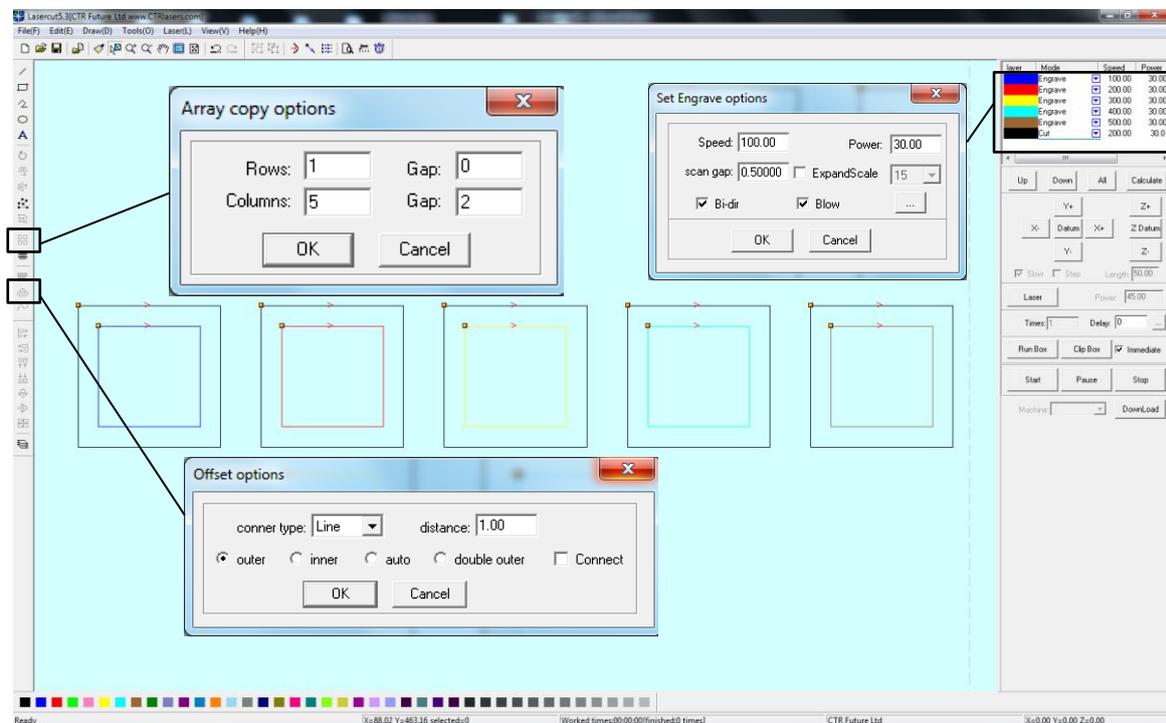


Backlash, Scaling, Offset and Squareness

To edit the backlash, scaling, offset or squareness of your laser machine, please complete the relevant steps. It is advised that this work is only carried out under the recommendation of CTR.

Backlash

The below image shows a layout of the laser software with the different icons and areas you will need to access to carry out the below steps.



1. Draw a 5mm x 5mm square in the laser software.
2. Select the **offset** command (see above image for reference) and set the offset options as follows;
 - Corner type: line
 - Distance: 1.00 (mm)
 - Outer (selected)
3. Highlight both the external and internal boxes with the pick cursor, select the **Array copy** command, and set array copy command options to;
 - Rows: 1
 - Gap: 0
 - Columns: 5
 - Gap: 2

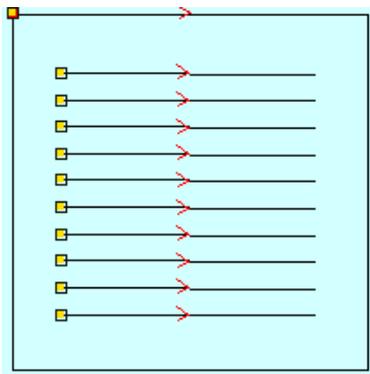
4. Select each internal box in turn and change each of the boxes to a unique line colour (i.e. blue, red, yellow, turquoise, and brown).
5. Select all five external boxes and set them all to the same colour, but making sure the colour isn't the same as any of the internal boxes (i.e. black). Please see the example above for reference.
6. Set all of the internal boxes to **engrave** and the external boxes to **cut**.
7. Select the engrave options and set these to;
 - Speed: 100
 - Power: 30
 - Scan gap: 0.5

For each of the five different engraving colours (for the internal boxes), set each engrave colour to a different speed from 100 to 500, in 100 increments (i.e. 100, 200, 300, 400, 500). The other settings (power / scan gap) remain the same as above.

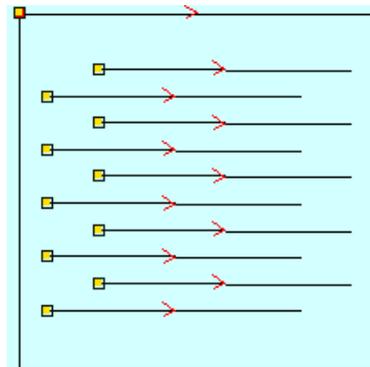
layer	Mode	Speed	Power
Blue	Engrave	100.00	30.00
Red	Engrave	200.00	30.00
Yellow	Engrave	300.00	30.00
Turquoise	Engrave	400.00	30.00
Brown	Engrave	500.00	30.00
Black	Cut	200.00	30.0

8. Download this file to the laser machine and run the file on a piece of scrap material that is suitable for engraving, i.e. wood, acrylic, thick greyboard/card.
9. Check the engraving and make sure that each of the individual lines are correctly positioned (each of the squares line up).

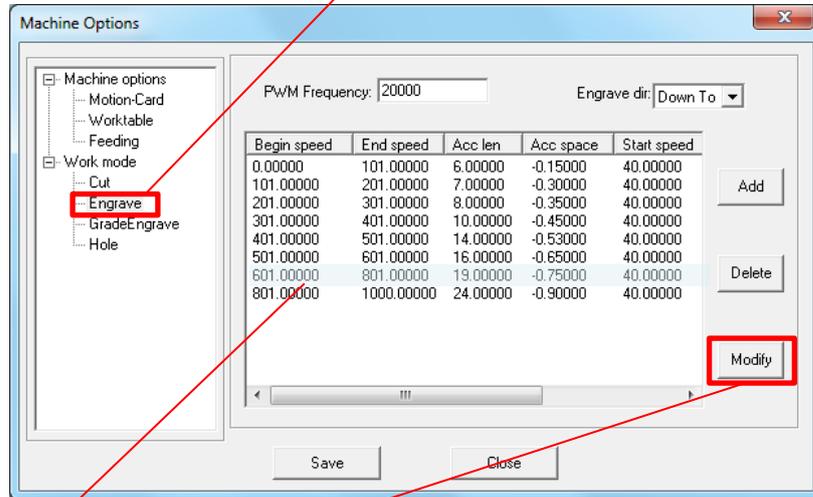
Correct;



Incorrect;

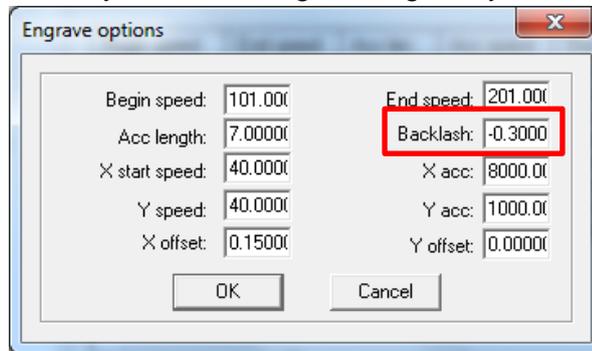


10. If the lines do not line up select **File > Machine Options**. In the machine options window, under Work mode, select **Engrave**.



11. Select the line with the beginning speed that produced the incorrect engraving, and either double click or select **modify** to open the engrave options window for this speed range. (NB: the above is an example only)

12. If the first line was too far right you must change the backlash figure by increasing it in the **Engrave Options** window.
If the first line is too far left you must change this figure by reducing it.

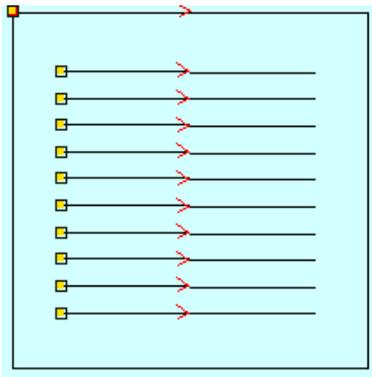


13. Save the changes made to the machine options and re-download the job to the laser machine. Repeat steps 8-12 until the backlash is correct.

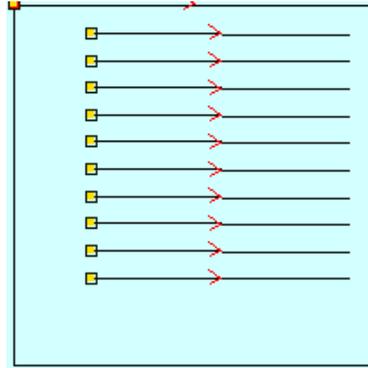
Offset

1. Use the same five boxes, created in steps 1-8 of the Backlash steps above, to check your machine offsets.
2. When you have run the file, check if each internal box has been engraved centrally within the external box.

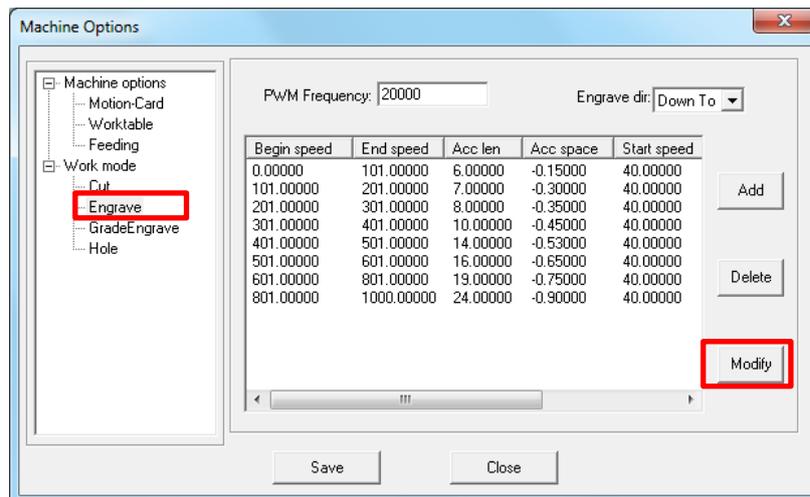
Correct;



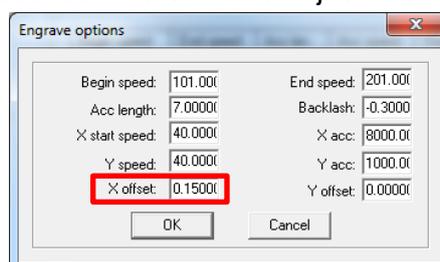
Incorrect;



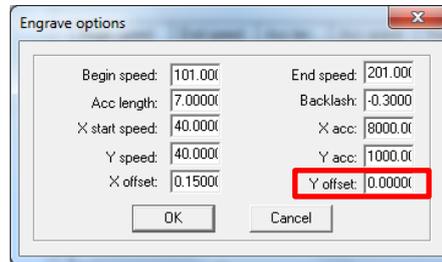
3. If the lines do not line up centrally, select **File > Machine Options**. In the machine options window, under Work mode, select **Engrave**. Select the line with the beginning speed that produced the incorrect engraving, and either double click or select **Modify** to open the engrave options window for this speed range.



4. If the internal box isn't central in the **X axis** adjust this figure;



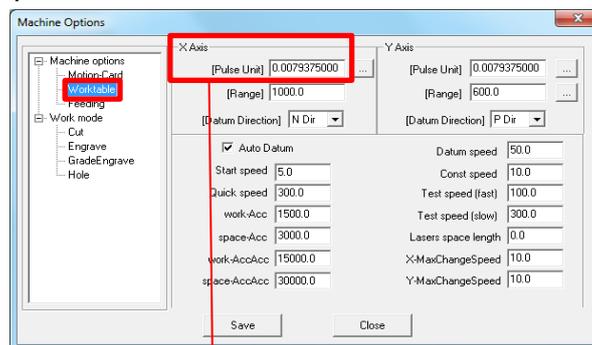
- If it isn't central in the **Y axis** adjust this figure;



- Save the changes made to the machine options and re download the job to the machine. Repeat steps 2 and 3 until offset is correct.

Scaling

- Draw a square 250mm x 250mm and set the laser to cut.
- If you are using a fairly robust material (i.e. acrylic or wood), set the speed to **200** and power to **30**, as you just want a score line (not to cut all the way through the material).
- Download the job to the machine and run the job.
- Measure in both X axis and Y axis to make sure the sizing is 250mm.
- If the sizing is incorrect, select **File > Machine Options**.
In the machine options window, under Work mode, select **Worktable**.



- If the sizing is incorrect in the X axis, change the X Axis Pulse Unit.
Only small changes need to be made!
Typically, the standard pulse unit is **0.0079375000**
This can be modified to **0.0079380000** (for example).



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7. Save the changes made to the machine options and re download the job to the machine.
8. Repeat the above steps until the scaling is correct.

Squareness

1. Using the same 250mm x 250mm square as step 1 of Scaling, measure between the diagonal corners to make sure that the two measurements are the same size.
2. If the measurements are different then loosen the grub screws in rear left drive shaft pulley.
3. Using a set square against the back of the X rail, make sure the X rail is square with the left hand Y rail and re-tighten grub screws in the pulley once this has been corrected.
4. Download job to the laser machine and re-run the test job. Repeat steps 1 to 3 until this is correct.