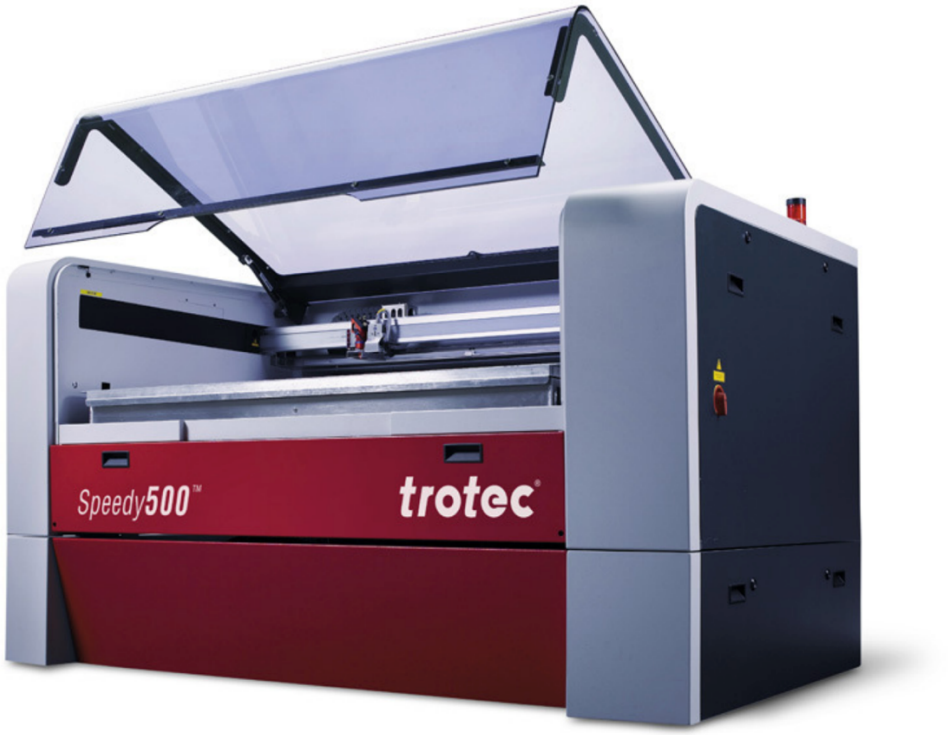
ANU MakerSpace @ SoAD
TROTEC USER GUIDE



¡Save time! Read the SOP!

Before beginning this process make sure your job is suitable for Laser Cutting – 2D designs using materials on the Approved Material List only.**

Using the laser is like sending a job to a printer, but with a few more steps. The laser can carry out cuts, etches and scores using a single Adobe Illustrator file*. In order to ensure the job sends and cuts or etches correctly, we must ensure that the file is set up correctly and that the laser settings we select are correct for the material being processed.

This document is broken down into a workflow of five steps and a troubleshooting section.

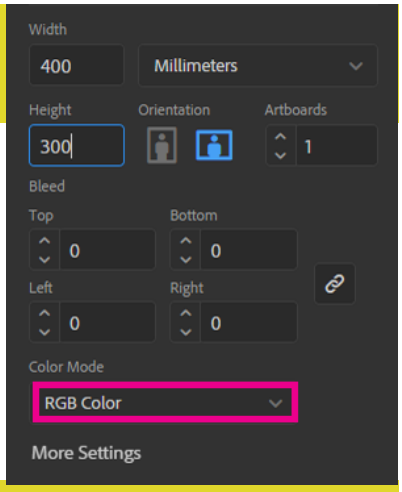
Step 1: Illustrator Set Up
Step 2: Print Dialog
Step 3: Job Control & Preparing/Running the Laser
Step 4: Emergency Shutdown Procedure
Step 5: Maintaining the Laser
Troubleshooting

*You can use other software to design your file such as Inkscape or Corel. However, this is not recommended as files will ultimately be sent to the laser through Adobe Illustrator. If you must use another program use this guide for document/cut/etch parameters and export as PDF.

**If your material is not on the Material lists you MUST submit it for testing by technical staff. Allow 48hrs for testing.

21 September 2020

How to make a file for laser cutting
Step 1: Illustrator Set Up



1. *Create a new document with the following parameters;*
   Max. document size *@SoAD 1200mm W x 700mm H*
   @Physics 800mm W x 500mm H
   Colour Mode *RGB (**not** CMYK)*
2. *File → Save As* *uNumber_projecttitle_versionnumber.ai*
   i.e. u12345678_123DMake_v2.ai

We recommend creating separate cut and etch layers in your file.

File Parameters

You must use the parameters below to transmit cuts and etches to Job Control (JC), the laser cutter software. If your settings are as per below, but are not showing up in JC, check the **Troubleshooting** section at the end of this document, or ask a MakerSpace mentor or staff member. *Note: not all materials have a setting for vector etching – speak to MakerSpace staff if you would like this setting added.*

Raster Etch
images, gradients, filled areas
RGB Black
(0,0,0) or #000000
or Greyscale

Vector Etch
outlines, scoring, partial cuts
RGB Blue
(0,0,255) or #0000FF
0.001mm or 0.025pt

Vector Cut
through cuts
RGB Red
(255,0,0) or #FF0000
0.001mm or 0.025pt

Vectors

- Vector cuts will be performed in the order the lines/shapes are drawn.
- Remove 'fill' from inside cut vector shapes
- Clipping masks will not work on vectors. Trim vectors using the Pathfinder or Scissor (C) tools.

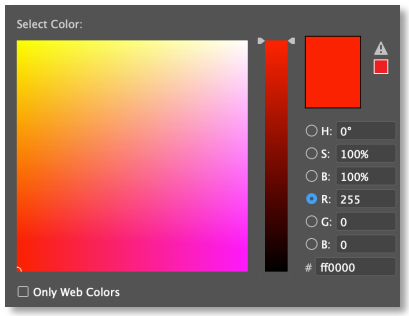
Rasters

- Check the materials library to see what effect you desire for your material and choose the appropriate greyscale tones.
- High contrast B&W images etch best, use Photoshop or similar program to convert images to greyscale and/or change their contrast.

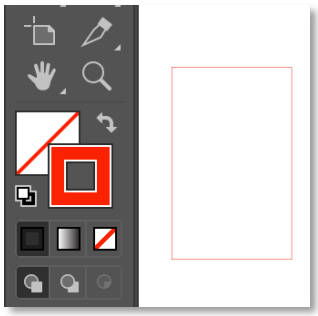
Fonts

- Fonts must be 'Expanded' (Object > Expand) and assigned cut or etch parameters before exporting from personal computers.

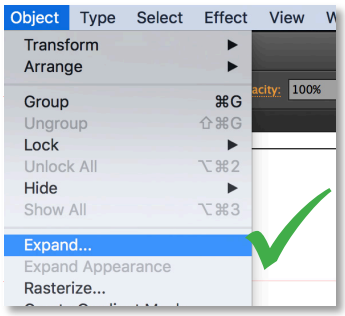
Use an RGB Cyan vector hairline for positioning marks: (0,255,255) or #00FFFF, 0.001mm or 0.025pt



↑ *Select colour*



↑ *Remove fill from vectors*



↑ *Expand text*

If you haven't already, File → Save As uNumber_title_revision.ai (i.e. u12345678_123DMake_v2.ai). Be sure to select 'Include linked files' in the save menu.

How to send a job to the laser cutter
Step 2: Print Dialog

1. *Open your document (AI or PDF) in Adobe Illustrator on the laser cutter computer*

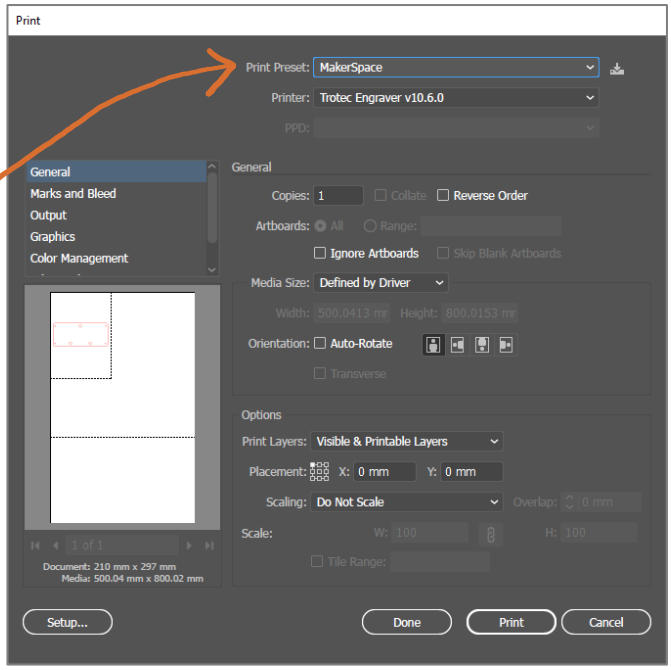
2. *Print (File → Print)*

3. *In the Illustrator print dialog, select the* MakerSpace *'Print Preset', which sets the following:*

   Printer: Trotec Engraver

   Orientation: uncheck AutoRotate

   Placement: X: 0 mm Y: 0 mm



4. *Enter the JC 'Printing Preferences' dialog:*

   Click Setup... → Preferences

5. *In the 'Print' tab:*

   i. *Select your Material Settings*

   ii. *Tick the boxes for:*

   - ☑ Minimise to Jobsize
   - ☑ Enhanced Geometries
   - ☑ Inner geometries first

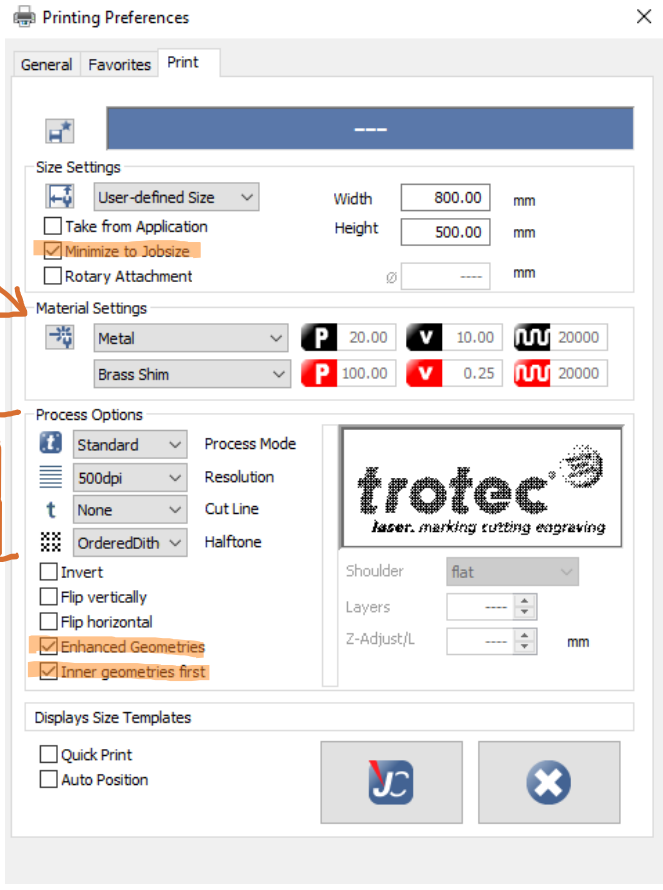
   iii. *Check the Process Options. Our defaults:*

   Process Mode: Standard

   Resolution: 500DPI*

   Halftone: Ordered Dithering

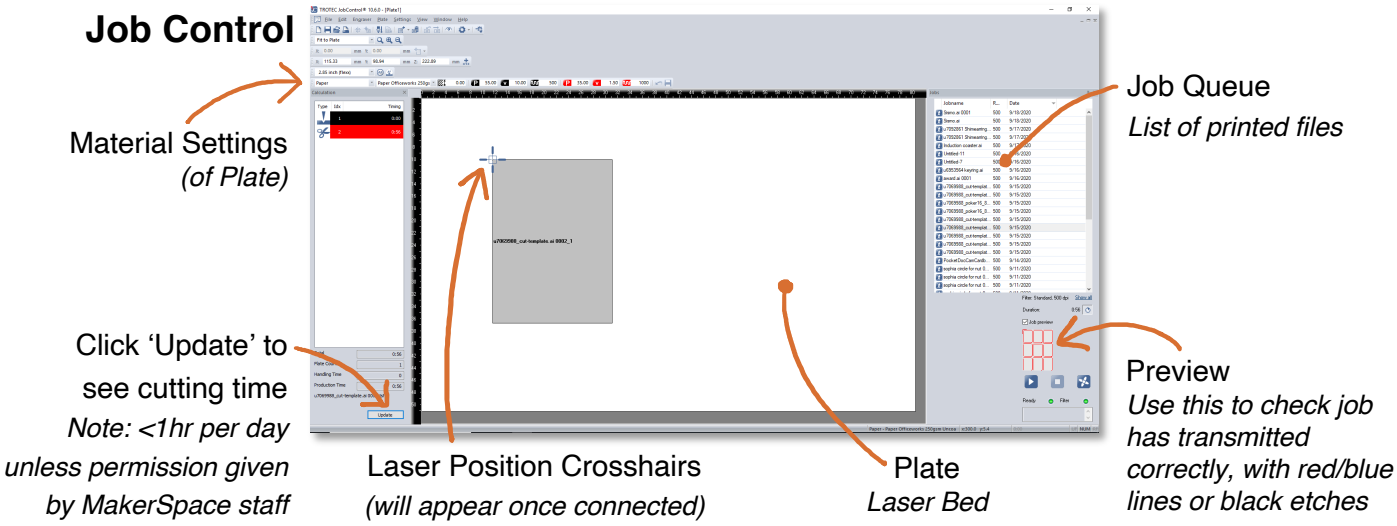
   **Note: Vectors will not transmit below 333 DPI, but higher resolution = longer etching time. Higher isn't necessarily better, particularly on wood. 500DPI is the best option if you're unsure.*



6. *Send your job to JC: Click* JC → Print → Print

7. *Open JC (glowing on the taskbar)*

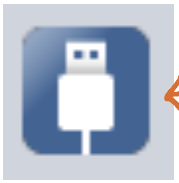
How to run a job on the laser cutter
Step 3: Job Control & Preparing/Running the Laser



If your job does not appear in the Job Queue, or the Preview doesn't show red/blue lines or black etches, refer to the **Troubleshooting** section.

Operating the Laser

1. *Turn on the laser using the key provided.*
2. *Turn on the exhaust by holding down the green button on the wall switch for a couple of seconds. MAKE SURE the green light is ON.*
3. *Ensure the bed is lowered before placing materials in the laser. Smooth the material so that the surface is as level as possible, using the vacuum bed if required.*
4. *FOCUS the laser by positioning the laser dot over your material using the laser keypad. Once positioned manually focus the head using the focusing tool.*
5. *Drag your job from the Job Queue onto the Plate.*
6. *Double check the correct material is selected in JC. You can only use one material per plate.*



7. *Find a MakerSpace laser mentor or staff member who will check your material and settings before enabling your card.*
8. *Click the USB button in JC to connect the computer and laser.*
9. *Move the laser dot over the material to any corner (or the centre) of your planned job position using the keypad. You should see this reflected in real-time crosshairs on JC.*

10. *Drag your job to snap to the crosshairs. Preview your artwork and its relative positioning using the eye symbol in JC.*
11. *Use the laser keypad to move laser head around your job to check for collisions and ensure you don't run out of material.*

12. *Close the laser cutter door.*
13. *Press the 'Play' button to run the machine.*
14. *STAY WITH THE MACHINE while your job is running and be alert for unusual flame or fumes.*
15. *After your job is complete WAIT 1 min for the fumes to clear BEFORE opening the door.*

Notes

- You can run your job again using Ctrl-A → Ctrl-R and then Play. You may also run the cut line again by right clicking and choose "Repeat cut lines". NOTE: This will restart the laser immediately.
- If you are positioning using a jig you can use a job marker to make sure jobs register to this position.

In the event of an emergency
Step 4: Emergency Shutdown Procedures

In the event of a fire or excessive fumes where there is risk of damage to people or equipment, the operator is responsible for shutting down the laser cutter and taking steps to ensure the fire/fumes does not spread.

1. *HIT THE EMERGENCY STOP BUTTON.*
2. *FIRE: TURN OFF THE EXHAUST. Leave the lid closed until you have the extinguisher/fire blanket ready. If the fire is very small (less than 30cm) and can be safely extinguished by smothering it, use the fire blanket. For larger fires use the CO_2 fire extinguisher.*

   EXCESSIVE FUMES: Leave exhaust running. Do not open the lid or resume cutting until you have notified technical staff/mentors.
3. *There should be a MakerSpace staff member/laser mentor nearby at all times. Immediately let them know that there has been an incident, in person, and assist with incident reporting if necessary. They will lock out the machine and follow up with out-of-service procedures. If you think you've broken something or done something wrong, don't be embarrassed! It's more important that you let a staff member know so that the machinery can be reinstated and policy can be updated.*
4. *Let security know. In the event of a fire or risk of serious injury, security staff must be informed.*

User Agreement
Step 5: Honouring the Laser

There is a small list of things we expect of users. Honouring laser maintenance will secure your access to this machine. Failing to honour this list will result in staff disdain, equipment malfunction and revoked access.

- Lower the laser bed before removing full sized or large sheet material.
- Remove all offcuts on the laser bed before leaving the machine.
- Ask a staff or mentor if you need to retrieve any items below the laser bed.
- Alert staff/laser mentors if you are cutting/etching something that produces surface marking leading to the extraction vents. They will perform lens maintenance.
- Contact MakerSpace staff if you notice improper function of the machine.
- Delete your file from the desktop/downloads/JC.
- Turn off the laser using the key and remove your ID card before leaving the MakerSpace.

Stuck?
Troubleshooting

JC Errors & Fixes

“Too many jobs on the plate/job cannot fit on the plate”	Make sure the plate is clear before dropping in additional artwork. Alternatively, your art-board may be too big for JC. Resize to the parameters specified in this document.
“Plate parameters cannot be found”	There are inconsistencies between the plate and your print profile. Place on plate and manually select the material in JC.
Your job is not found in JC print queue	If you have selected an irregular print resolution your print may be hidden in the queue. Select ‘Show all’ below the queue to find the print.
Print-preview or JC displays only etch lines where there should be cuts, or shows as an empty job.	The most common error. Check for document colour settings, cut line colour/stroke weight and clipping masks and print resolution. If that fails, check both your document resolution (File > Document Setup) and print resolution (Illustrator Print dialog > Advanced), if Medium is selected change to High. If that fails, try to paste into another doc and check again. If that fails, ask MakerSpace staff.
The laser will not respond or there are no crosshairs on the JC plate	The laser is not turned on or connected to JC. Use the ‘USB’ shaped button to reconnect.
I can’t see the plate, I can only see my job	You have double clicked your artwork in JC. Press ‘esc’ to return to the plate.
“No jobs to cut”	You need to reset your job (Ctrl-R) before re-running a job.
“No response from laser”. Check if engraver is connected to the correct COM port and switched on.”	Find a laser mentor or technical staff to swipe their access card.

Operational Errors & Fixes

$*$!@!@ lens collision, fire or excessive smoke	Stop the laser using the key shut off. In case of fire open the lid and extinguish. In case of smoke let the extraction run before opening the lid. Contact a MakerSpace staff member before resuming the machine.
Laser not cutting all the way through material	Check the laser is in focus and the material is flat. Run the cut lines again. If problem persists, see MakerSpace staff.
Printer does not home	The lid must be closed as part of the initialisation homing process.
Air-assist is not functioning	Check with MakerSpace staff.
Etches are weaker toward edge of the material.	Check with MakerSpace staff.
I need to be more precise about my job placement. How can I achieve this?	In Illustrator, use positioning marks (RGB Cyan, 0.001mm hairline vector), then in JC use the job X/Y coordinates or use drag-down rulers (the laser bed must be correctly placed to use this feature accurately). You can also place job markers to save job positions.