

### Tool Description

A laser cutter is a machine that uses a laser beam to cut, score or engrave a material by burning it, melting it or vaporizing it away.

They are highly precise and quick.

We have two laser cutters the Universal VLS 4.60 bigger and more powerful (60W) and the VLS 2.30 (30W).

### Bookings

Once inducted, you will be able to book the VLS 4.60 by the hour on our website. Make sure to arrive at least 15min after the beginning of your booking time otherwise someone else will be able to use the machine.

The VLS 2.30 is a first come first serve machine

### Materials

Materials you can work with include woods including laser ply, paper, card, textiles, acrylic or laser rubber. We sell 3mm thick laser ply and recycled acrylic.

You can't use normal plywood (too much glue), MDF or other materials such as PVC or ABS that create toxic fumes when burned. Certain materials will ignite in the laser cutter and will either need special settings or cannot be used at all.

So you should never put any object in the laser cutters if you don't know what they are made of. And always check with a technician before using a new material in the laser cutter.

### Drawing Files

The laser cutters will work with vector based drawing files. These are different to pixel based files created by programs, such as Photoshop, where images are represented by individual pixel colours. Vector files can be scaled or zoomed in without affecting quality.

You can create your vector based drawing files by using software such as Illustrator, Inkscape, or CorelDRAW. You can import files such as .dxf, .dwg, .eps, or .svg on Illustrator and create them from other software including AutoCAD or Rhino.

### Basic Workflow

You will use Illustrator to send your files to the laser cutters own control software called UCP - Universal laser system Control Panel. This software interprets the data from Illustrator to control the laser cutters and is used to set the material and material thickness (as measured by the caliper).

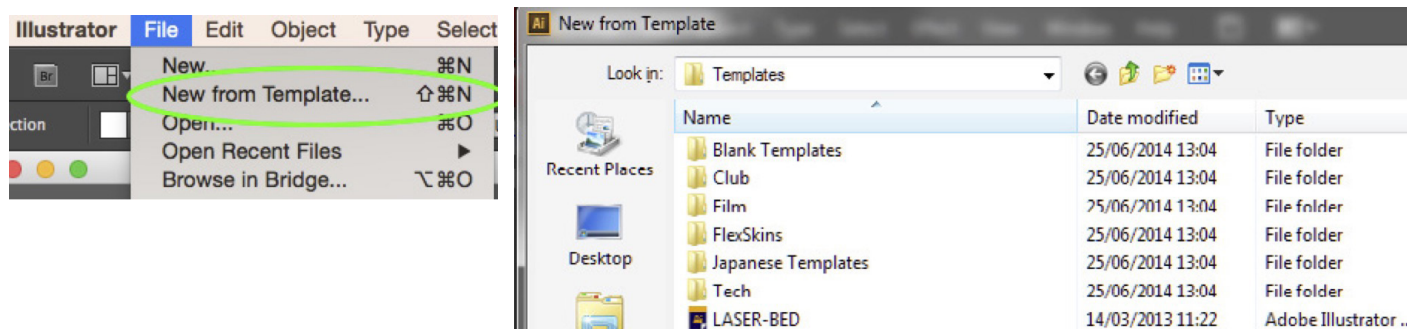
Once the settings are correct for your material and thickness you can turn the extraction on and start the cutting/scoring/engraving.



## New Project

When starting a new project, please remember to go to File -> New from Template and choose the laser bed template.

This will ensure that your project is in RGB colour space and that the size of the artboard is the same as the bed of the laser. If you have already created your design in a document that wasn't started from a template in Illustrator or another software, please copy and paste it from that document into a new template file.



NB: Both template for the big and small laser cutter are available online on our website

## Cut / Score / Engrave

You will use different colours in illustrator to tell the laser cutter what you want it to do.

The laser can cut, score and engrave. Cutting cuts all the way through a material, scoring scores lines into a material without cutting all the way through and engraving takes off an area of the surface of the material.

Cut and Score lines need to have their stroke weight set to 0.001mm.

Cut lines to be RED (R: 255, G: 0, B: 0) and score lines need to be BLUE (R: 0, G: 0, B: 255).

Anything else in your document, that is not a red or blue line of 0.001mm will be engraved.

You can import images or photos for engraving as well.

CUT

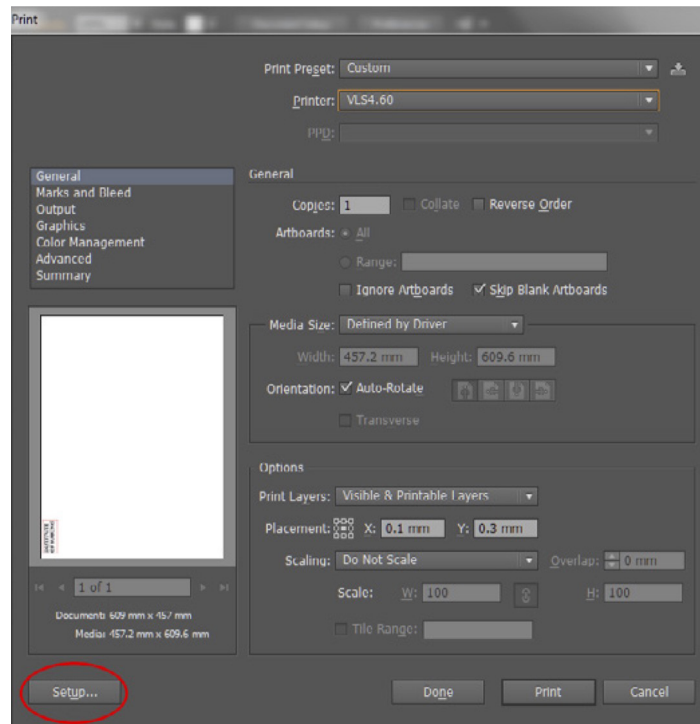
Score

Engrave

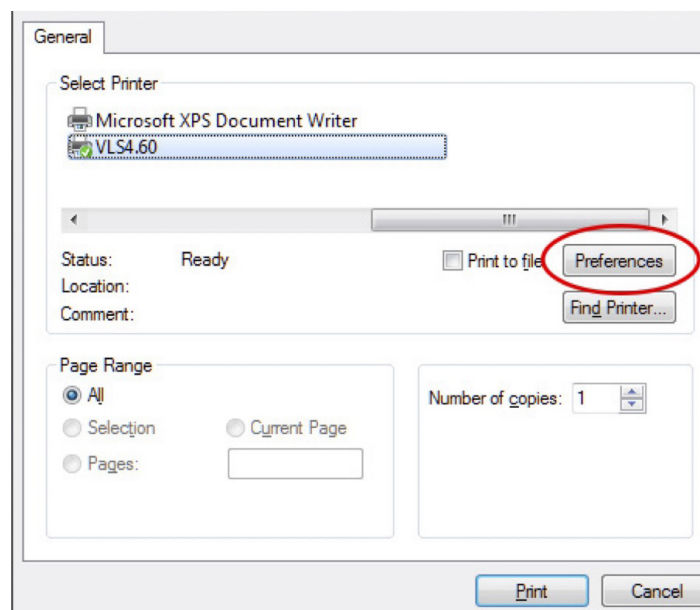
**Send to laser**

The next step is to send your design to the laser cutter. To do this click file print.

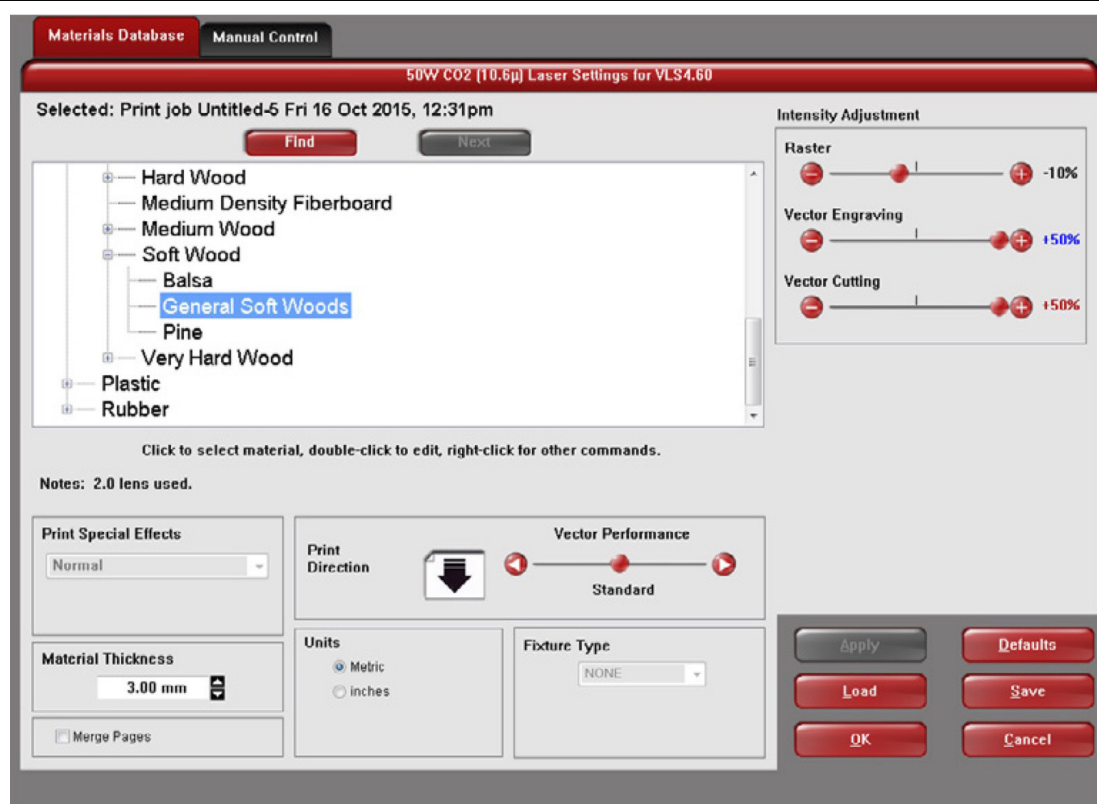
On the first page click setup...



On the second page, click preferences to bring up the laser settings page.



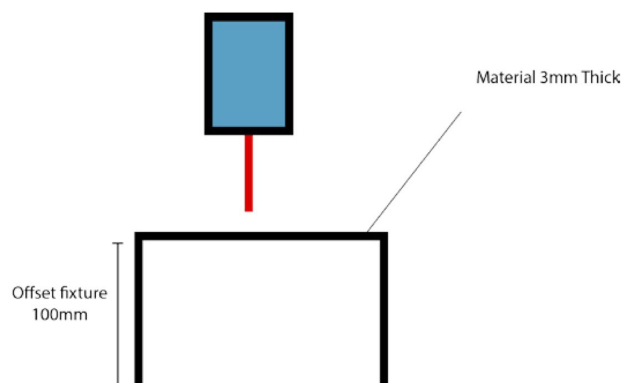
## Laser settings



The laser settings page has a few options for your to configure:

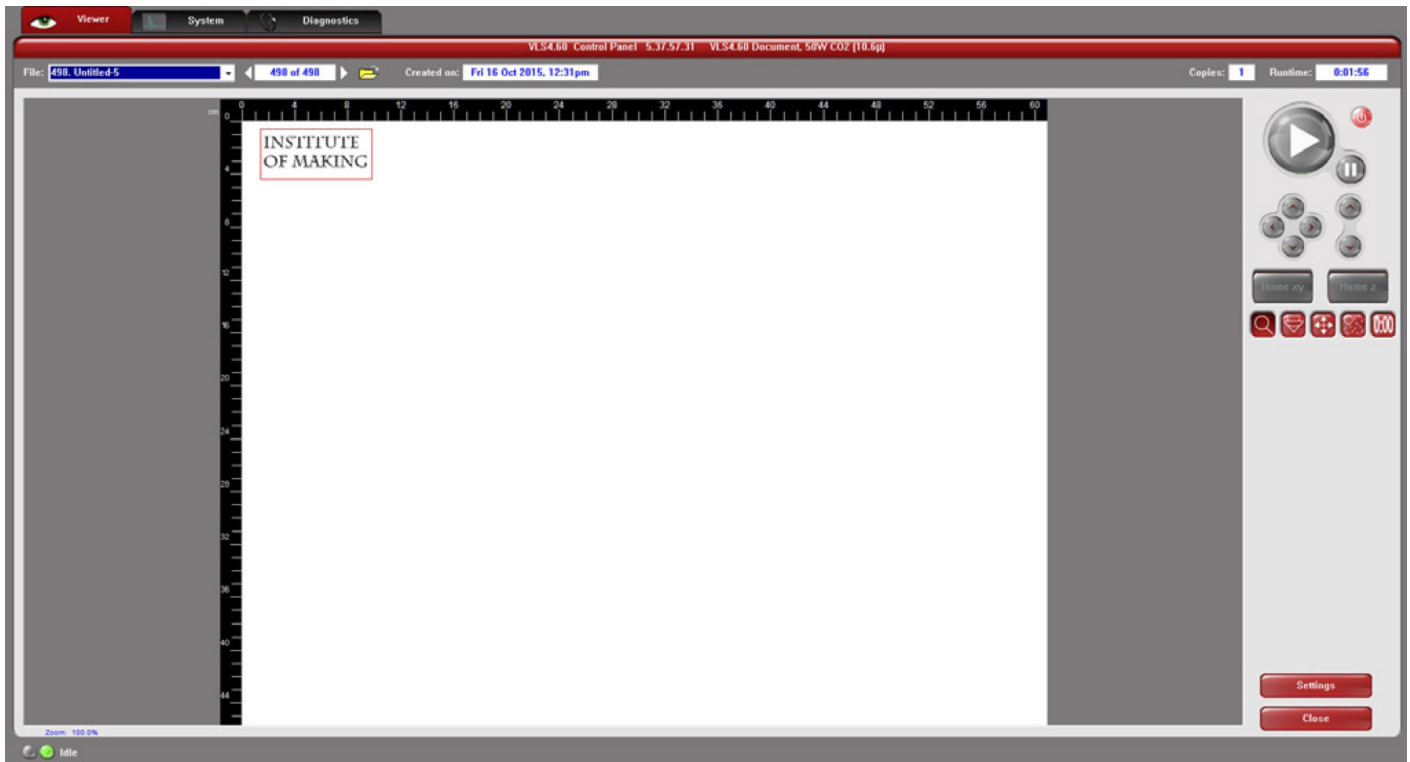
- First chose a material from the list, click the + next to the group names to expand the whole list. If you can't find your material in the list ask a technician for help.
- Then you need to set the Material Thickness. This is the total thickness of your chosen material. It is recommended to use the calipers next to the laser cutter for precision.
- At the top right of the page are three sliders, Raster (Engrave), Vector Engraving (Score) and Vector Cutting (Cut). The sliders change the power settings for the three laser operations. You won't usually need to adjust these presets but if, for example, your job is not cutting all the way through, you could try raising the value for Vector Cutting.
- The final setting on this page is Fixture Type. This setting will offset the whole bed, for example to acomodate a box with a lid. In this situation the offset is the total height of the box minus the thickness of the lid.

In this example the lid is 3mm thick  
the total height is 103mm  
so the offset becomes 100mm.



Once you have finished setting up the material, thickness and other settings, click OK. Then print, and print again on the next page.

To access to the Universal laser system Control Panel, click on the expanding icon at the bottom right of your screen and look for the ULS red square logo.



The laser control software should show a preview of your design. This is a good time to check that you have the correct line weights and colours. The sections that are red or blue should appear in that colour on this preview. If you see lines that are supposed to be red or blue coming up as black or grey please go back to your illustrator file, double check you have it set up right, make any alterations needed and send it to print again.

Explanation of the icons from left to right:



Zoom - Zoom in to inspect an area of your design

Move - Move the design around the bed (it is best to do this in illustrator and resend it to software)

Focus View - Click an area on the screen to move the laser head to that position on the bed.

(please note you need to adjust the bed height down before doing this if there isn't enough space for the laser head to pass over the top of your material)

Multiply - Create copies of your design, again it is best to do this in illustrator.

Estimate time - Estimate how long the job will take.



**Run the Job**

Before you start the machine, please turn on the extraction. For the large laser the extraction is below the screen and have a sensor, for the small laser it is the unit underneath the laser and there is no sensor, so make sure to remember to turn it on.

Then press the play button to start cutting. Pause job by clicking pause button.

Resume the job by clicking the pause button again, if you click play it will start again from the beginning.

**Safety**

- Stay next to the laser cutter at all times while it is running.
- Don't stare directly at the beam.
- Make sure extraction is on and lid is closed before cutting.
- If something catches fire - pause the machine to allow the extraction to extinguish the fire and then alert a member of staff.
- Don't laser cut any of the banned materials, if in doubt please ask! This is for the benefit of your health, that of our staff, and other members.

**Waste**

Please put laser cuttable offcut materials of a decent size in the scraps bin, under the vacuum form machine .

Small unusable acrylic scraps should go in the acrylic recycling bin, located in the opposite corner of the mezzanine to the laser cutters.

**Extra Info**

[Makercase.com](http://Makercase.com): Great free website for generating laser cuttable plans for boxes and other cases.

[Geargenerator.com](http://Geargenerator.com): Cool website that generates laser cuttable gears.

Ask a technician if you want to use our login for this.

[Thingiverse](http://Thingiverse): While mainly for 3d printable files, Thingiverse has a lot of projects you can download and make. This is a good place to get some ideas and learn what is capable on the laser cutter.

[Institute of Making website](http://Institute of Making website): Find all information about our laser cutters (bed size, power, etc.), the bed templates and complete induction sheet under the MakeSpace > Tools > Laser Cutters section.