

Genmitsu L8 Laser Machine

Camera Calibration Tutorials

for LightBurn only

Overview

- Turn off the Machine
- Connect the camera using the provided USB cable.
- Download and print the '[Calibration-Circles.png](https://docs.lightburnsoftware.com/img/Camera/Calibration-Circles.png).' image. If the hyperlink doesn't work, try this link:
<https://docs.lightburnsoftware.com/img/Camera/Calibration-Circles.png>
- Affix the printed calibration image to a rigid, flat surface such as cardboard, foam board, wood, or a clipboard.

For optimal performance, ensure that the calibration image is:

Undistorted

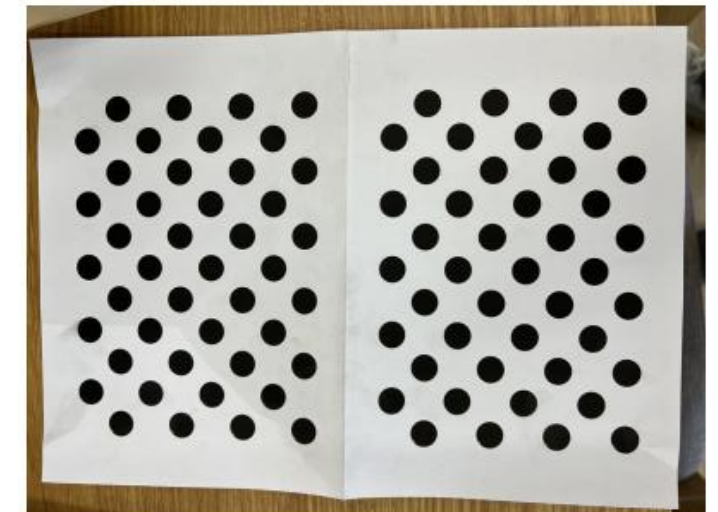
Perfectly flat

Surrounded by a margin of 6mm (1/4") or larger

We suggest printing the calibration image on A4 paper, scaled to half the size of the paper.

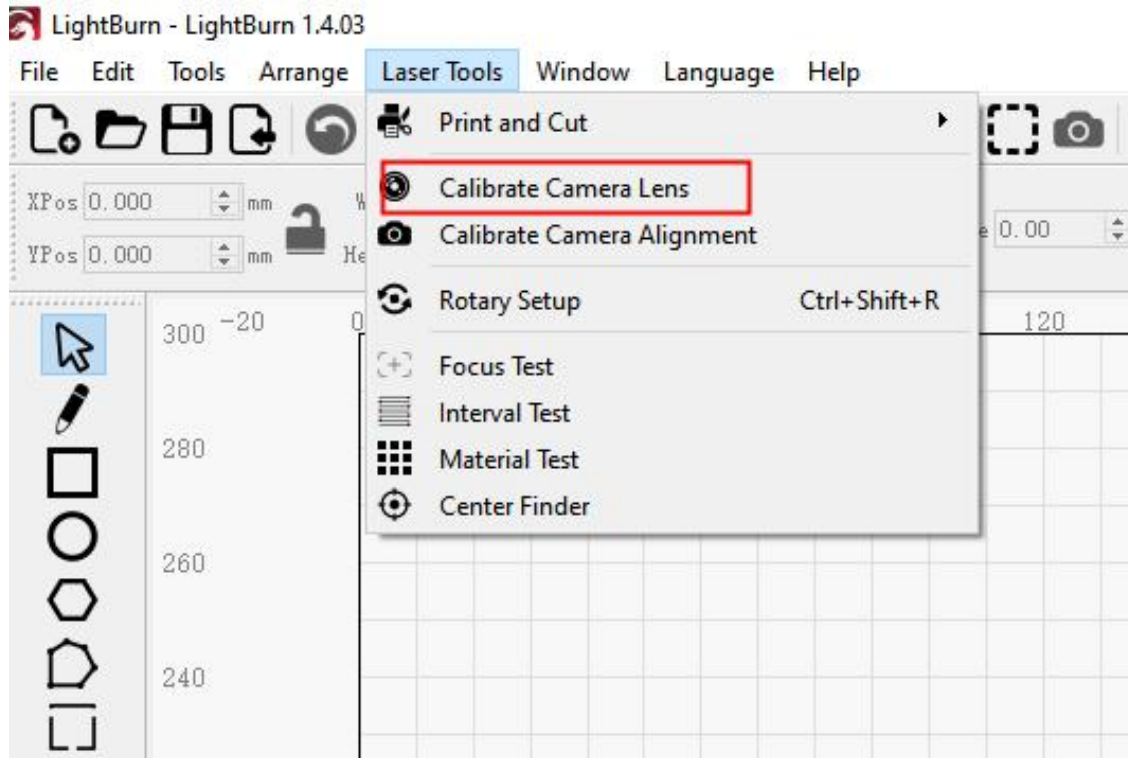
Important: Do not overlook the alignment process!

Calibration and alignment are both critical for the proper setup of the camera. Ensure you complete the alignment process following calibration.



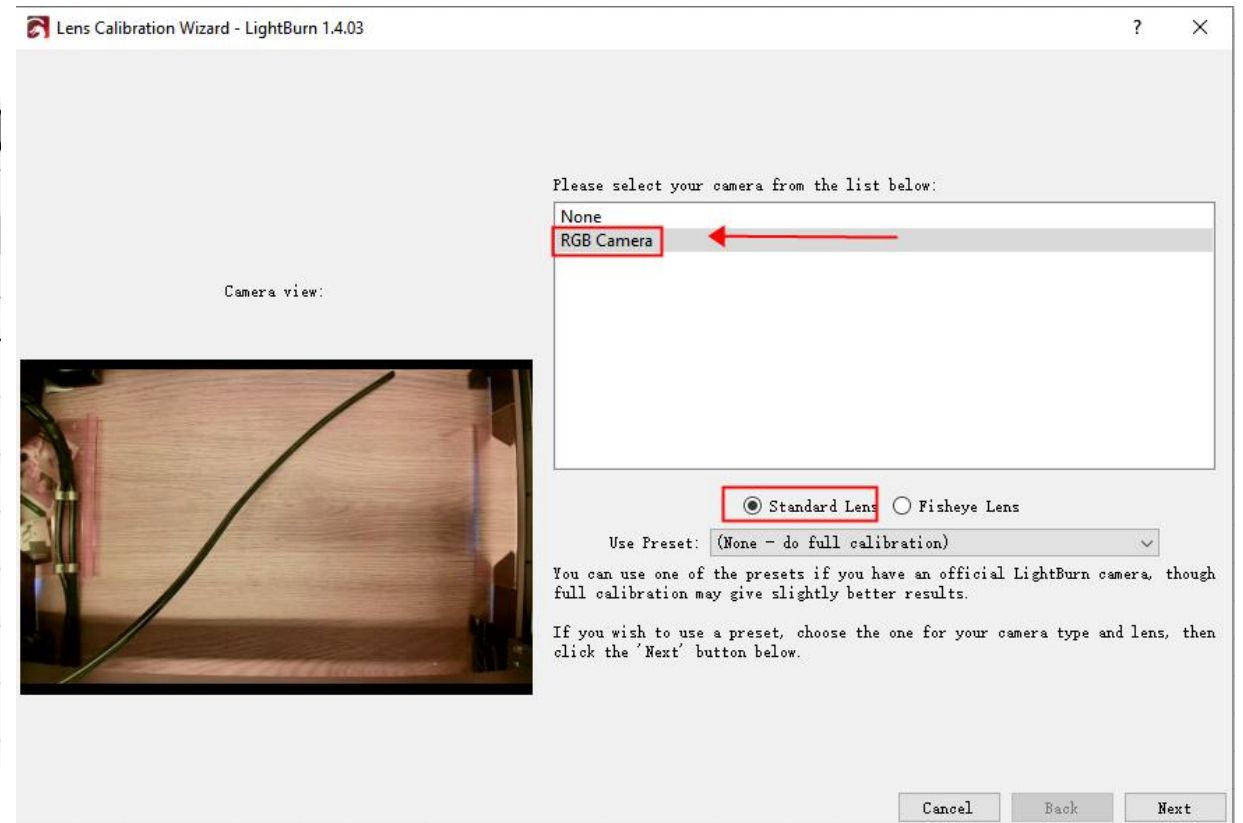
Step 1 Calibration

Open LightBurn to enter Calibrate Camera Lens



Note: The Camera Lens Calibration process involves capturing multiple images of the printed calibration image. The software examines the pattern's appearance in these images and compares it with its pre-existing understanding of the pattern's expected appearance. It then calculates the degree and form of distortion caused by the camera lens and computes a lens correction that is precise for your specific camera.

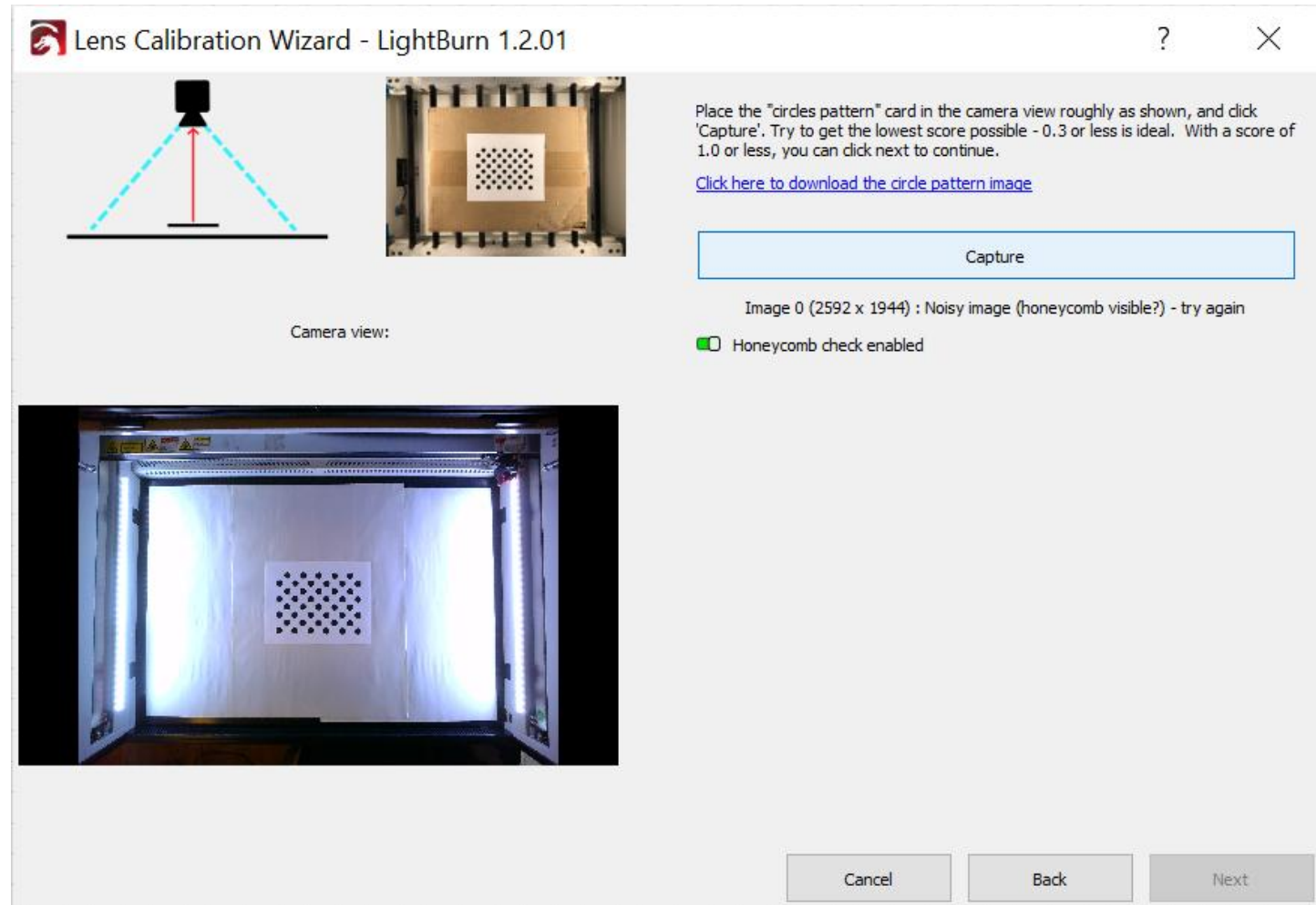
Choose RGB Camera and select Standard Lens
Then click Next



Step 1 Calibration

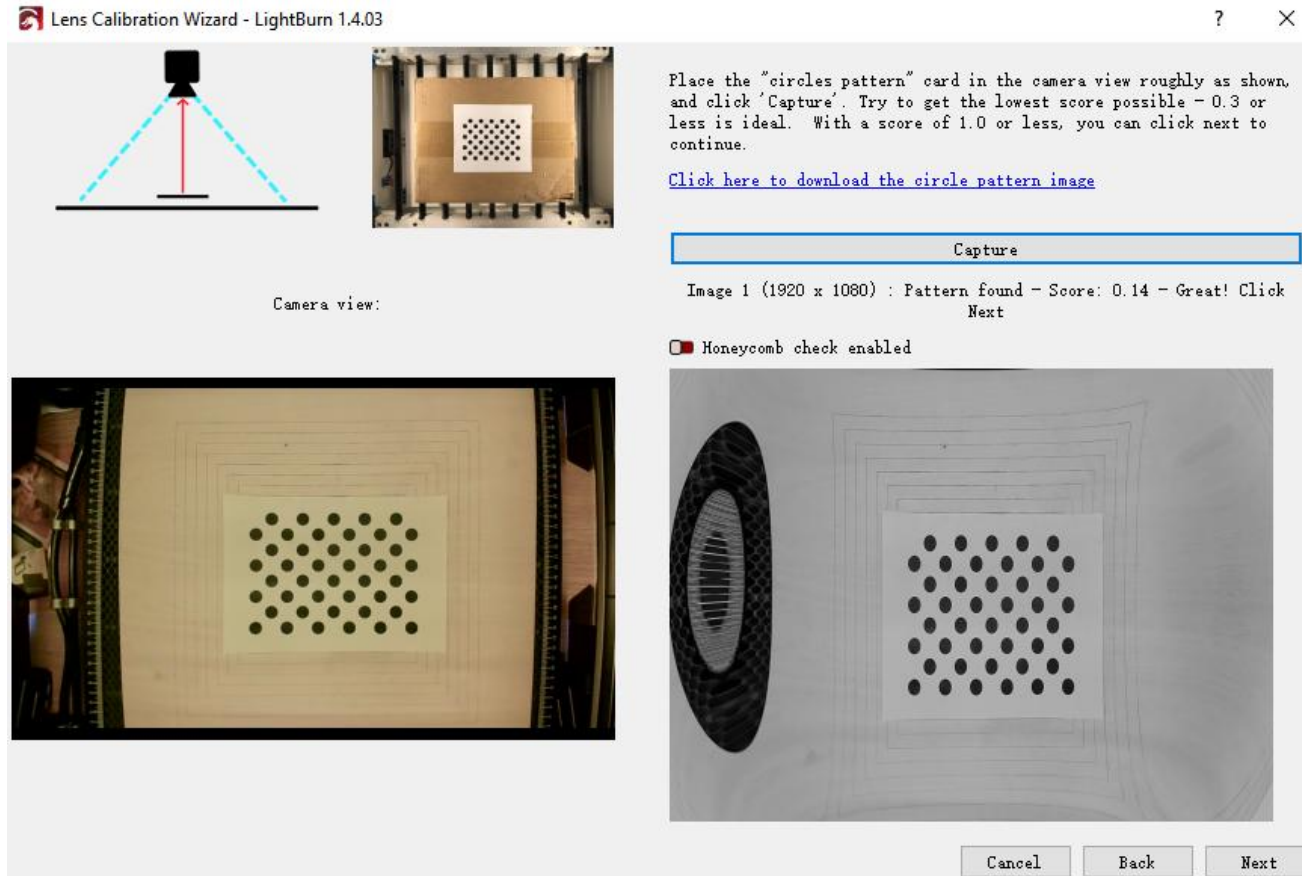
The interface will then display a capture button and a diagram illustrating the correct positioning of the printed pattern. For the initial capture, ensure the pattern is centrally located within the camera's field of view, with the printed side facing the camera, as depicted in the top view. If the captured image does not align with the suggested image, consider adjusting the scale of your printed card or removing the camera from the machine for lens calibration. This ensures an accurate calibration process.

Preparing for the first image capture. The calibration image should be placed on the covered honeycomb bed.



Step 1 Calibration

Click the Capture button, and you should see something like below:



Above the image on the right you see:

*Image 1 (1920x1080) : Pattern found - Score: 0.14 - Great!
Click Next*

This tells you:

The image was successfully captured
The resolution of the captured image is 1920x1080
The calibration pattern was found in this image

The image has achieved a satisfactory score. Lower scores are preferable, indicating a smaller average error between the positions of the dots in the image and the actual dots after distortion removal. In this case, the average error is only 0.14 pixels, slightly exceeding our target score of 0.3 pixels of error.

You may notice that while the circles are clear and undistorted, the surrounding background appears more distorted. This is a temporary effect due to the use of a single calibration image. As the process continues, your computer will gather more data about your camera's lens distortion, improving the clarity of the entire image.

If the calibration pattern is not detected, LightBurn will notify you. Make sure the calibration image faces directly toward the camera and occupies roughly the same amount of view area shown in the "suggestion" image. It is acceptable if the calibration image is rotated within the view for easier placement.

Step 1 Calibration

As you progress through the image captures, the suggested image will update accordingly. The sequence begins with five images centered in the view, followed by images at the bottom, left, right, and top. If your camera exhibits a pronounced fisheye effect, you may need to slightly adjust the non-central images inward to ensure successful capture. This is ok.

The final four images are the corners, and these can be difficult to capture with high-distortion cameras. If your first 5 images score very well (below 0.3) you are allowed to skip the final four images (the 'Next' button will show as 'Skip' in this case). If you are having trouble capturing the last four images and don't have the option to skip, you can place the card anywhere within the view and capture that instead - We don't verify that your placement matches what we're suggesting.

Even after only a few good captures, the image on the right should appear to be free of lens distortion, as shown here: A poorly calibrated result will still show lens distortion, and may have other artifacts, like the "wobble" seen in the lower-left of the gray image below:

If you aren't getting good results, you can re-capture the current image, or just go back to the beginning and try again. It can take a few tries to get a feel for how to align the card with the camera to get the lowest score.

Lens Calibration Wizard - LightBurn 1.4.03

Place the "circles pattern" card in the camera view roughly as shown, and click 'Capture'. Try to get the lowest score possible - 0.3 or less is ideal. With a score of 1.0 or less, you can click next to continue.

[Click here to download the circle pattern image](#)

Capture

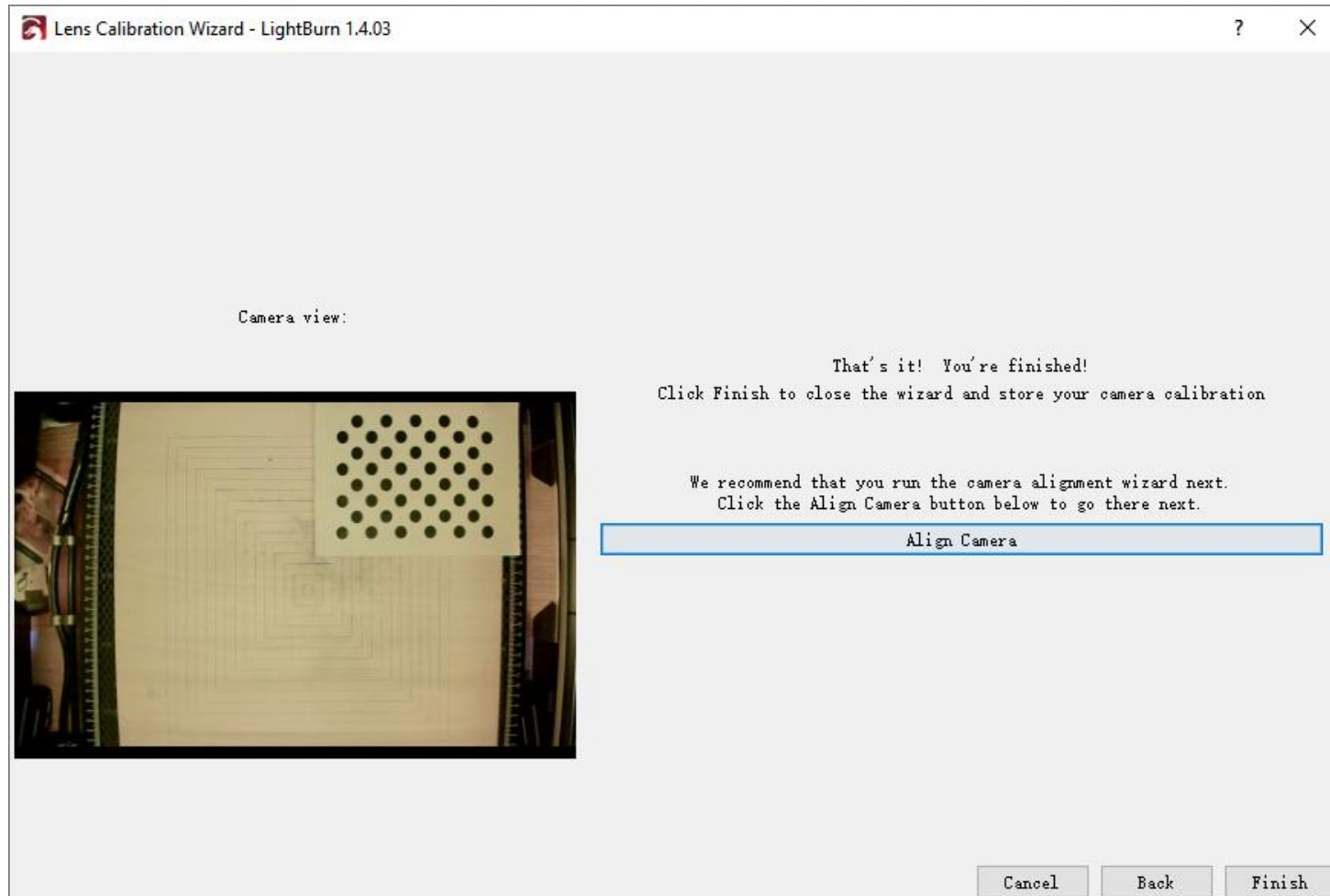
Image 2 (1920 x 1080) : Pattern found - Score: 0.29 - Great! Click Next

Honeycomb check enabled

Cancel Back Next

Step 1 Calibration

When you have advanced through all the steps, and you are satisfied that you have a good calibration result with a nicely undistorted image, click Finish to save the results. You can also click the "Align Camera" button in the final page to take you to the next wizard automatically.

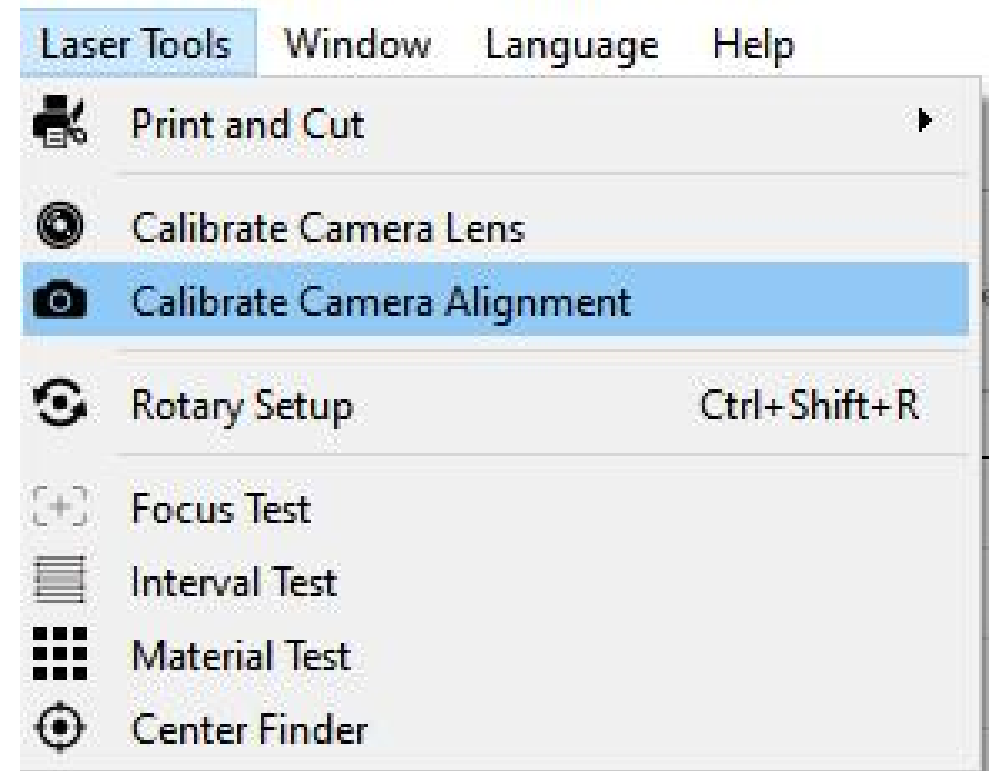


Step2 Alignment

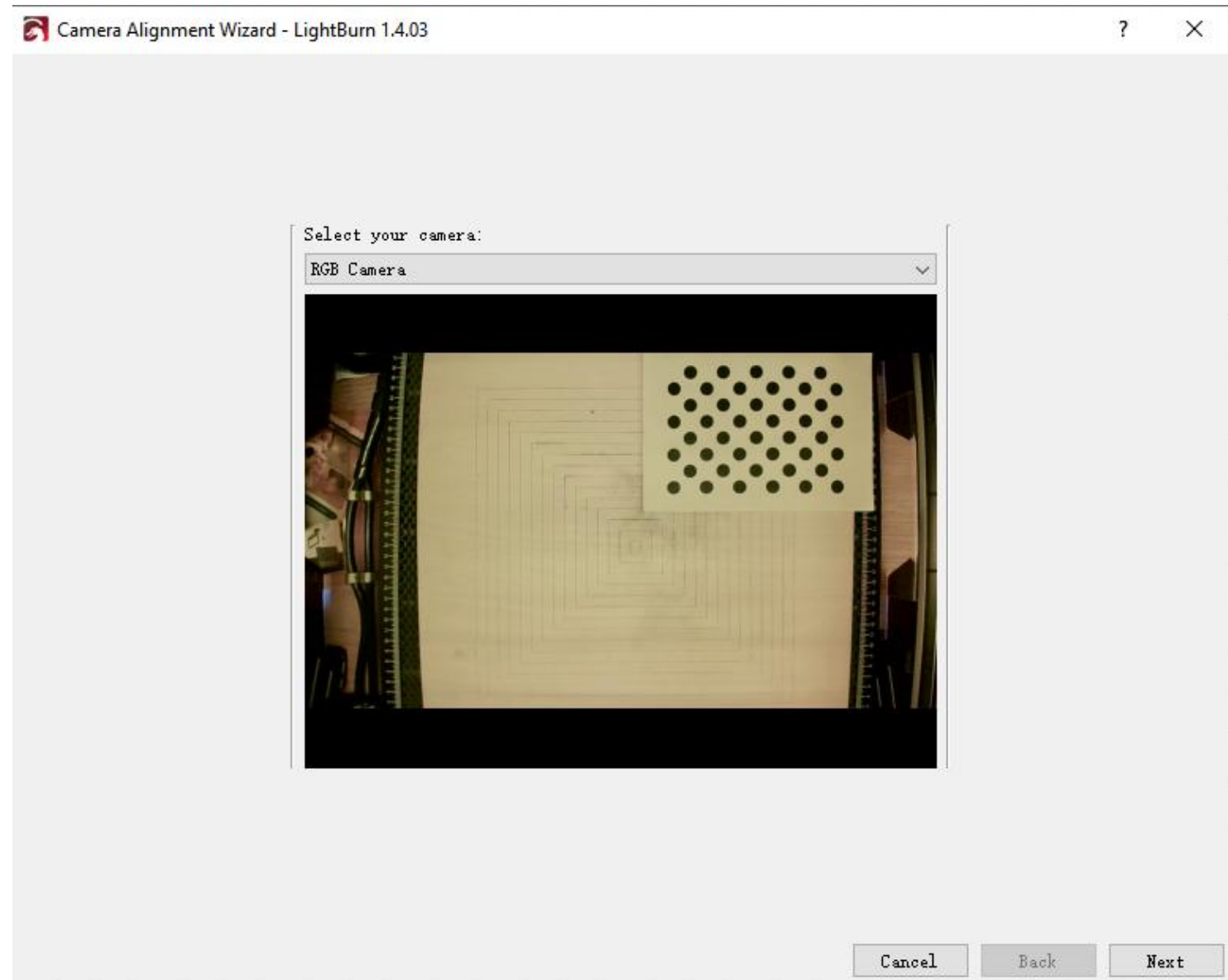
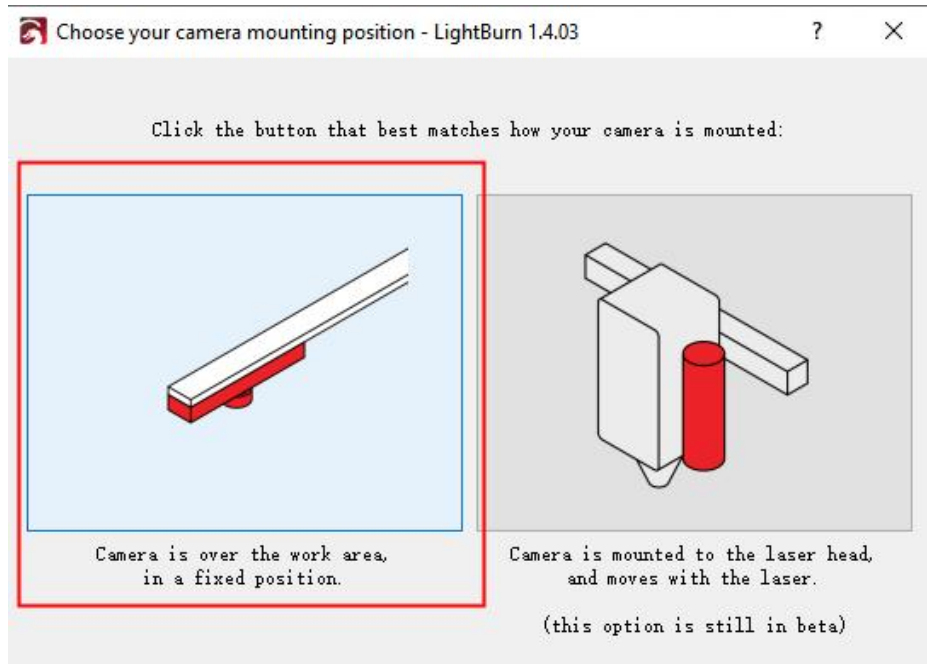
Now that the camera is calibrated, you can move on to the next step, camera alignment. This process tells LightBurn where your camera is in relation to the workspace of your machine.

Preparation:

1. Make sure you have a piece of material you can burn the calibration pattern onto. This should be at least 200mm x 200mm (roughly 8" square), but you may want larger materials for large lasers.
2. Focus your laser based on the material you're using.
3. In the "Laser Tools" menu, choose "Calibrate Camera Alignment" to start the alignment wizard. Choose the same camera you did for the Lens Calibration wizard.
4. After verifying that you see an image from the camera, click "Next" to enter the alignment wizard.



Step2 Alignment

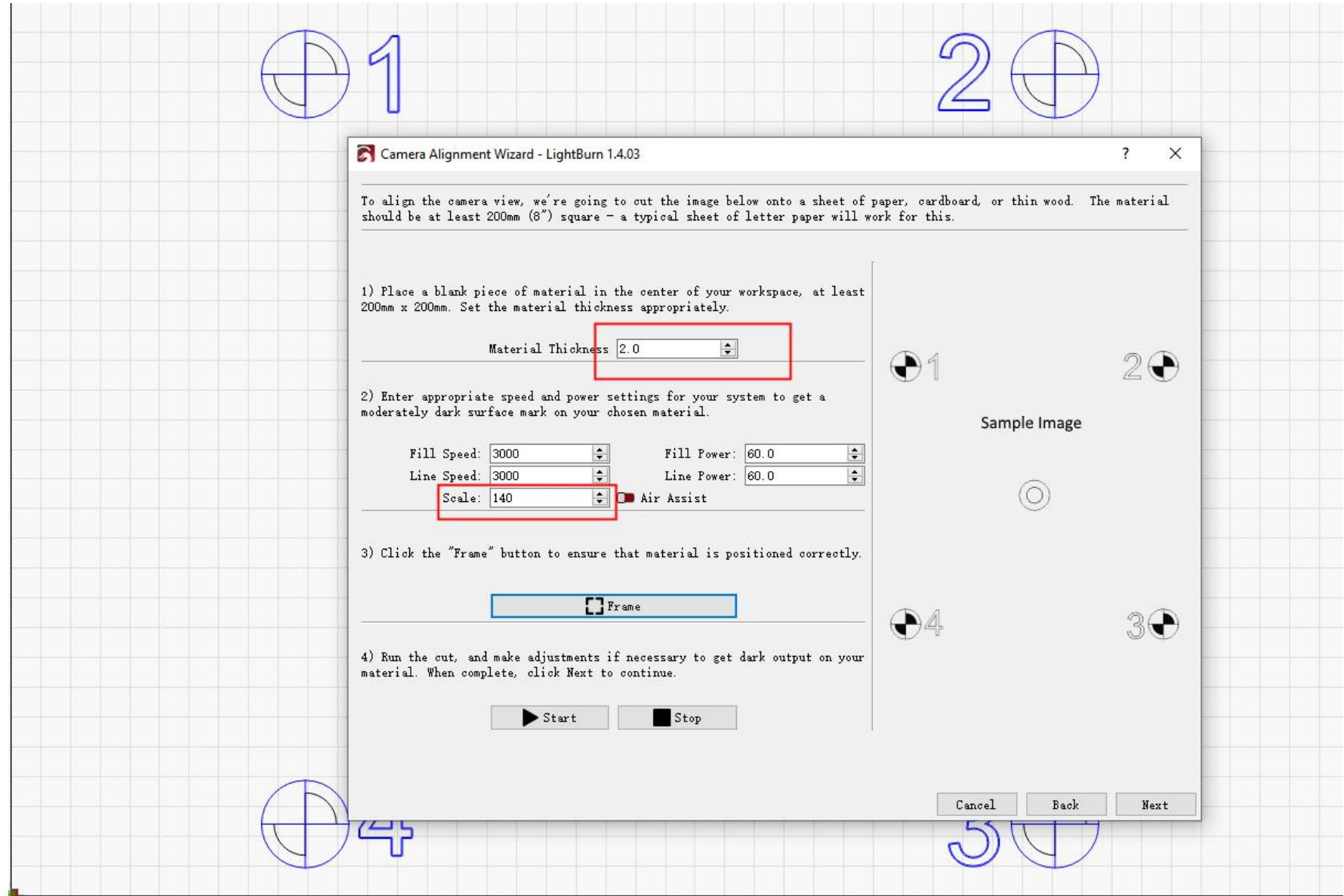


Step2 Alignment

Cutting the Alignment Pattern:

This tool uses your laser to cut a target pattern onto a piece of material, such as card stock, paper, cardboard, or thin wood and asks you to indicate the center of the targets.

Note: Use **Frame** to adjust the border to fit your engraving material



Step2 Alignment

Before Click Start:

1. Place your material in the center of your workplace. The material thickness setting can be ignored if you don't usually use it.
2. Enter appropriate speed and power settings to get a moderately dark mark without burning through. This will vary based on your laser and the material you're using, so we can't provide these for you. On the right side are 2 references
3. Frame the pattern to make sure it's positioned on the material you're using.
4. Run the cut. If it's not dark enough, you can adjust the settings and run it again. When the pattern is clearly visible and easy to see, click "Next".

Plywood:

Fill Speed:	<input type="text" value="3000"/>	Fill Power:	<input type="text" value="60.0"/>
Line Speed:	<input type="text" value="3000"/>	Line Power:	<input type="text" value="60.0"/>
Scale:	<input type="text" value="160"/>	<input type="checkbox"/> Air Assist	

Cardboard:

Fill Speed:	<input type="text" value="12000"/>	Fill Power:	<input type="text" value="45.0"/>
Line Speed:	<input type="text" value="8000"/>	Line Power:	<input type="text" value="45.0"/>
Scale:	<input type="text" value="160"/>	<input type="checkbox"/> Air Assist	

Step2 Alignment

From this screen, you'll capture the alignment image. Use the jog or "send to corner" buttons to move the laser out of the view of the camera. When the camera has a clear view of all four targets, click the Capture button. You should see an undistorted version of the camera view appear in the right side of the window, with all four corner targets visible, as shown left:

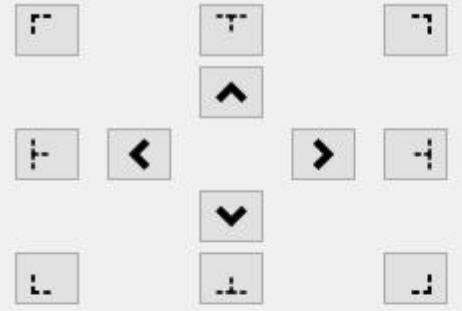
Warning!

Don't move the target marker image after cutting it! The location within the laser is important to make sure the process works correctly.

If your camera is mounted to a moving part of the laser, such as the lid, make sure that before you begin capturing the target marker image, you have the camera in the same position it will be in when you're using it.


Camera Alignment Wizard - LightBurn 1.4.03

1) Use these buttons to jog your laser head to clear it from the camera view



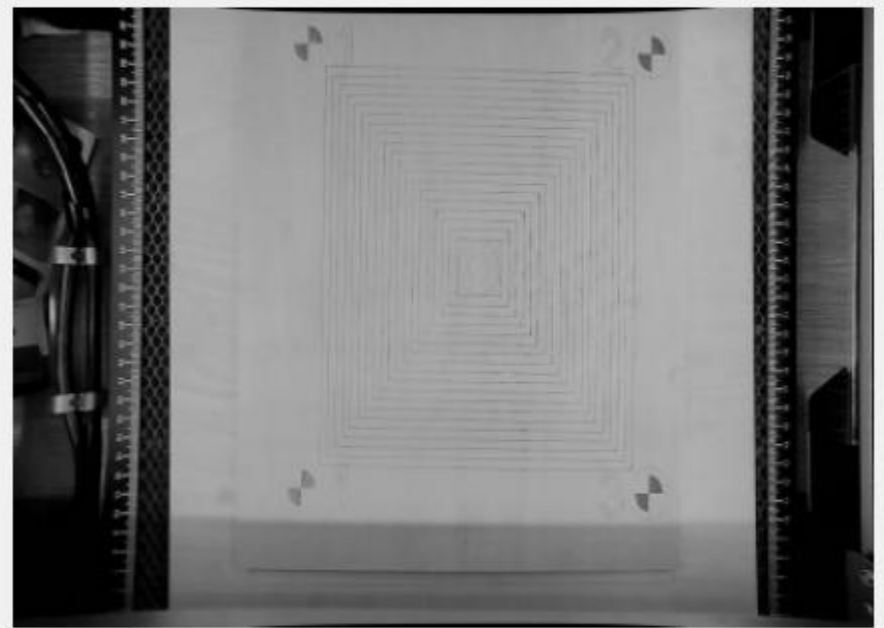
2) Press below to capture the alignment image

Capture Image



3) When the captured image shows all four corners clearly, click Next to continue

If the capture is distorted or incomplete, you may need to run the Lens Calibration wizard.



Cancel Back Next

Step2 Alignment

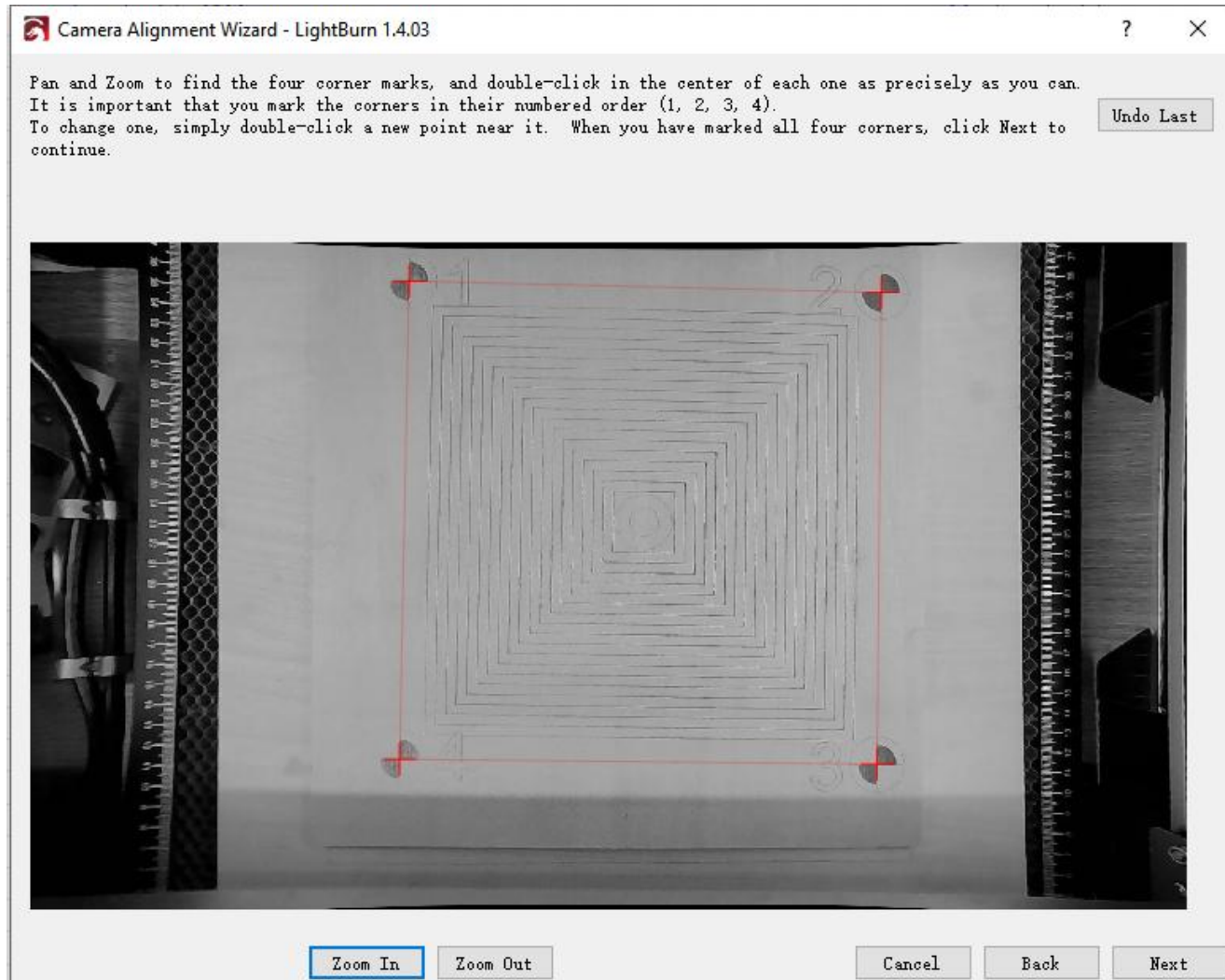
Marking the Targets

On this page you 'tag' each of the targets by double-clicking in the center of each one in order. You can pan and zoom around the image using the same controls as the LightBurn edit and preview windows. When you double-click, a red '+' mark will appear. Place a marker in the center of each of the four targets, in the order they are numbered (1, 2, 3, 4). If you place one incorrectly, you can double click near it to shift it around, or click "Undo Last" to remove it and try again.



Step2 Alignment

When you have placed all four markers in order, zoom back out and verify that all four are visible and clearly centered on the targets, like this:



You're done! Press the Finish button below to exit.

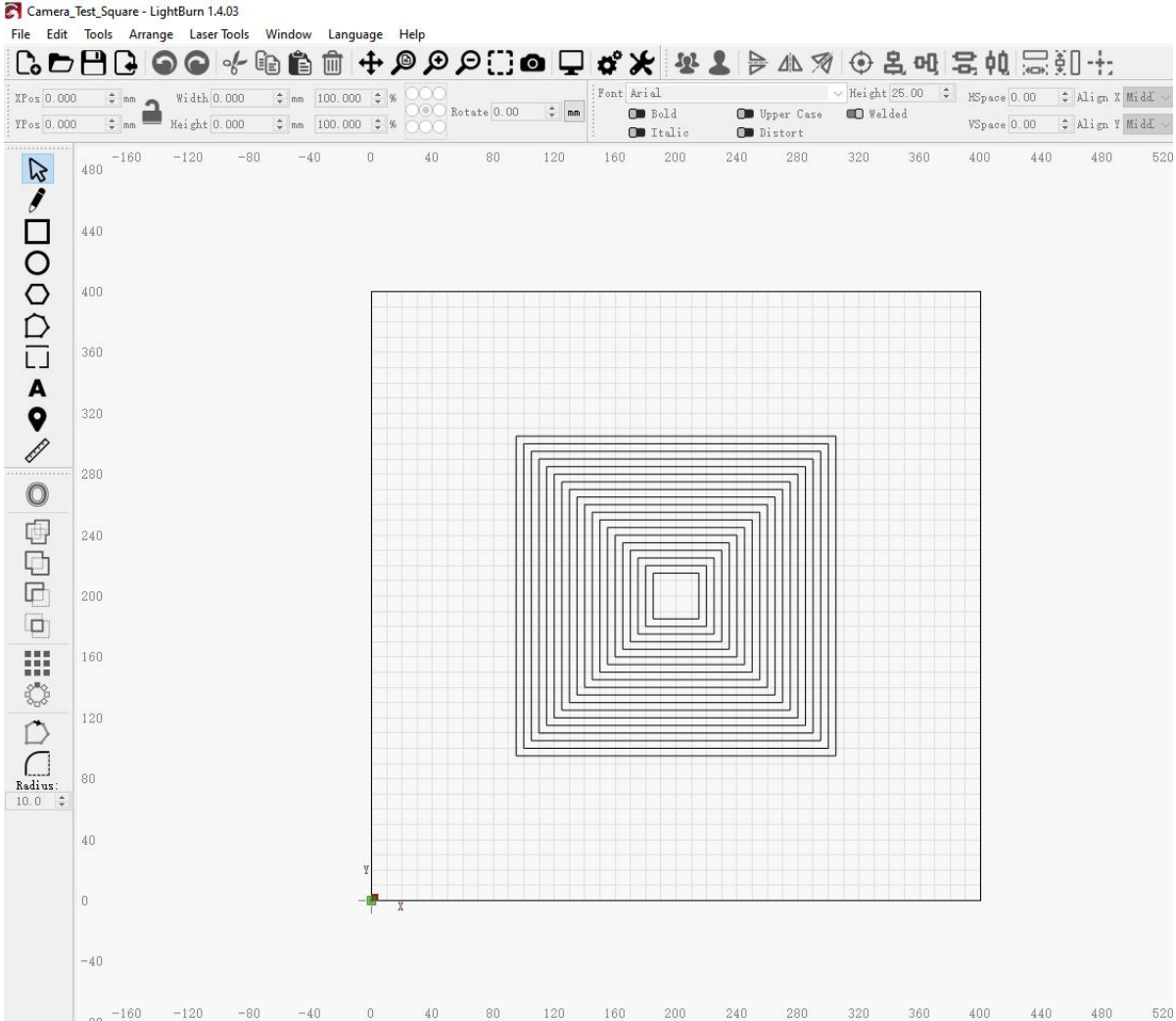
Click Next to finish the marker placement screen and click Finish to complete the process and store the results. You're done!

Step3 Final Fine-tuning

Open the Camera_Test_Square.lbrn2 file in LightBurn, the number of squares can increase with your material size.



Camera_Test_Square.lbrn2



Step3 Final Fine-tuning

Once the carving is complete, click **Update Overlay** to adjust the X and Y offsets so that each line segment overlaps as much as possible, keeping this offset parameter constant.

