

Fab Lab Laser Cutter Course Structure

Type: Training

Safety and basic instruction. These are mandatory for using a particular piece or set of equipment at Fab Lab and will entail hands-on learning with small group instruction.

Learn how to use a laser cutter to cut, etch, and engrave designs in a variety of materials up to 28" x 17" and up to 3/8" thick in this Safety and Basic Use (SBU) class. Work with acrylic, wood, paper, cardboard, fabric, leather, and even chocolate! Using graphics software like Adobe Illustrator or CorelDRAW, cut intricate designs and engrave highly detailed images at the touch of a button. The sky is the limit with this simple and versatile tool.

Project:

Prerequisite(s): None. However, familiarity with graphics software will be helpful

Equipment access: Laser cutter

Minimum age: 12

Supervision requirements: During class, all 12- to 15-year-old students must be accompanied by a parent or guardian who is also enrolled in the class.

When using the laser cutter outside of class time, 12- to 15-year-old members must be accompanied and supervised by a parent or guardian who has passed the SBU.

Safety: Closed-toed shoes are mandatory.

It must be purchased in advance, and is non-refundable.

Once you take and successfully pass this class, you can use this equipment for your projects whenever you work at Fab Lab as a member!

Course Structure:

LASER SERIES: Laser Cutting and Etching Safety and Basic Use

Course Synopsis

In this Safety and Basic Use class (SBU), you will learn how to safely use the

Laser Cutter/Etcher/Engraver to cut a shape out of acrylic. What you learn about the process for this material can be applied to any other materials you may use in the Laser Cutter.

This class is taught in a highly interactive fashion. Your eager participation makes it easier for the instructor to tell if you understand the concepts and feel comfortable around this machine. Our goal is for you to come back and use the lasers confidently on your own. If you have any questions about anything pertaining to safety and basic usage, please ask.

Time Required: 2 Hours

Tools Required (most provided by FabLab)

Trotec Cutter

Computer with CorelDraw

Ruler (or tape measure)

Note taking paper and pen/pencil (bring with you)

Materials Required for Class (provided by FabLab)

Material to cut and etch/engrave

Materials to bring when you use the Laser Cutter as a FabLab Member

Your Laser SBU Notes!

Your material to cut or etch/engrave

Notebook to record results/parameters for next time

Ruler or tape measure

Washers or coins to weigh down light materials

SAFETY

General Safety

- ◇ Eye protection is required when working with anything that might get into your eyes, like metal shards, chemicals, sawdust
- ◇ Closed-toe shoes must be worn at all times
- ◇ Long sleeved shirts should be worn when working with chemicals, short sleeved shirts should be worn for anything with a rotary motor (saws, mills, lathes, etc.)
- ◇ Never leave a machine running and unattended

Shop Etiquette

- ◇ Never talk to anyone while they are working with a piece of equipment
- ◇ Leave the area you are working in cleaner than when you arrived
- ◇ Begin final clean-up and store your project no later than 11:30 pm

Equipment Specific Safety

◇ Laser Mantra –

o ALWAYS WATCH YOUR WORK!

o OPEN THE LID if you see a fire.

o BLOW IT OUT if the fire keeps burning.

o DON'T USE Auto Focus.

◇ You can cause great harm to yourself and burn the building down with these machines. If you follow the safety rules, the chance of you causing this should be close to zero

◇ These lasers affect your material by heating it. Your job can change in seconds with the accumulation of energy – HEAT – in your material.

ALWAYS MONITOR YOUR LASING JOB! NEVER leave the room while your job is running.

◇ Some materials, like wood, are burned in order to achieve an etch or cut. Some materials, like acrylic change their chemical structure. In all cases, some light may be visible. This light at the point of lasing may be ok as long as it stays with the motion of the laser. If a flame appears while the laser is in operation, stop your job and try again with lower heat settings.

◇ Each FabLab laser cutter is a finely calibrated piece of machinery.

Please close the lids quietly and do not push or jar the machines at any time. Do not lean on or press on the tray. BE SURE the edge guards are in the down position before operating.

Trotec Speedy300 Lasers at FabLab

A laser cutter is used to etch, engrave, or cut a variety of materials. Be sure to see the approved and unapproved lists of materials for the laser cutter before purchasing or working with the material in the laser cutter.

At FabLab we have Trotec lasers with 74cm x 44cm tables.



Your Laser SBU class will follow this high level outline:

1. Demo
2. Tour
3. Safety
 - A. Fire
 - B. Materials
 - C. Machine
4. Cut and Etch
5. Laser Safety and Basic Use (SBU) Signoff Sheet
6. Key Tag Project
7. What to do when you come back
8. Checklist
9. Parameter Setting Recommendations
10. CorelDraw Help
11. Cleanup

Demo

- a. Raster vs Vector

The laser is a printer that prints with heat. It first prints all your raster data, similar to an ink jet printer that prints with ink, putting down “dots of heat” instead of ink. It then moves like a plotter and follows your vector paths to draw or carve them into your material.

Raster data is made of pixels. File types of jpg, gif, png, and bmp are all examples of raster data. Images that come from your camera or scanner are also raster data. The laser varies the amount of heat delivered for each pixel, resulting in what looks like a photo burned into your material.

Vector data is expressed via equations. Straight lines, circles, rectangles, splines, hand drawn squiggly curves are all examples of vector data.

The above is true from the perspective of software applications that handle vector and raster data. The laser treats the data slightly differently.

For the laser, all data is treated as raster data except for vector data that also has a line thickness of “hairline”. “Hairline” is the smallest non-zero value possible for vectors in CorelDraw, which is the main application used to send files to the lasers. If you develop your artwork in another application, choose the smallest non-zero thickness available and your data will typically import into CorelDraw as hairline thickness.

Just because you’re using vector data doesn’t mean you must cut through. You can score cardboard to mark the fold lines to make it into a box. Conversely, just because you’re using raster data doesn’t mean you can’t etch through.

Each method has the capacity to produce a fire. Always watch your work!

b. Turn off laser beam

There are two ways to stop the machine – one for convenience and one for emergency.

i. Stop/pause button

WAIT for the machine to stop before you leave it

This method does not stop the laser immediately.

Use this method for convenience when you have to leave the room and want to just pause your job.

ii. Lift Lid

Use this method if there is a fire. This immediately turns off the laser beam but it does not stop the motion of the X/Y table.

c. Make sure exhaust fan is on

The fan should always be on. Do not turn the fan off.

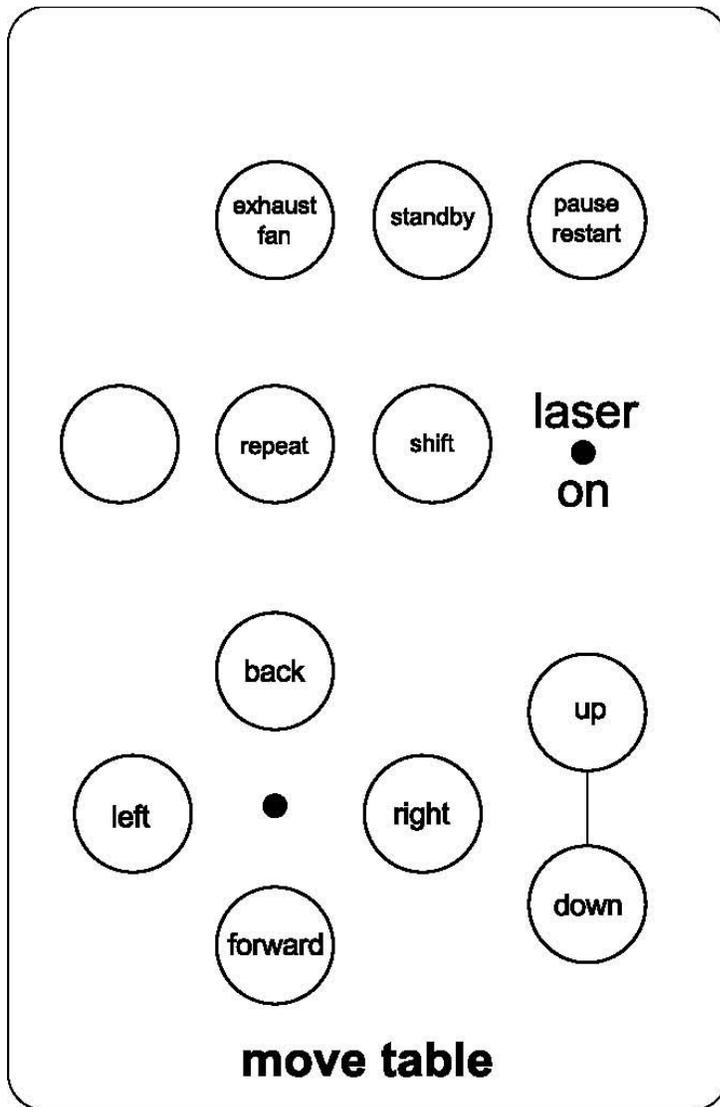
The FabLab laser cutter is connected to an exhaust fan system to remove toxic fumes. For your safety,

always make sure the fan is running when operating the laser cutter. It has a separate on/off switch from the laser machines and must be turned on independently.

Tour

The Trotec cutter is controlled by software and is installed as a printing device.

This is the front panel of the laser cutter:



LED status

solid: paused/data ready

slow flash: ready

fast flash: cover open

The Up and Down arrows move the bed up and down to set the focus. They are not accessible when you are not in Focus mode.

d. Reservation cleanup

The user before you had to do the following, which explains why the machine and the room are in the state they are for you. See next section for detailed instructions on each step.

- i. Vacuum up debris from metal bay to remove this fire hazard
- ii. Check the lens; if dirty, let staff know
- iii. Leave laser on, open, in focus mode
- iv. Leave exhaust fan on

e. Reservation setup

Be careful when moving parts and material around in the laser. The laser is a finely calibrated machine. Bumping parts can knock it out of alignment for you and everyone after you resulting in less precise cuts and etches and possibly ruined projects.

- v. Vacuum up debris from metal bay to remove this fire hazard
Always ensure you start with a clean machine.
- vi. Take table from bag and insert into laser. Be sure to flip the three straight edges down after inserting the table.

1. Lower the bed to be able to remove the tray (this is FAR easier than trying to lift them by the front edge).
2. The bottom of the tray has registration that aligns with the frame on the bottom of the bed. The tray should not be flush with the edge of the machine if it's properly registered.
3. Put the tray in, back edge first. If necessary, push back and down gently so it sits properly and avoids hitting the focus head.

- i. Place your material on laser table
 - ii. Focus laser onto top surface of your material
- Perform these steps in the following order to ensure that you DO NOT bump the lens assembly with your material or with the laser table:

1. Set the focus tool on the slight shelf of the laser carriage.
2. Place your material under the focus gauge.
3. Bring the table up to just about the height of the bottom of the focus tool and then slowly tap the height closer and closer until the focus tool just falls off.
4. Remove the focus gauge from the bed after you have set the focus.

Design work is not permitted at the laser computers. These computers are

provided for running laser jobs. Complete the work on a separate computer and transfer your work to a thumb drive to access on the PC.

2. Safety

a. Fire Safety

Always watch your work, no matter how long your job takes. The danger of fire is ever present. If you need to leave, you **MUST** either pause the job or get a qualified person to monitor your job for you.

Remember: you could be in this room while someone else is carelessly lasing and have to deal with their fire. Do not put yourself or your fellow FabLab members in that situation. If you see that someone else has left their running laser job, then for the safety of everyone in the building, stop the laser and bring it to the attention of FabLab staff.

You should always expect that your material could present you with a few birthday candles' worth of flame at any time and you need to be prepared for that. Your material can also heat up or move or change state in ways you cannot predict.

i. Small fire

If you see a small fire or more than one flash flame in 15 seconds, you must:

1. Open the lid

This may be enough to put the fire out. If not -

2. Blow it out

ii. Larger fire

If you see a slightly larger fire still contained within the laser but such that opening the lid may burn you, do the following:

1. Alert FabLab staff
2. Pull the fire alarm or use your voice to alert people
3. Apply the fire extinguisher to the front grill air intake
4. Turn the machine off

iii. Even larger fires

1. Alert FabLab staff
2. Pull the fire alarm or use your voice to alert people
3. Evacuate everyone from the laser room and close the door
4. Call 911
5. Evacuate the building

Use wise judgment and common sense when responding to a fire.

b. Materials Safety

i. Permitted materials

Start with clean material on the Approved Materials List.
Avoid any toxic or flammable coatings on your materials.

Laser Approved Materials List

MATERIAL ENGRAVE/ETCH CUT

Wood YES YES

Wood Veneer YES YES

Acrylic YES YES

Delrin (hard plastic) YES Only if it's thin enough

Melamine YES YES

Mylar YES YES

Corian YES YES

Rubber YES YES

Glass YES NO - cannot cut glass

Ceramic YES NO - cannot cut ceramic

Tile YES NO - cannot cut glass

Marble YES NO - cannot cut marble

Coated Metals YES NO - cannot cut metals

Anodized Aluminum YES NO - cannot cut metals

Painted Metals YES NO - cannot cut metals

Cloth of natural fibers YES YES

Leather YES YES

Matte Board YES YES

Paper YES YES

Pressboard YES YES

Cork YES YES

Chocolate YES NO - it just melts onto the metal bed

Pumpkin YES NO - too much water in pumpkin to be effective

ii. Prohibited materials

Laser Unapproved Materials

PVC

Contains chlorine, will produce hydrogen chloride gas and can harm your body and the machine's optics!

Vinyl

Contains chlorine, will produce hydrogen chloride gas and can harm your body and the machine's optics!

PVC Foams

Contains chlorine, will produce hydrogen chloride gas and can harm your body and the machine's optics!

Foam Core

Modern foam core is usually made of PVC, so it contains chlorine, will produce hydrogen chloride gas; it also risks a flash fire

Styrofoam

Can flash fire

Polycarbonate or PETG

Does not cut. Many stores sell both polycarbonate and acrylic. Be Careful!

Read your label. Lexan is a trade name for polycarbonate. Plexiglas is a trade name for acrylic.

ABS Gives off hydrogen cyanide polymer clay Contains pvc.

Fiberglass Get

approval from FabLab staff

Metals

The laser cutter will not cut metals but you can etch anodized metals.

iii. Materials that are not on either list

1. Get approval from FabLab staff person

2. Increase your chances of getting this approval by:

a. Buying from a reputable source

b. Having the corresponding MSDS with you

Do not laser anything that is not on the Approved Materials List or has not been permitted by FabLab staff.

c. Machine Safety

i. Vacuum cut off bits

ii. Check lens

iii. Don't use auto focus

Do not use auto focus, DO NOT USE AUTO FOCUS, DO NOT USE AUTO FOCUS!!!

It can fail and then the machine is unusable for hours or days until external support fixes it.

Cut and Etch

For this class, you will be given paperboard, and you will send artwork to the laser cutter to cut and etch on the paperboard. Each person will take a turn to improve the previous person's job. In this way, you will see a number of ways to mark your material. You can then apply these techniques to your own materials.

If you have ANY questions about any operation or task, be sure to ask your instructor or another FabLab staff member before proceeding.

- a. Make simple art in CorelDraw including:
 - i. Make two ovals
 - 1. Set the large one to “hairline” outline thickness
 - 2. Set the small one to 3pt outline thicknessThis will show the difference between hairline and NOT hairline as well as how smoothly this laser can cut curves.
 - ii. Make two hand drawn curves with the pen tool
 - 1. Set the top one to “hairline” outline thickness
 - 2. Set the lower one to .5 pt outline thicknessThis will show the difference between the thinnest rastered line and a vector line.
 - iii. Make a small letter “H” to cut out
Show a tiny cutout piece.
 - iv. Draw a rectangle with no outline and a Fountain Fill (gradient) with Light Orange
Show how laser handles color.
- b. Setup first job with draft parameters:
 - i. Draft DPI
 - ii. Choose Combined
 - iii. Raster Speed
 - iv. Raster Power
 - v. Vector Speed
 - vi. Vector Power
 - vii. Frequency – follow the chart
 - viii. Auto focus – DO NOT USE!!

Take the Laser Advanced Booster to learn more about these and other parameters.

When using the Speed and Power Recommendations, it is best to start at the low end of the heat spectrum, with high speed and low power. You are less likely to have a fire situation, and it causes much less duty cycle on the laser tube, which will ultimately cause the laser to run better for longer.

Slower speed increases heat. Think of the candle analogy. If you slowly pass your hand across the flame, your hand will receive more heat than if you pass it across more quickly.

- c. Send and run job
 - i. Laser is ready to receive a job if it says “Job:” on the panel.
Press “Reset” button if needed.
 - ii. Send job to “printer” – user must press “Go” button to run

- job.
- d. Each person takes turn improving parameters and running job
 - i. Hone in on dpi first.
Dpi affects the heat delivered to raster art. You can cause a fire JUST BY increasing your dpi for raster art.
Dpi also affects vector art but only in the quality of the vector, not in depth of cut.
 - ii. Hone in on power and speed
Start at low heat settings; increase power in small increments per trial. If you reach 90% power and still don't have the effects you want, decrease the speed in small increments per trial run.
 - e. Last two people experience flames and manage them by opening the lid when appropriate.

Review max behavior for pushing machine

3. Laser SBU Signoff Sheet

I will always watch my work.

I will open the lid if I have more than one flash flame in a 15 second period.

I will blow it out if the fire continues to burn.

I will not allow any continuous flame to keep burning.

I will not use more heat than is necessary to accomplish my cut or etch job.

I will not use auto-focus.

I will not put any prohibited items in the laser.

I will get the agreement from FabLab staff before putting any material in the laser that is not on the Laser Approved Materials list.

I understand that if I leave the machine unattended while it is running, at a minimum I have no recourse if I find my job has been stopped. I may even lose my membership.

If I am in doubt about the use of the laser cutter/etcher, I will ask FabLab staff for help.

I have received a copy of the Laser Quick Guide and I will bring it with me and refer to it when using the Laser Cutter/Etcher at FabLab.

I will treat the Laser tray and all other Laser equipment with GREAT CARE, not leaning on the tray nor running the focus into the tray.

Laser Focus Tool Project

For this project, each student will create a laser focus tool from a piece of acrylic.

If you have ANY questions about any operation or task, be sure to ask your instructor or another FabLab staff member before proceeding.

Preparing for this project

For this project after class, you may change the text in the file provided but in the interests of time, please do not change the font or incorporate graphics.

Locate and open the CorelDraw file named trotec-keypad-2-export.eps

Use your USB drive to take your finished work to the Laser Cutter (don't forget to reserve time via the front desk, the laser cutters are in very high demand).

a. Prepare the computer.

The computer is normally on and should be left on. Make sure the monitor is also on.

b. Turn on the laser cutter.

The On/Off switch for the laser cutters is on the left side of the machine.

c. Make sure the exhaust fan is running

If it is not running, turn it on. This exhaust fan is external to the laser.

Both the laser and the exhaust fan must be on before running your job.

d. Check the lens

A dirty lens can affect your power settings significantly and can also be a source of fire. If dirty, alert FabLab staff so they may clean it.

e. Check the metal bay for debris

f. Place the piece of acrylic at the upper left corner of the grid. BE SURE to use only approved materials

g. Set the focus manually

h. From the File Menu, choose Print. The Print window will appear.

i. Click the Properties button on the Print window.

j. Set the preferences to 5mm acrylic

k. **The Piece Size is 8 x 4**, which is the size overall of the jig. Be sure to set this or else the laser will print your file in the middle of the table.

l. Click OK to accept the new Properties you have just set.

m. Click Print to print this job.

4. What to do when you come back

a. Attach your USB thumb drive to the computer.

b. Launch CorelDraw on the computer. This resets all parameters to their default settings.

c. Bring in your file:

From the File menu, choose Open, locate your thumb drive and select your file. Click Open.

Some common file formats for carrying raster data are .JPG, .GIF, .PNG

Some common file formats for carrying both raster and vector data are .DXF, .DWG, .EPS, .PDF, .SVG

d. Set the parameters:

- i. From the File menu, choose Print. The laser will show up as a printer.
- ii. Click the Properties button. The Properties window will appear:
- iii. Set the following for this job, using the chart on page 12 as starting place:

5. Piece size should be set to your document dimensions:

a. To change the size of your document, at the top of the screen type in the vertical and horizontal dimensions and make sure to press Enter to set the new dimensions.

HINT: If you are in your document with no objects selected, the x and y size of it will be displayed on the top line of CorelDRAW. Type these numbers in for the Horizontal and Vertical Piece Size:

Vector parameters will be applied to every object in your data file that has the attribute of "Hairline". Remember – just because you might think of it as vector, if it does not have the attribute of "Hairline", it will not be cut; it will be etched instead.

Raster parameters will be applied to everything else. Think of Raster as a photo or GIF, JPG, BMP – pixel-based. Raster will account for gray-scale or colors. Lighter colors and lighter gray scale will receive less laser energy.

Consult the documentation posted on the wall in the Laser Room or this handout to determine what speed and power settings might work for your material. Remember, these are just a starting place, you will need to experiment.

IMPORTANT NOTE: Some experimentation will be required to get the desired result. Start at a lower energy level and work up to find your sweet spot. Always bring extra scrap material with you that is identical in quality to what you want to finally lase. Use this scrap to test and verify that the machine and your material are behaving as you expect.

2. Print the job

a. Click the Print button on the Print screen.

COOL LINKS

www.EpilogLaser.com/tech_library.htm has great technical info and projects

for use with the Trotec.

www.epiloglaser.com/sample_club.htm has great projects for the laser Cutter.

www.laserbits.com offers laser specific materials for etching and cutting.

www.instructables.com offers many projects that would be suitable for the laser cutter.

WHAT'S NEXT?

After successfully completing this Laser Cutter Training, consider taking a Booster to get up and running faster!

- Special materials
- CorelDraw like a pro
-

Trotec 300 laser cutter Quick Guide

This **Quick Guide to the Trotec Speedy 300** laser cutting and engraving machine provides a summary of the main features and functions and should be used alongside the *Approved Materials List*. This is not a replacement for the operation manual that can be found at: <http://www.troteclaser.com/en-US/Support/Documents/Speedy-300-Manual-EN.pdf>



Before using the equipment for the first time you must have attended the fablab London Laser Cutter Training course and read and understood the manufacturer's Operation Manual, in particular the "Safety" section.

Damage to persons and/or material can result from not following the instructions. You can also save yourself a lot of time, material and money by doing it right first time !

Rules of use

- Do not leave the laser cutter unattended when switched on, to prevent risk of fire.
- The extractor should switch on automatically during operation. If the extractor fails to start, pause your job and seek advice from a member of the fablab team.
- Some materials can ignite or produce harmful and invisible by products when heated. Only materials listed on the fablab London **Approved Materials List** can be used with the Equipment. If you are not sure ask a member of the fablab team.
- Do not store any flammable materials inside the machine or in the immediate vicinity. Offcuts produced after a job run should be removed to prevent a fire hazard.
- Only use the **Manual Focus** as the Autofocus feature can result in damage to the machine if used with transparent or reflective materials.
- Only use the computer attached to the laser for processing jobs for the Trotec, please do not use it for design work as this takes up valuable machine time.

Before you start

- It is your responsibility to inspect the machine before you start work to check for any visible signs of damage. If you discover anything unusual, do not use the machine and report to a member of the fablab team.
- Check that the fire extinguisher is available and situated next to the equipment.
- Have your graphics file ready file on a USB, so that you can transfer it to the computer attached to the Trotec machine. The size of the graphic does not matter as the printer driver can adjust it to the work piece automatically if requested.

What to do in case of fire

If there is a small fire, keep the lid closed and the extractor on. If it does not self extinguish and you are 100% sure you can put it out, then do so. Otherwise follow the usual fire procedure.

Startup sequence

- Switch on the computer, attached to the Trotec machine, and open the Corel Draw and Job Control application from the desktop.
- Switch on the the Trotec machine. The switch is on the rear, left hand side.



Focusing the laser and positioning your material

- Open the top cover and position your material into the upper left-hand corner of the honeycomb table against the horizontal and vertical rulers. Use the rulers to check that the dimensions of the object to be engraved will fit onto the material.
- Use the north/south/east/west function keys on the machine to position the laser at a suitable starting point above your material (normally the top left of your material)
- Carefully place the focusing tool on the lens and use the up/down function key to move the deck slowly up, towards the bottom of the focusing tool.
- As the deck approaches the focusing tool you can use single key presses to move it incrementally. Stop when the deck just causes the tool to drop off. The lens is now focused for the material you are using.

Corel Draw steps

- Open your graphics file (from your USB) and select "File Print", to access the printer driver. Select "Trotec Engraver" if not pre-selected.
- Check your line thickness (hairline for cut) and colour (red = cut, black = engrave)
- In the Print Window, select Preferences
 - Check that the print dimensions shown here match the dimensions of your graphic. Adjust if necessary.
 - Select the type of material that you are going to use (paper, card, acrylic...)
 - In the sub menu select the material sub-type e.g. corrugated
- You should not need to touch any of the other print preference options.
- Finish by clicking the JobControl Icon at the bottom of the window.
- In the Print Window, click Print. The file is then sent to the Job Control programme.

Job Control steps

Your job should now appear in the Job Control programme.

- Press the "Establish Connection" icon so that the programme can talk to the machine.
- Press the Preview icon. The laser starting position (represented by the cross-hairs) will now be displayed on the screen.
- Move your image into position using the mouse. The image will 'snap' into the laser starting position when you move it close to the cross hairs.
- Click the Laser icon to check how the machine will treat the different line types in your file. Ensure that the red = cut and black = engrave. You should not need to change these settings, but if you do, make sure that you change them back again as they remain as the default for the next person.
- Once everything is set you can start the job by pressing the **Play** button on the screen. The laser will now cut/etch your work.

- The screen preview will show you the job progress . When complete you can delete, reset or repeat the job.

Cleaning up after your work

When you have finished your session

- Use the Up/Down key to lower the honeycomb deck.
- Open the top lid and carefully lift out the deck making sure that you avoid the lens.
- Open the front cover and use a dustpan and brush or Hoover on low setting to remove any offcuts or dust.
- Carefully replace the deck, ensuring that it is positioned over the rulers on the base plate. It should sit securely when positioned properly.
- Close the front and top drawers.
- If nobody else is waiting to use the machine switch it off.
- Backup and delete any temporary files that you may have saved to the computer. If nobody is waiting to use the machine close down the applications and switch it off.

Pausing a Job

The Speedy 300 switches off the power to the laser tube when the protection cover is opened. Consequently an incomplete engraving can occur if the cover is opened during operation. Therefore, first press the "PAUSE" button, if you want to interrupt an engraving process.

General tips:

Always do a test engraving/score/cut on the material you will be using to avoid wasting large pieces of material and time, ensuring your settings are correct.

If making intricate cuts in acrylic remove the backing before cutting, as it is time consuming to remove afterwards.

Tips on engraving depth

The engraving depth can easily be varied through the laser power or the speed. To increase the engraving depth, reduce the speed or increase the power setting. This way you increase the amount of energy per area unit. Engraving too deep, however, reduces the quality of the details.

Tips on engraving photos

When engraving photos, ensure the image is black and white and very high contrast (might not look good on the screen but it will engrave well)

Choose an appropriate material for engraving photos. Woods get darker the more they're burned to a certain extent. Calibrate almost the darkest burn to your 100% black engraving setting, then your range of lighter colours should burn slightly lighter. Acrylics engrave a one colour regardless of power, so photos usually look monotone and lack detail.

Tips on cutting

It is sometimes preferable to make two cut 'passes' in certain materials to avoid scorching or possible burning caused by increasing the power or slowing the speed. You can achieve this by running the job twice or changing the line type action (but remember to set back to the default setting for other users afterwards)

