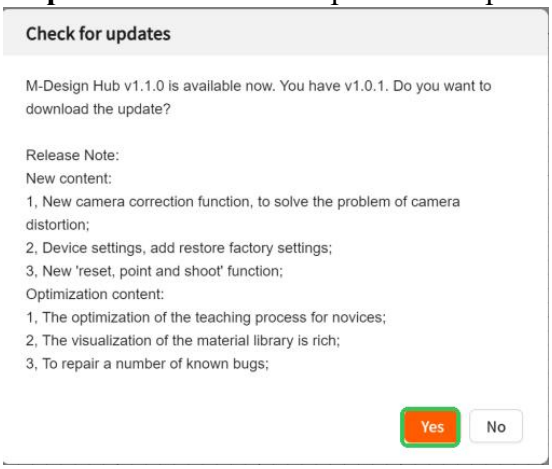
Important:

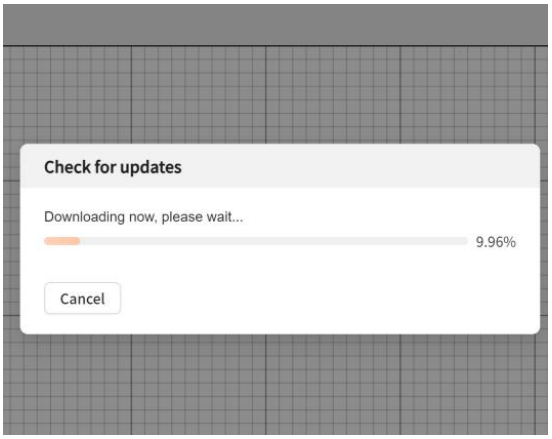
- To ensure a stable connection, avoid using special characters (e.g., !@#$) in the Wi-Fi name and password.
- If you need to switch networks, repeat the configuration process.
- For further assistance, contact support at: **support@monportlaser.uk**

2.3 Upgrade Mega's Firmware

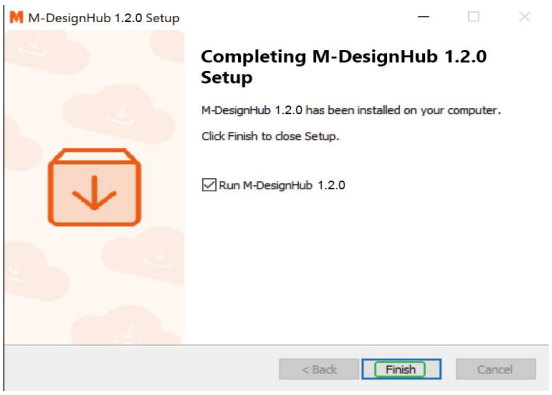
Firmware V1.0.0.9 updates automatically via M-Design Hub. Before proceeding, ensure your MDH **software** is updated to **V1.2.0**. If using an older version, you will be prompted to update.

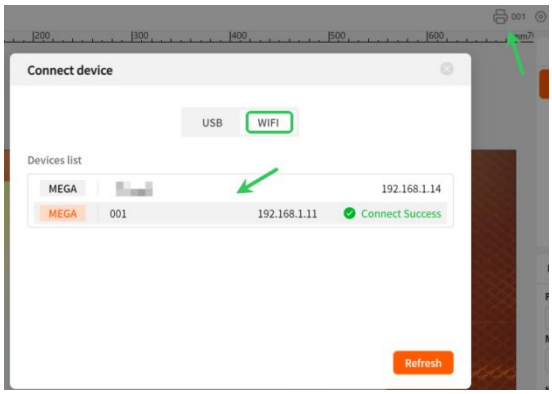
Step 1: Click **"Yes"** to update when prompted, and wait for the process to complete.





Step 2: Click **"Finish"**. The software will restart.
Step 3: Reconnect to your device via Wi-Fi.

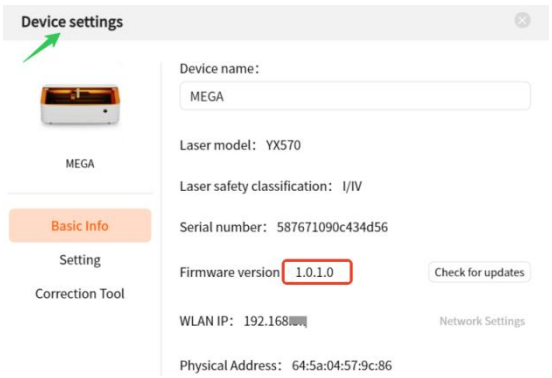




Step 4: Once connected, the firmware will update automatically in the background (about 3 minutes). Afterward, go to **Device settings** and check the firmware version.

If the firmware version shows **1.0.1.0**, the update was successful.

If the update fails, contact our after-sales support at: **support@monportlaser.uk**



3. Preparing MDH Before Your First Project

Important:

- **Flame Detection Sensitivity:**

The flame sensor is highly sensitive and may trigger false alarms. If the Mega device sounds an alarm without an actual flame inside, there is no need for concern. The flame detection software is still undergoing sensitivity optimization.

※ *If you confirm that the alarm is due to a software issue,* ***we recommend temporarily disabling the flame detection function in MDH*** *and re-enabling it after the new firmware update is released on March 15.*

- **Water Flow Speed Detection:**

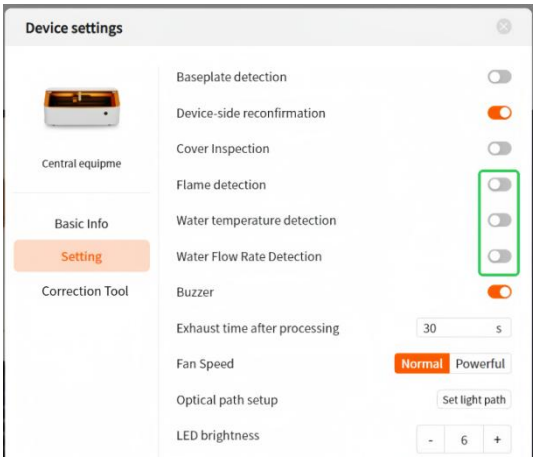
Regional differences in temperature and altitude can affect water flow speed, and the water flow detection software is still being optimized for broader adaptation.

※ *To prevent any impact on basic functions,* ***we recommend turning off the water flow speed detection function in the MDH client*** *while ensuring normal water flow. Future updates will improve this feature.*

3.1 Machine Settings & Default Parameters

Disable Flame and Water Flow Detection

These features are still in development and will be enabled in future versions, but they may impact user experience in their current state.

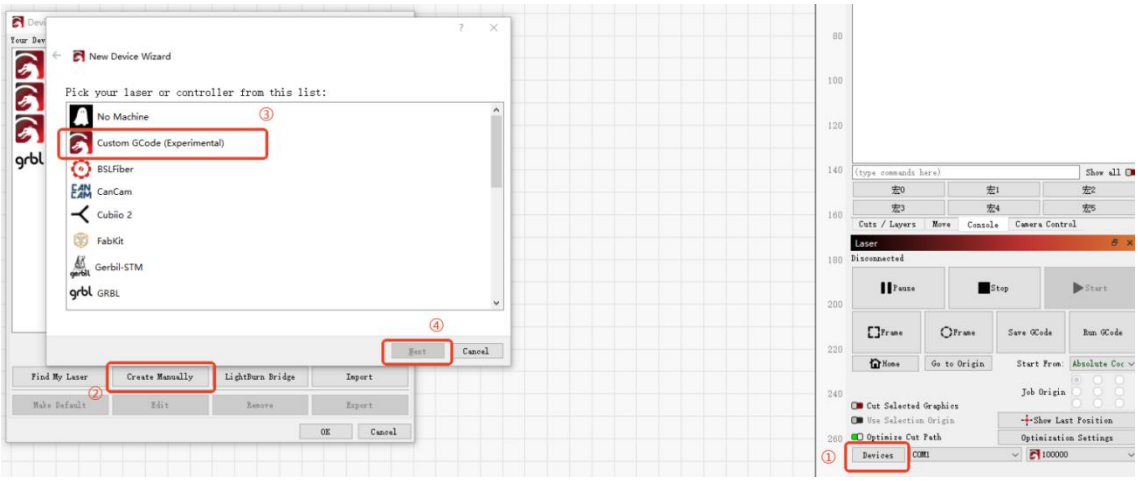


Set Up LightBurn for MDH

Before adjusting machine parameters, ensure your laser is properly set up in LightBurn:

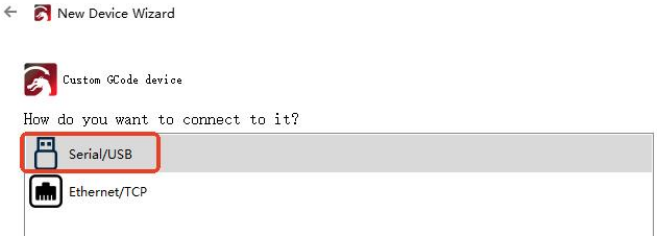
Step 1: Create and Add a Device

Click **"Devices" > "Create Manually"**, select **Custom GCode (Experimental)** > **"Next"**.



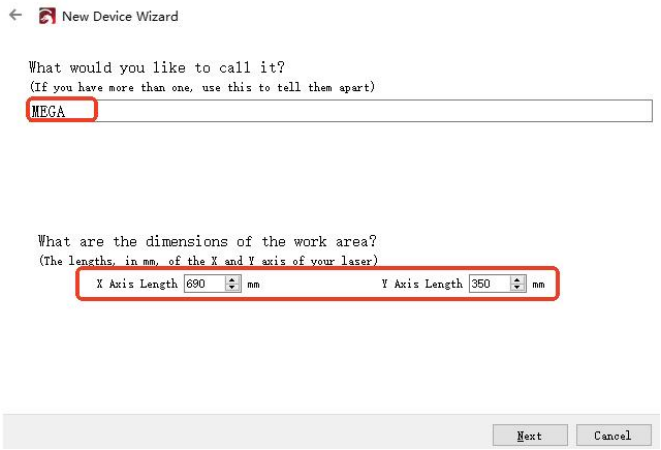
Step 2: Select Connection Type

Choose **Serial/USB > "Next".**



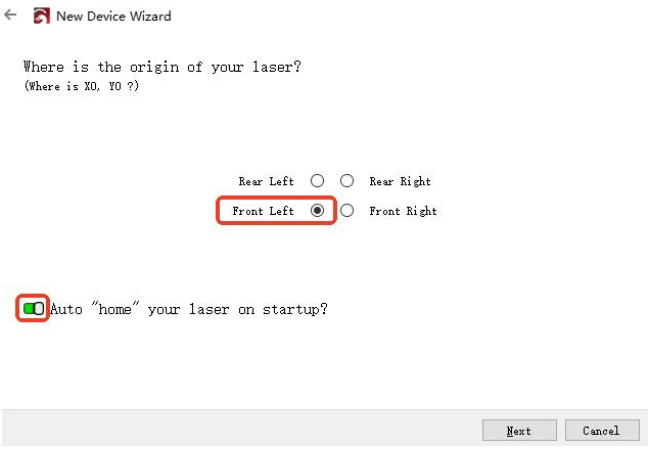
Step 3: Name & Set Work Area

Enter a device name and input the laser's max X and Y dimensions (mm) **> "Next"**.



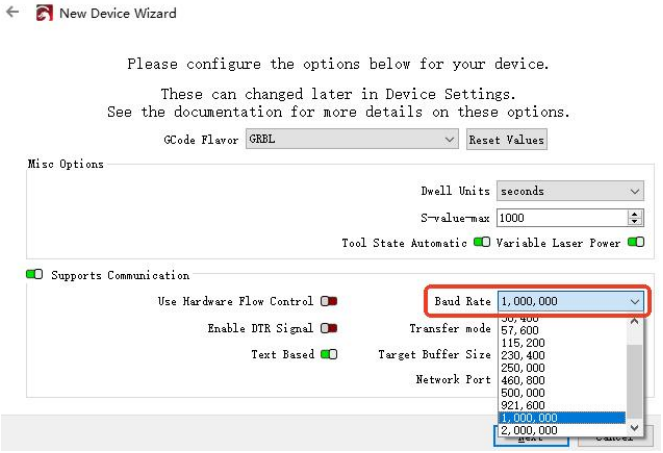
Step 4: Set Machine Origin

Select Front Left as the origin; Enable Auto HOME on startup **> Next**.



Step 5: Configure Settings

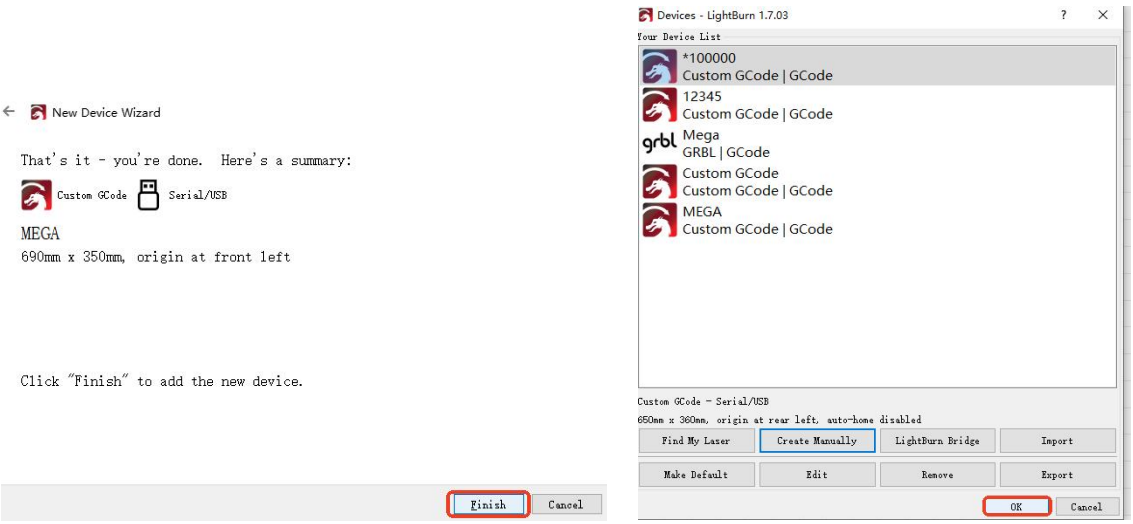
For Baud Rate: Select **1000000**. Keep all other settings default.



Step 6: Finish Setup

Review settings > **"Finish"**.

Ensure the device appears in the list > **"OK"**.



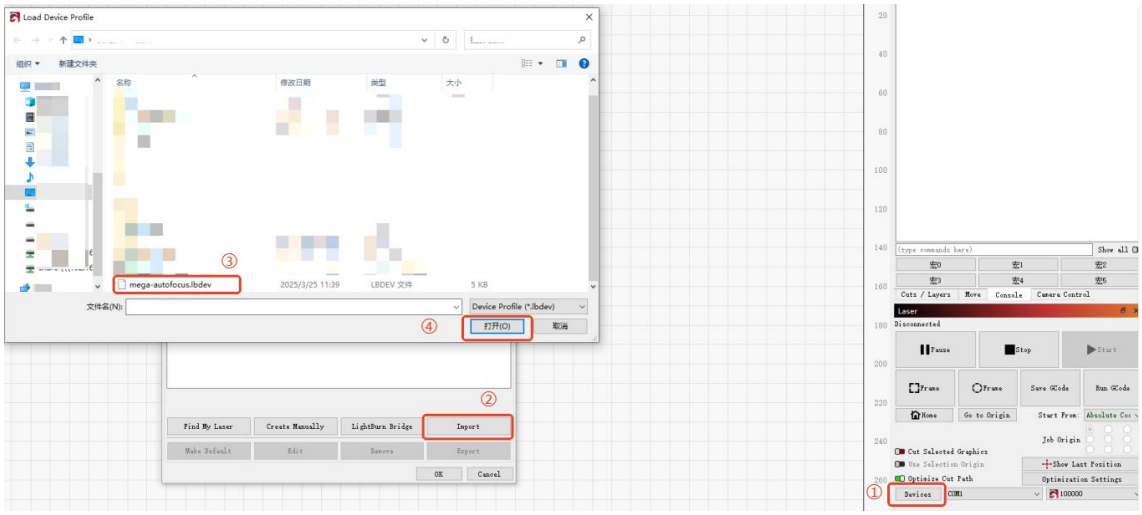
Modify GRBL Acceleration and Deceleration Parameters

Before using the machine, we recommend modifying the default motion parameters for optimal engraving and cutting results. Follow these steps using **Lightburn**:

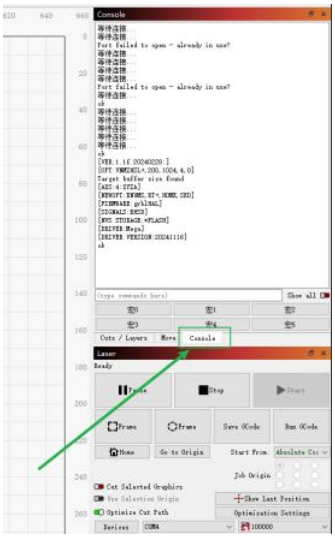
※ *Parameter adjustment function will be included in future MDH versions, eliminating the need to adjust them in Lightburn.*

Step 1: Download the **mega-autofocus.lbdev** file:
https://drive.google.com/file/d/1Cn4gn5nSisQrJvbOz5JR2RCPVwtx3a2c/view?usp=sharing

Step 2: Import the device file:
Open LightBurn > Click **"Devices"** ① > **"Import"** ②
Select **mega-autofocus.lbdev** ③ > Click **"Open"** ④.

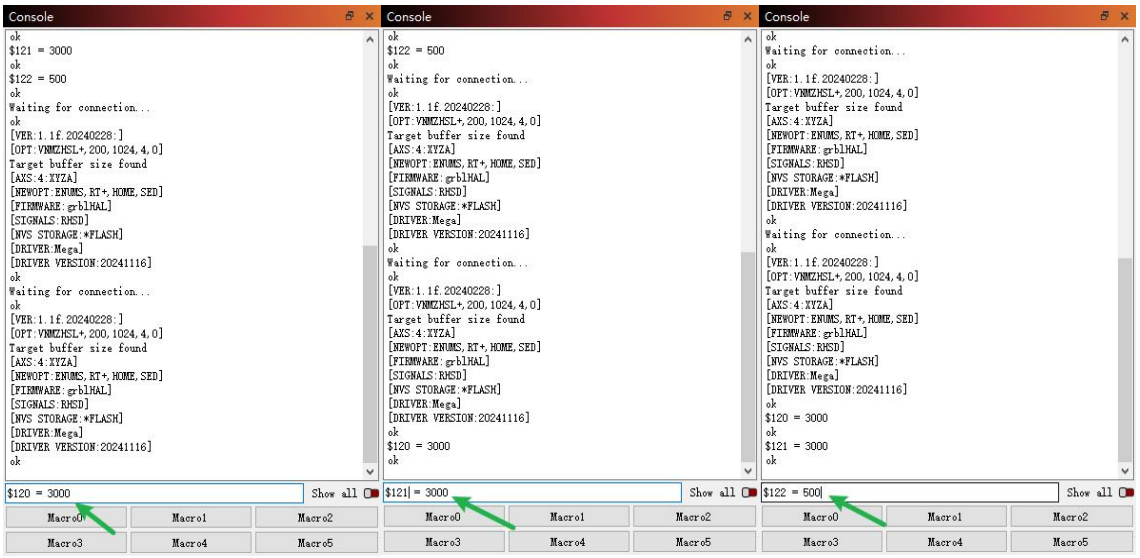


Step 3: In LightBurn, click on the **"Console"** tab.

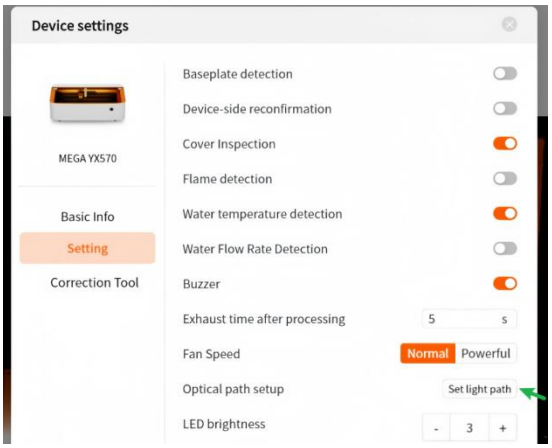


Step 4: Enter the following commands in sequence to set the optimal acceleration and deceleration parameters:

\$120 = 3000, \$121 = 3000, \$122 = 500



3.2 Adjust the Light Source & Focus the Beam

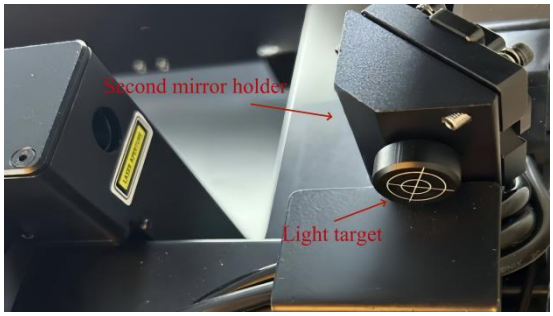


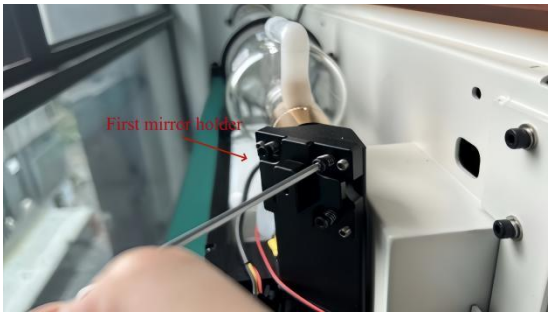
Step 1: Open the MDH software and connect the device.

Step 2: Navigate to **"Device Settings"** and click on the **"set light path"** to emit red light.

Step 3: Adjust the First Mirror

- Place the optical target into the second mirror holder.
- Move the X-axis up and down to verify the optical path alignment between the first and second mirrors.
- If misaligned, use a hex wrench to adjust the first mirror holder.

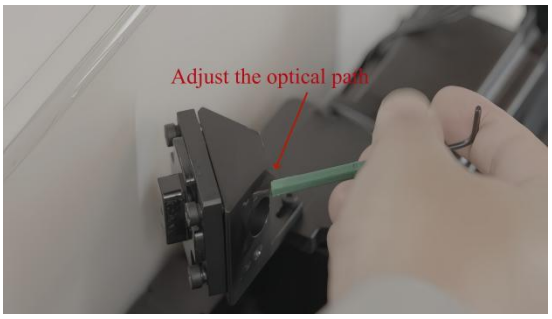




Step 4: Adjust the Second Mirror

- Place the light target into the laser head.

- Move the laser head left and right to check if the optical path between the second mirror and the laser head is aligned.
- If misaligned, use a hex wrench to adjust the second mirror holder.



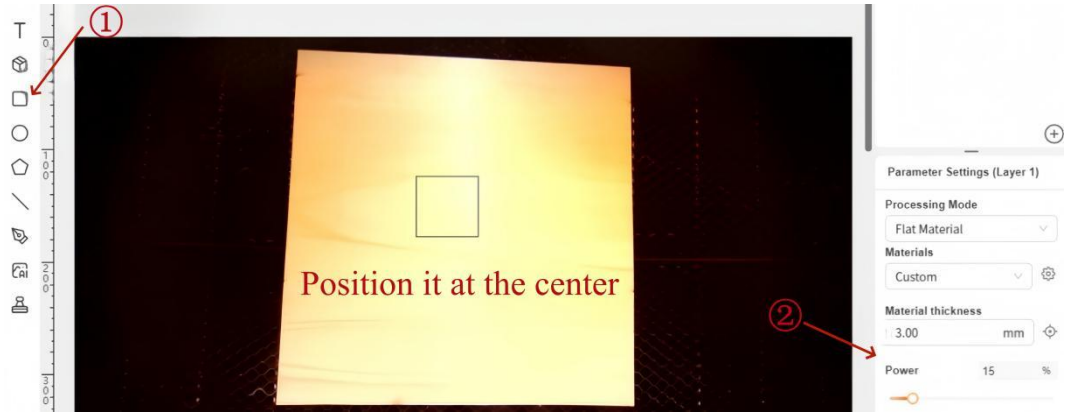
Step 5: Turn off the optical path test after adjustments.

3.3 Verify Laser Output

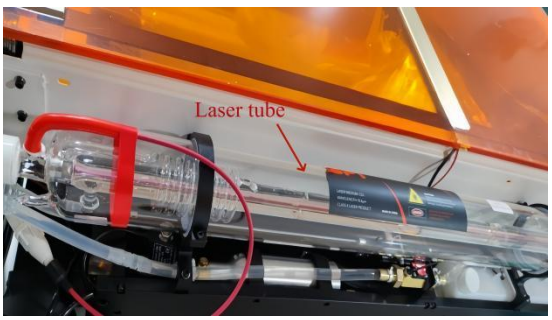
Software Check: Use the MDH software to confirm that the laser emits light during engraving.

Step 1: Create a small rectangle (e.g., 50×50 mm) and position it at the center of your material. Set the material thickness.

Step 2: Configure the engraving settings to 15% power and 20 mm/s speed.



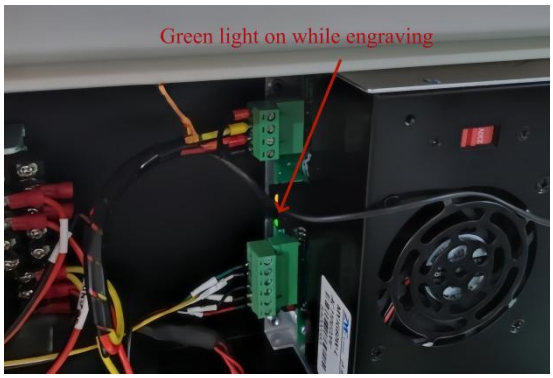
Step 3: Click **"Preview"** > **"Start engraving"** to begin the actual engraving. Observe if the laser tube emits light during the engraving process.



Hardware Check:

Step 1: While engraving, observe the laser tube to ensure it emits light.

Step 2: If the laser tube does not emit light, check the side laser emitter. Ensure its **green light** is illuminated (the yellow light should automatically turn on when the machine starts).



3.4 Remove the Camera Cover

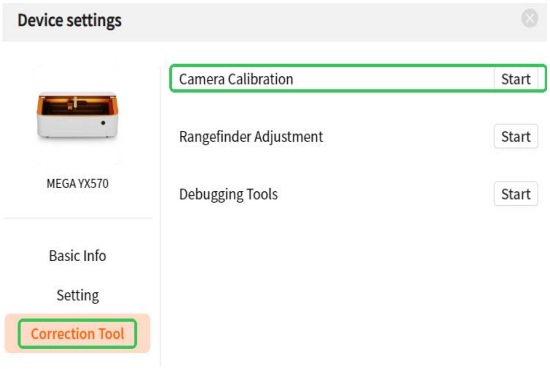
Use a utility knife or other sharp tool to open the cover from the side. Do not rotate the cover, as it may change the focal length and blur the captured images.

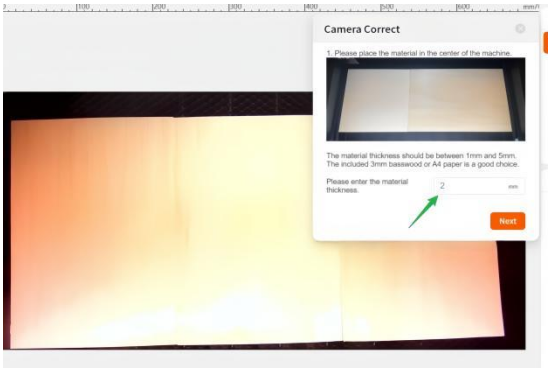
3.5 Camera Canvas Calibration

Before proceeding, calibrate the camera and canvas for precise positioning:

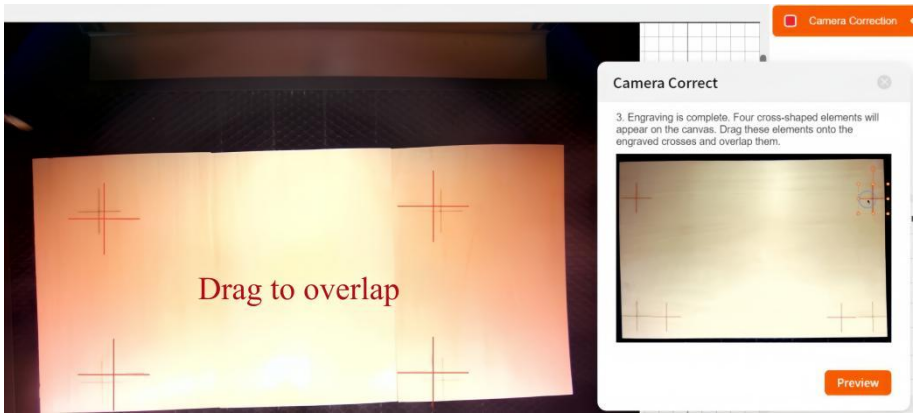
Step 1: Access the correction tool in the settings.

Step 2: Place the material, enter material thickness, and enable the engraving cross element.





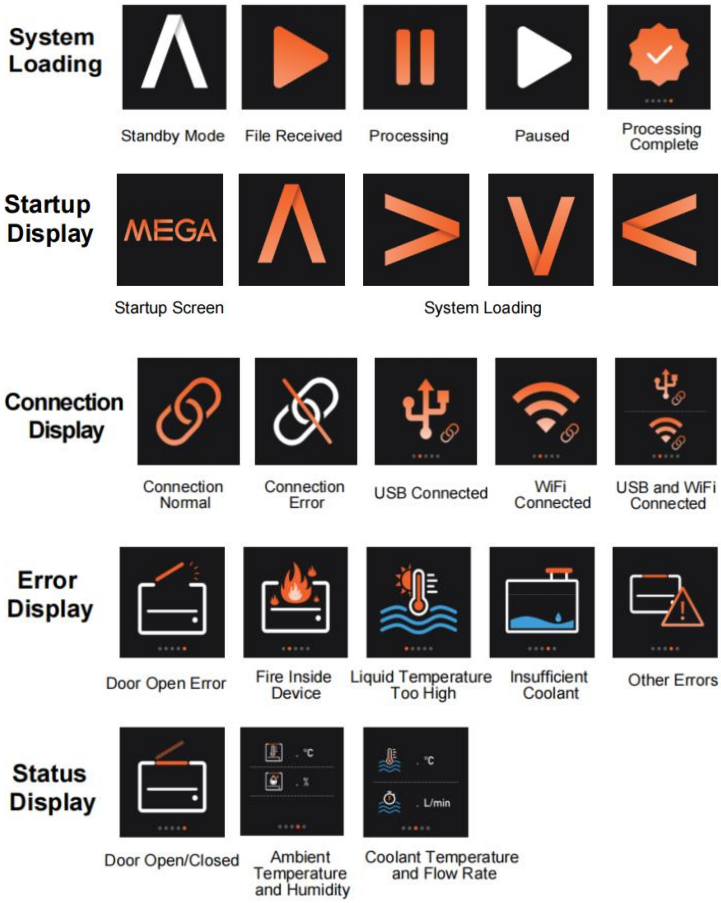
Step 3: Align the four cross elements with the engraved ones to complete calibration.



You can also refer to our complete camera calibration video tutorial: https://drive.google.com/file/d/1bSUxcotalmM20TxAzQ4-d8PSI6onLXo6/view?usp=drive_link

3.6 Familiarize with Mega's Touch Screen Icons

The Mega's front smart button screen displays various statuses of the cutting machine. Refer to the images below for a visual representation of each icon and its corresponding status.

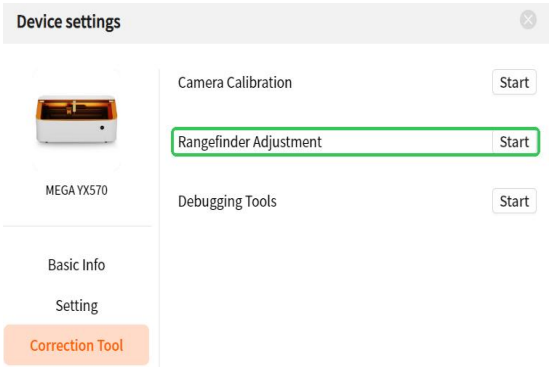


Important: Currently, the device can be controlled by swiping and pressing; rotating the knob is not supported.

3.7 Distance Sensor Calibration

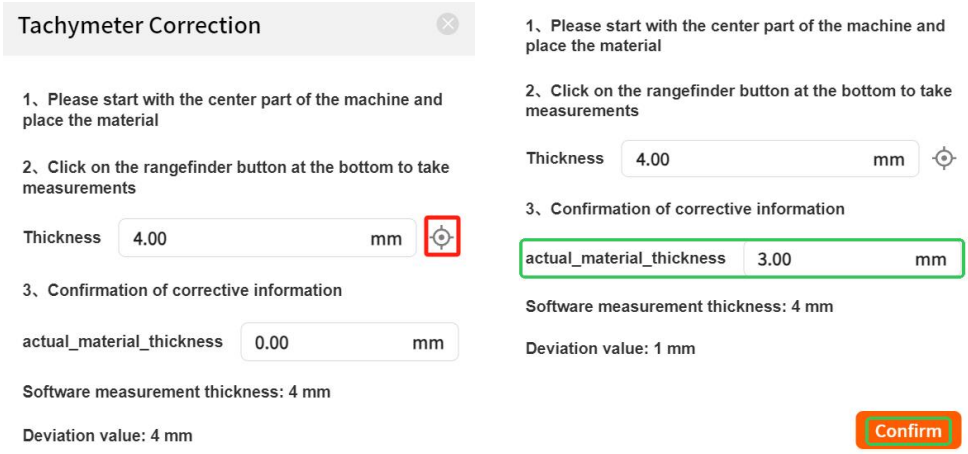
If you experience inaccurate material thickness measurements, calibrate the distance sensor to enhance accuracy.

Step 1: Go to **"Device Settings"** > **"Correction Tool"** > **"Rangefinder Adjustment"**.



Step 2: Place the provided 3mm Linden wood inside the device and click the measurement button.

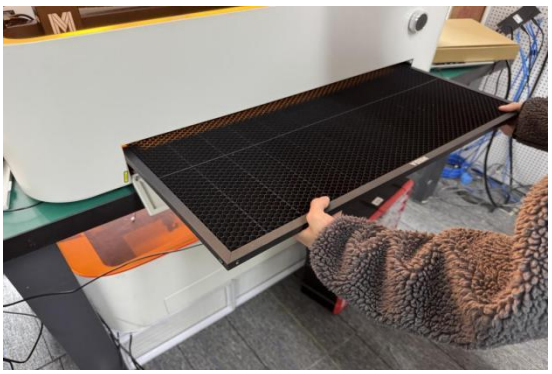
Step 3: Enter the actual thickness of 3mm and click **"Confirm"**.



4. Using MDH to Complete Your First Project

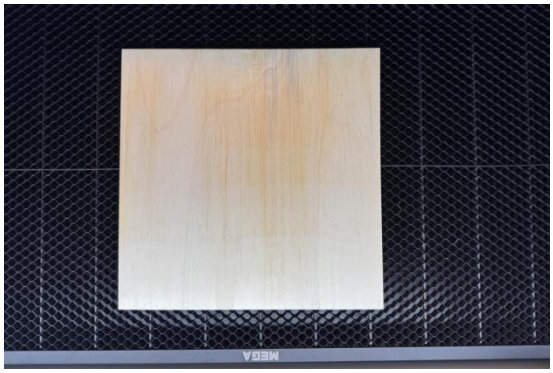
4.1 Place the Honeycomb Board

Open the bottom door of Mega, and insert the honeycomb board into the machine as shown below, ensuring it is securely positioned.



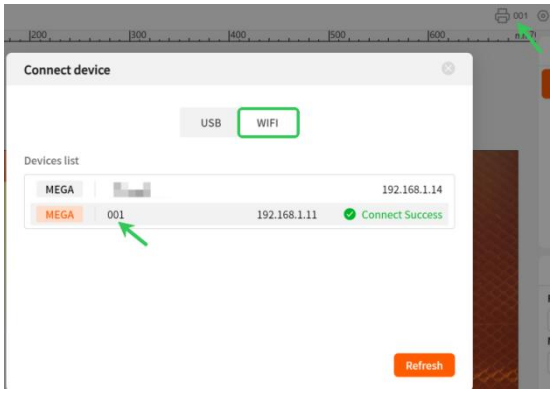
4.2 Place the 3mm Plywood

Place the 3mm plywood sheet at the center of the honeycomb board.

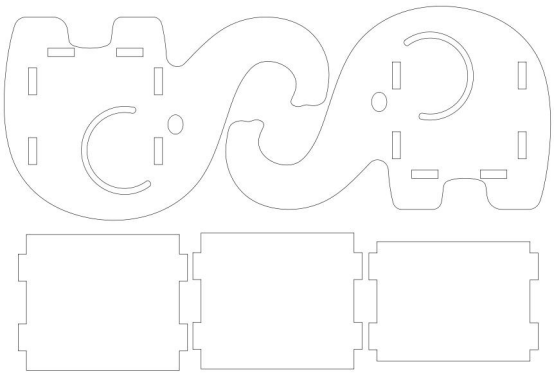


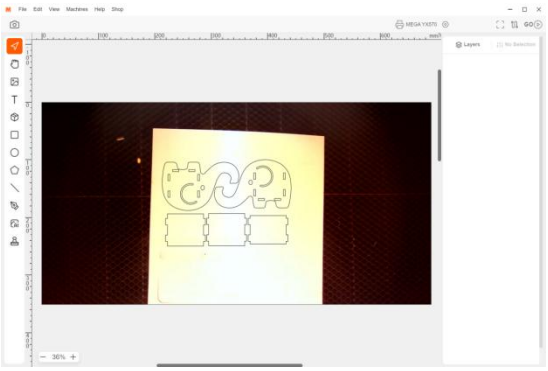
4.3 Refresh the Camera & Import File

Step 1: If your Mega device is already connected to the network, you can locate it within the MDH software interface shown below.



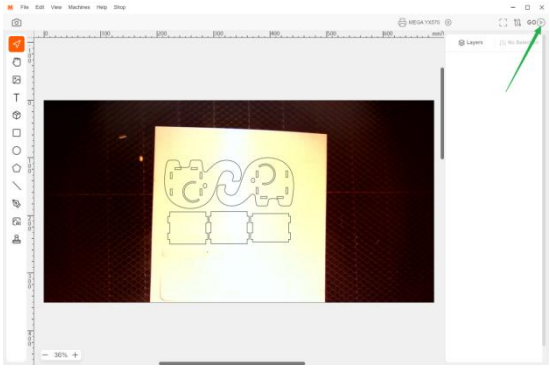
Step 2: Download the provided file and import it into MDH. (Refer to the attachment.)





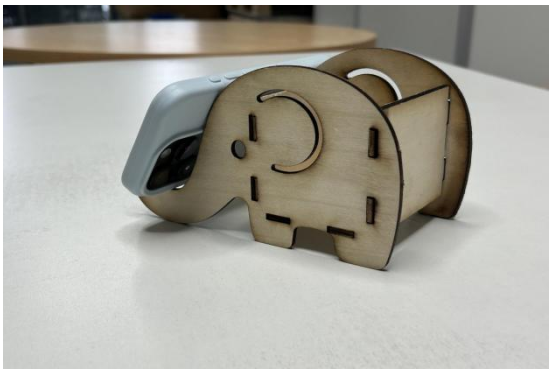
4.4 Upload File and Start Engraving

Step 1: After arranging the layout, click the designated icon to upload the file.



Step 2: After clicking, both the MDH software and the machine's display will prompt **"Press it unlock"**. Press the indicated area to start the engraving process.

The final work is as shown. Congratulations on completing your first project with Mega! We look forward to seeing your future creations.



5. Explore Other Features

- MDH Software Operation Manual
- Mega Batch Filling Guide
- Mega Curved Surface Engraving Guide
- Mega Conveyor Belt Batch Operation Guide
- Mega Common Troubleshooting
- Mega Daily Maintenance

6. Contact Us

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WhatsApp QR code: (figure on the right)
Facebook Official Group: https://www.facebook.com/groups/8651579938232034