

VCarvePro

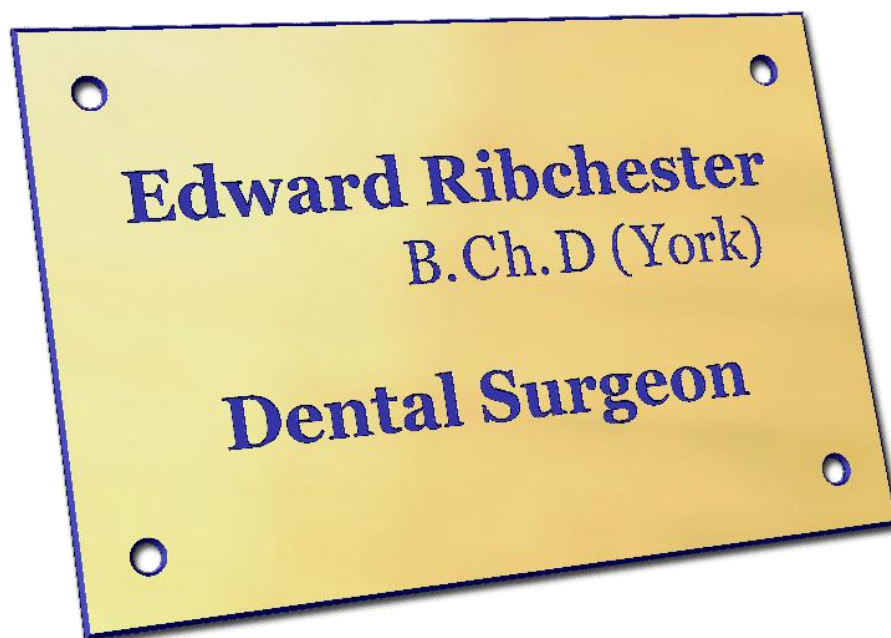
Aspire

Getting Started

A quick start guide for
VCarve Pro & Aspire
users

Vetric Ltd.

Document V.6.0 V3.0



Tutorial 1

Engraved Brass Plate

Getting Started with Aspire & VCarve Pro

Disclaimer

All CNC machines (routing, engraving, and milling) are potentially dangerous and because Vectric Ltd has no control over how the software described in this manual might be used. Vectric Ltd or any associated Resellers cannot accept responsibility for any loss or damage to the work piece, machine or any individual, howsoever caused by misusing the software. Extreme care should always be taken and the output from the software thoroughly checked before sending it to a CNC machine.

The information in this manual may be subject to change without any prior notice. The software described in this manual is supplied under the terms and conditions of the software license agreement and may only be used in accordance with the terms of this agreement.

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Introduction

Many businesses use their CNC machine for simply cutting out flat letters and shapes from plastic sheet, or engraving standard badges and nameplates, which are all based on simple 2D machining strategies. VCarve Pro can handle all these day to day tasks, however this tutorial will show you how to use your CNC machine to route and engrave jobs that include decorative 3D designs that will be more interesting and hopefully more profitable if you run a business.

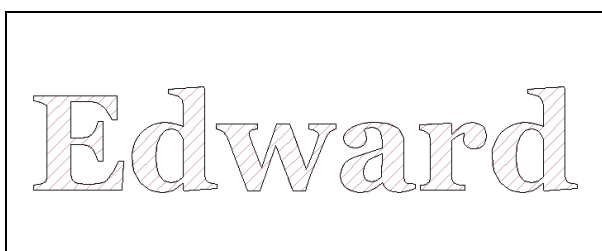
The manual takes you step-by-step through an illustrated tutorial that shows and explains exactly how to use the Aspire and VCarve Pro Software. Tips and tricks have also been included that will help you get the most from your CNC machine.

We hope you enjoy using the software.

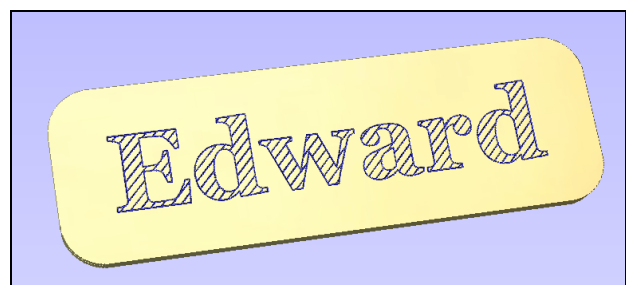
What is Quick Engraving

Quick Engraving is typically used to mark and scribe text or logos onto badges, nameplates, gifts and awards, trophies, control panels and instruments using either a diamond tipped or rotating cutter. This is a very quick and effective toolpath strategy that is used by professional engravers looking to engrave designs as quickly as possible.

The process is often called Diamond Drag Marking because a diamond pointed cutter is used to simply mark / scratch the surface of the component, and this can be run at very fast feed rates. This type of marking runs the tip of the diamond / cutter on the lines in the design or uses a hatch / offset fill-pattern marking inside closed shapes such as text and lettering.



2D Preview of marked lines



3D Preview of Quick Engraved Text

What the software allows you to do

V-Carving is typically used in the following industries to add decoration to objects and products such as,

Sign making	House signs, Business, Restaurants, Pubs, Gold Leafed and Gilded
Woodworking	Kitchen cabinet doors, Chairs, Doors, Table tops
Engraving	Commemorative Brass plaques, Company logos
Gifts	Key rings, Personalized gifts
Stone cutting	Memorials, Commemorative engravings

What file formats can be used?

Aspire & VCarve Pro will open and import vector files that have been saved in the following formats.

DXF	Drawing Exchange Files from CAD systems
DWG	AutoCAD DWG up to and including version 2008 files
EPS	Encapsulated Postscript from Adobe Illustrator and Corel Draw etc.
AI	Adobe Illustrator
PDF	Portable Document Format for industry standard print data
BMP, JPG, TIF, GIF	Image files can also be imported and Traced / Vectorized for machining.

If the designs are being prepared with software such as Corel Draw or Adobe Illustrator we recommend that you convert the vector geometry and text to curves and switch off all patterns or colour fills before exporting, preferably as an EPS file.

Getting Help

If you need assistance when using the software there are 5 primary places to look.

1. **Program Help File** - From the Main menu select Help
2. **Video Tutorials** - These are supplied on the installation CD or can be downloaded from the Vectric website.
3. **User Forum** - The Vectric user forum at www.vectric.com/forum is a very useful resource for information on VCarve Pro along with materials, cutters etc. and also to share knowledge and experiences.
4. **E-mail Support:** - The Vectric Support Team at support@vectric.com
5. **Frequently Asked Questions (FAQ)** - The support area on the Vectric web site at www.vectric.com maintains a list of the most frequently asked questions along with the answers.

Watch the supporting tutorial videos



The video camera icon indicates there is a video file for that particular section of the manual.

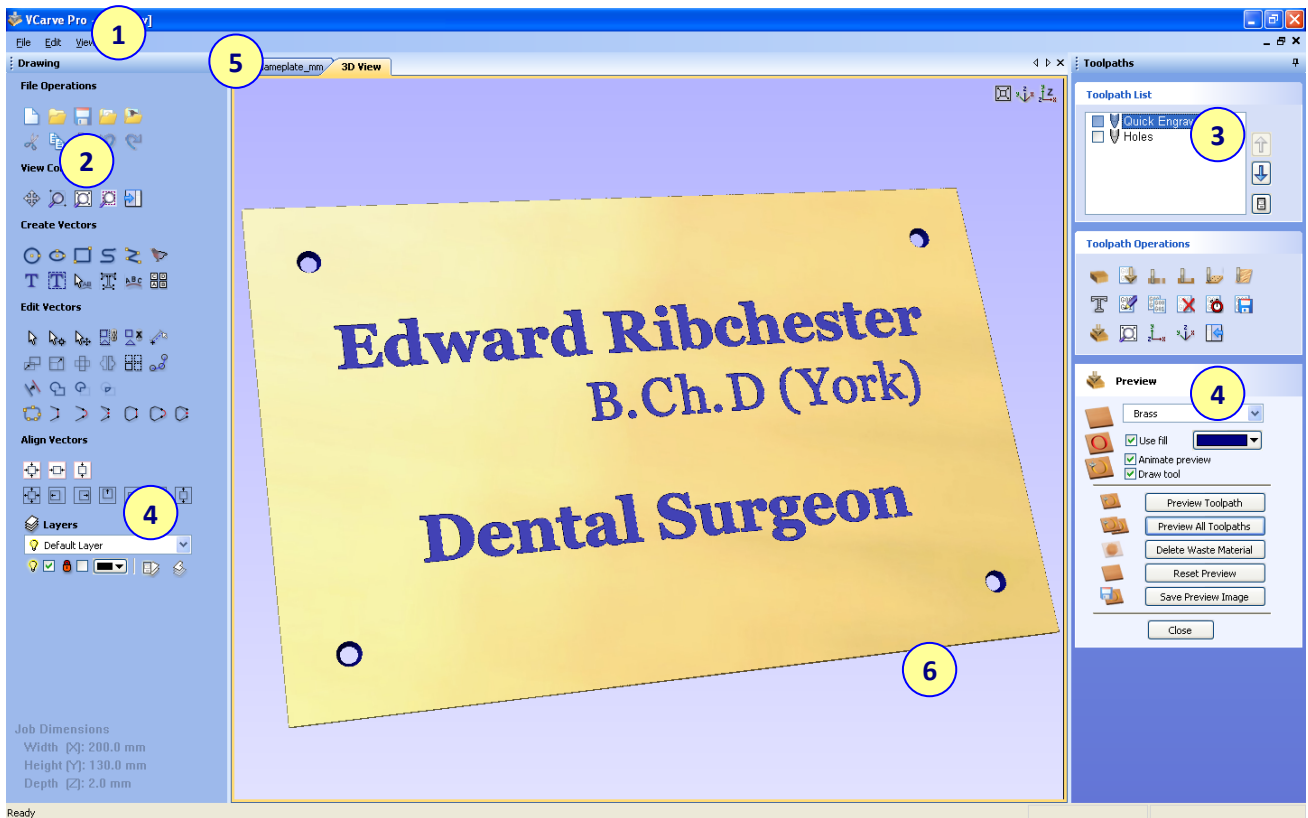
Many of the tutorials and help files have associated video footage that will make learning to use this software more interesting and enjoyable. These are available to downloadable from the web site.

Overview of the interface

The screen area is split into 6 main regions.

1. The **Main Menu bar** along the top of the screen provides access to additional, less commonly used commands available in the software. Simply click and each option will show a drop-down list of the functions.
2. The **Drawing Tab** on the left side of the screen provides general drawing tools for design modification, sizing, alignment etc. prior to machining.
3. The **Toolpath Tab** on the right side of the screen is where toolpaths are defined, calculated, edited and deleted. The Material set-up and Job Preview tools are also in this area.
4. The **Command forms** automatically appear in the Drawing window and the Toolpath tabs when tools are selected that require details to be entered such as dimensions for sizing or positioning etc.

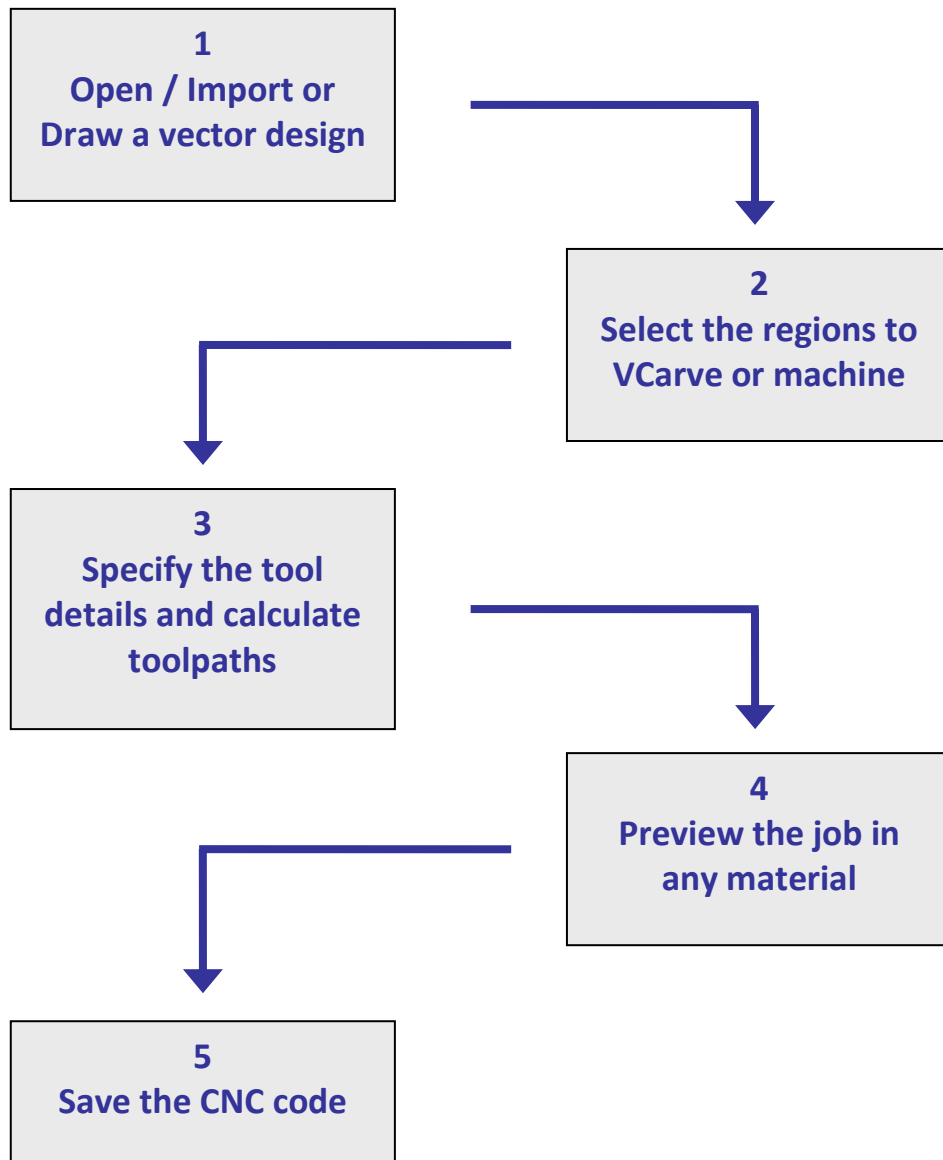
5. The **2D Design window** is where the design is drawn, edited and selected ready for machining. Designs can be imported or created directly in VCarve Pro. This occupies the same area as the 3D Preview window and the display can be toggled between the two using F2 and F3 or the tabs at the top of the window.
6. The **3D Preview window** is where toolpaths and the colour shaded job preview are displayed.



The User Interface

The Machining Logic

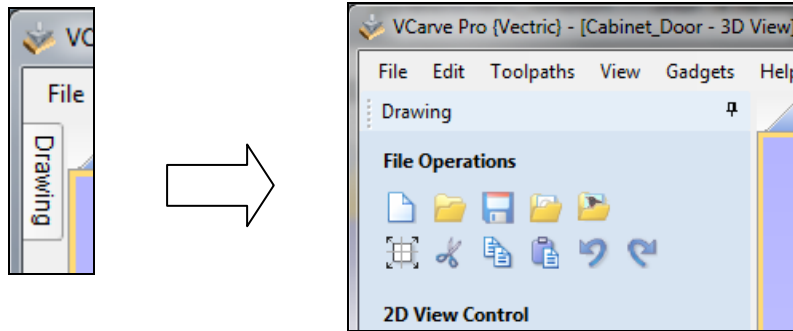
Aspire and VCarve Pro have been developed specifically to open decorative designs and calculate perfect CNC toolpaths for 3D V-Carving / 3D Engrave, profiling, pocketing, drilling, texturing etc. as quickly and easily as possible. The general work flow logic to apply to most jobs is explained in the diagram below.



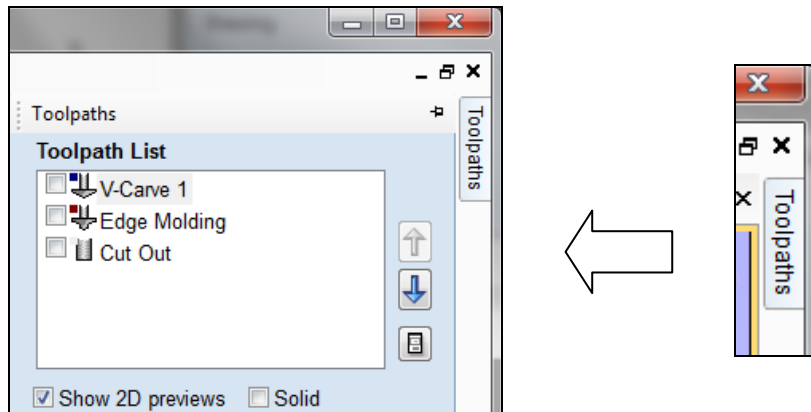
Aspire and VCarve Pro are both excellent toolpath engines that also includes drawing and editing tools that allow designs to be created and modified. Tools for drawing, positioning, alignment and node editing are very easy to use and multiple design elements can also be drawn or imported, scaled, positioned and interactively edited to make a new design. Text can also be created using any TrueType font installed on your computer or the Single stroke engraving fonts supplied with the software.

Managing windows - Auto Show / Hide

The two primary **Drawing** and **Toolpath Tabs** have Auto Hide / Show behaviour which allows them to automatically close when not being used, maximizing the working screen area. They can be opened and closed at any time by clicking the left mouse over the **Drawing** and **Toolpaths tabs** in the **top left** and **top right** corners of the interface.



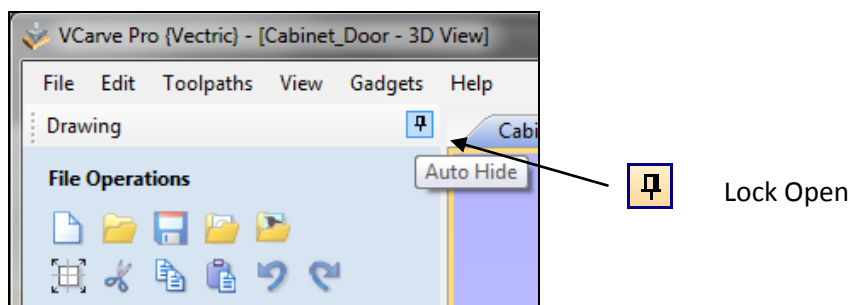
Click on the Drawing Tab to open the Drawing Window



Click on the Toolpaths Tab to open the Toolpaths Window

Note Clicking on the Drawing or Toolpath tab will also close an open window.

Both windows have Auto Hide / Show behavior and can be locked open by clicking on the **Push-Pin button** in the top right corner of the window region as shown below.








Auto Hide / Show windows

View Controls






The View Control options available when working in the 2D Design and 3D Preview windows are,

2D Design Window

	Zoom Interactive	Mouse with Middle Wheel – Push / Pull
	Zoom Box	Click top left corner Click bottom right corner
	Pan	Click and hold the Left mouse button – Esc to cancel Shortcut: Click and drag the Middle mouse button
	Zoom Extents	Zooms to show material limits in the 2D window
	Zoom Selected	Click to select an object or objects Zooms to the bounding box of the selections

Note Mouse with Middle Wheel can be used to interactively zoom in / out.

3D Window

	3D Twiddle	Click and drag Left mouse button in the 3D window
	Zoom	Right mouse button – Push / Pull Mouse with Middle Wheel – Push / Pull
	Pan	Click and drag Right mouse button + Ctrl Click and drag Right and Left mouse button
	Plan View	Looks directly down the Z axis onto the design in 3D window
	Isometric View	Shows the model in a 3D isometric view in the 3D window

Note Pressing **F2 & F3** will toggle between displaying the **2D & 3D windows**

Working with Vectors

Decorative vector designs and shapes will often be imported from another drawing package such as Corel Draw, AutoCAD etc. rather than being completely drawn in VCarve Pro. The imported vector shape(s) can be modified, moved, scaled, rotated, mirrored or deleted.

Vector selection methods

Multiple vectors can be selected in the following **4 ways**.

1. Manual multiple selection

Hold down the **Shift** key while clicking the **Left** mouse button on each vector required.

Objects can be deselected simply clicking on the object again with the **Shift** key pressed.

2. Moving the cursor from **Left to Right selects only FULLY enclosed** objects.

Click and drag the left mouse button moving from **Left to Right** selects all objects fully inside the selection rectangle.

3. Moving the cursor from **Right to Left selects all objects INSIDE** the selection rectangle and also any objects that the selection rectangle **TOUCHES**.

Click and drag the left mouse button moving from Right to Left selects all objects inside the selection rectangle + any that the selection touches.

4. Pressing the keyboard keys **Ctrl + A will select all** vector objects in the design

Note Selected vectors are displayed as dotted purple lines.

Vector deselect

Selections can be cancelled by simply,

Left clicking on an area outside the selection

Pressing the **Right mouse button** and selecting **Unselect All** (top option) from the list. You must click on the white drawing background to get this option in the menu.

Vector editing

A design is created from vector lines, arcs and bezier spans, which all have different properties that can be selected, modified and moved at any time.



Vector Selection Tool

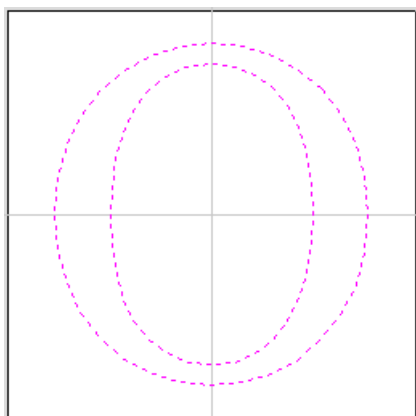
Selected from the Drawing tab on the left

Selected vectors are shown as dotted purple lines. Vectors need to be selected before any of the editing tools such as scaling and moving etc. can be used.

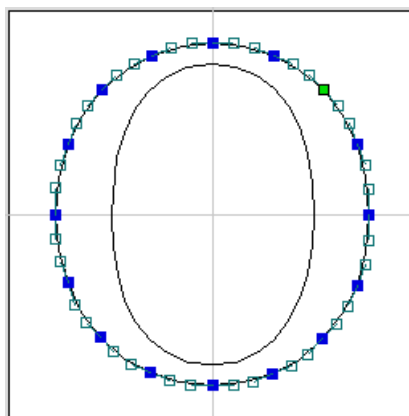


Node Editing Tool

Selected from the Drawing tab on the left



Vectors selected



Bezier node editing

When the Node Editing tool is active the cursor changes to a Black Arrow indicating that individual points (nodes) can be edited. Nodes can be interactively moved by clicking and dragging the left mouse button on a node to select and move the node to a new position.

The shape of lines, arcs and bezier spans can be edited by clicking and dragging on the nodes or control points to move them. Multiple nodes and control points can be selected and moved by using the multiple selection options such as the Shift key and dragging to make a selection.

If you right click on nodes or spans a context sensitive popup menu will be displayed which allows you to insert or delete points and nodes, cut the vector, move the start point etc.

Drawing shapes

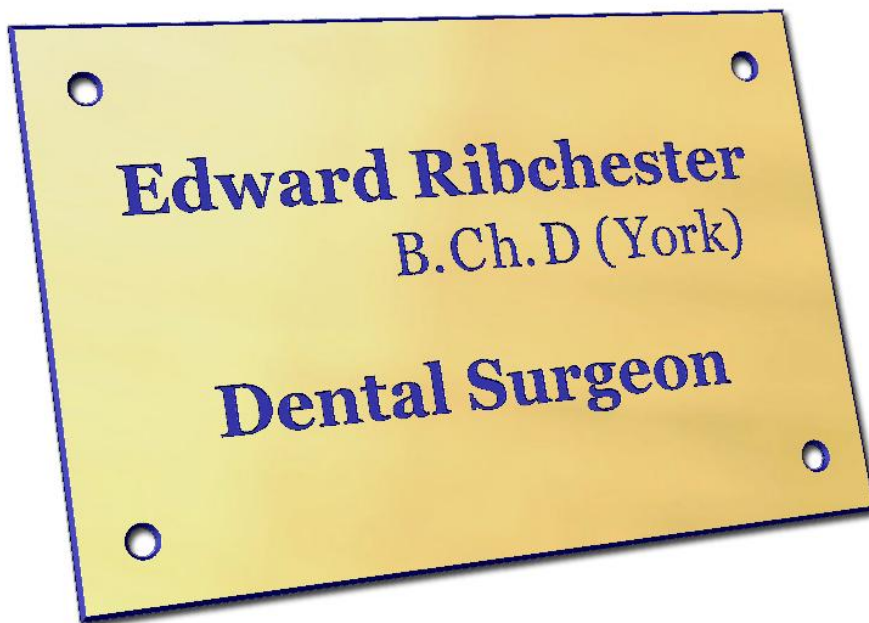
Simple shapes and designs can be drawn using the Circle, Oval, Rectangle and Polyline options. These shapes are commonly used to create new borders for signs or as a reference plate for a kitchen cabinet door etc. Shapes can be created by either entering exact dimensions in the Command Window or simply clicking the left mouse button in the 2D window to specify the parameters and coordinates interactively.

Tutorial 1 Engraved Brass Plate

Introduction

This tutorial will show you how to Engrave the Brass Plate shown below, which is approximately 200mm (8") wide x 130mm (5.5") high. The artwork for this sign will be designed using the software and then engraved using a standard Engraving cutter.

We estimate that this tutorial should take you approximately 15 minutes to complete.



The finished Sign

There are 5 key stages in opening and preparing toolpaths for this sign.

1. Create a New Sign at the required size
2. Add the Text and Holes
3. Calculate the Engraving Toolpaths
4. Preview the completed job and Estimate the machining time
5. Save the Toolpaths ready for sending to the machine

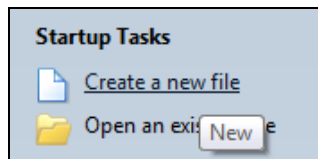
The file required for this tutorial are installed on your PC in the folder,

C:\ Program Files\Aspire or VCarve Pro\Sample Files\Nameplate.crv

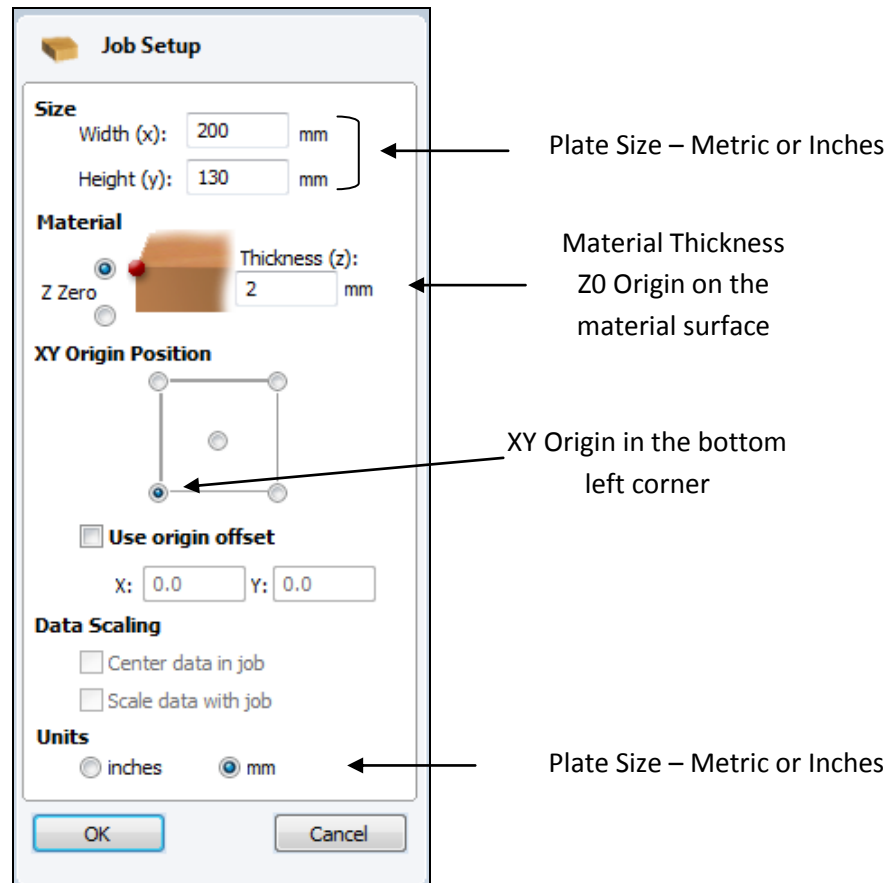
Note If you are using the **Trial version** of Aspire or VCarve Pro and want to save the toolpaths to run on your own CNC machine. You will need to load the file **Nameplate.crv** from the list of **Evaluation files** on the left side of the interface.

1. Creating a New Design

From the Startup Tasks tab toolbar click on the Create a new file icon.




Enter the required dimensions for the sign as shown below.

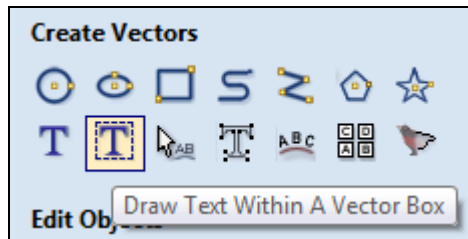


Click the **OK** button and the 2D window will show the new blank job.

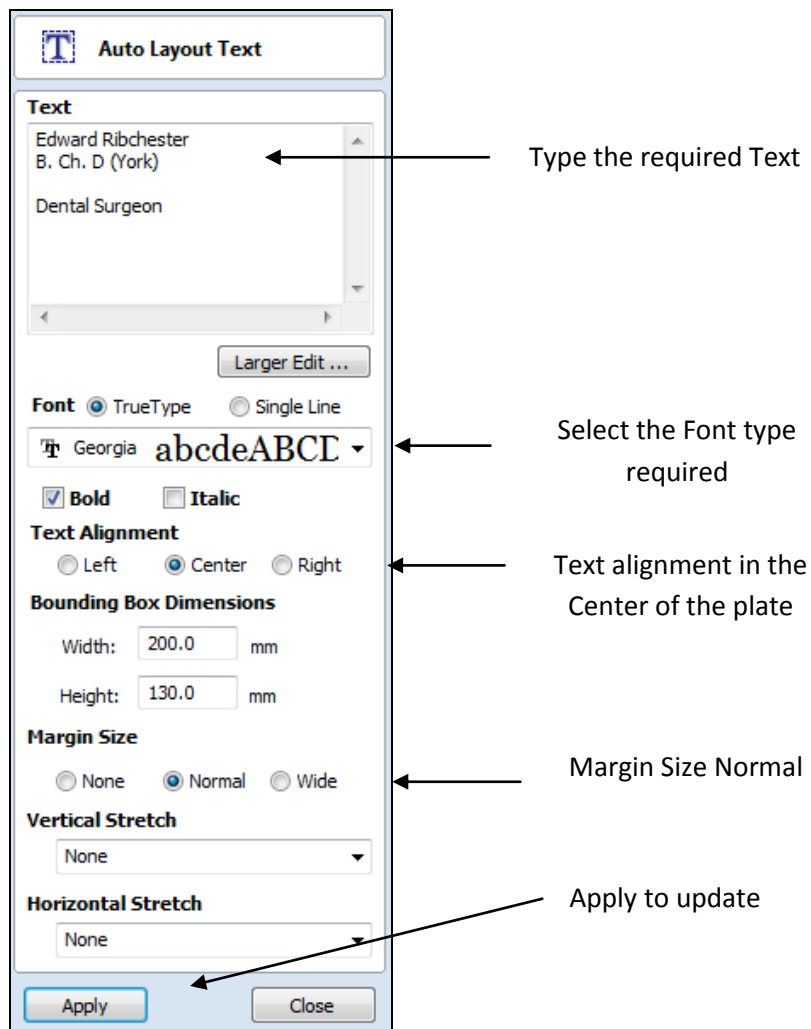
2. Adding Text and Holes

Using the Drawing Tools from the left side of the screen the Text and Holes will be added to the design.

Click the Draw Text within a vector / boundary  icon.

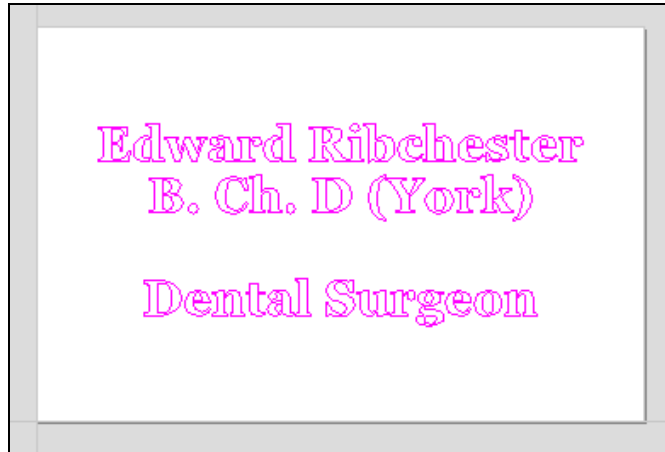


This text drawing option automatically sizes the text to the material size with options for defining the Margin size around the text block.



Enter the Text and select the required font to be used from the pull-down list.

Click the **Apply** button and the text will automatically be scaled to fit on the specified plate.



The text will be drawn in the 2D view as shown above.

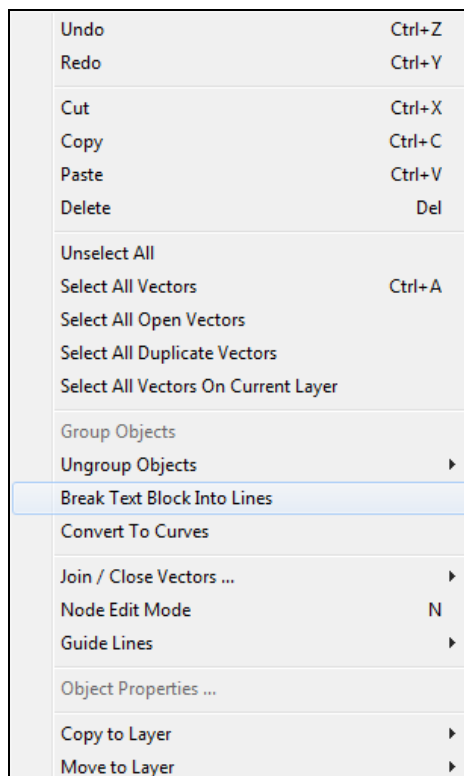
If the text needs editing simply click the Left mouse button on the text to select it and click the Draw Text within a boundary icon.

Click the **Close** button.

The middle line of text needs editing to align it to the right of the first line and to improve the letter kerning.

Left click to select the text and it will be drawn in purple.

Click the **Right Mouse button** and from the Quick menu select Break Text Block into Lines.



This creates 3 separate lines of text that can each be modified and moved etc.

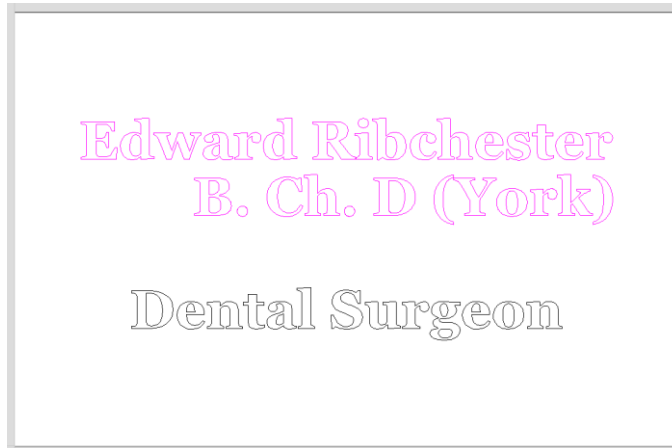
To align the middle line to the right-hand side of the first line of text.


Select the Middle line of text

Holding the **Shift key** select the **Top line of text** - 2 lines now selected.

Select the **Align Right**  icon

The middle line of text will move to the right and be aligned with the top line of text.




Note The letter kerning can easily be edited using the Edit Text Spacing and Curve tool .

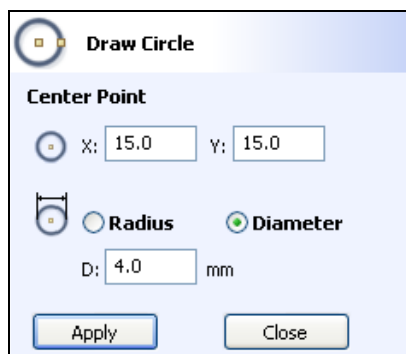
Place the cursor between the letters to move and click the left mouse button.

Holding the **Shift** key moves the letters apart

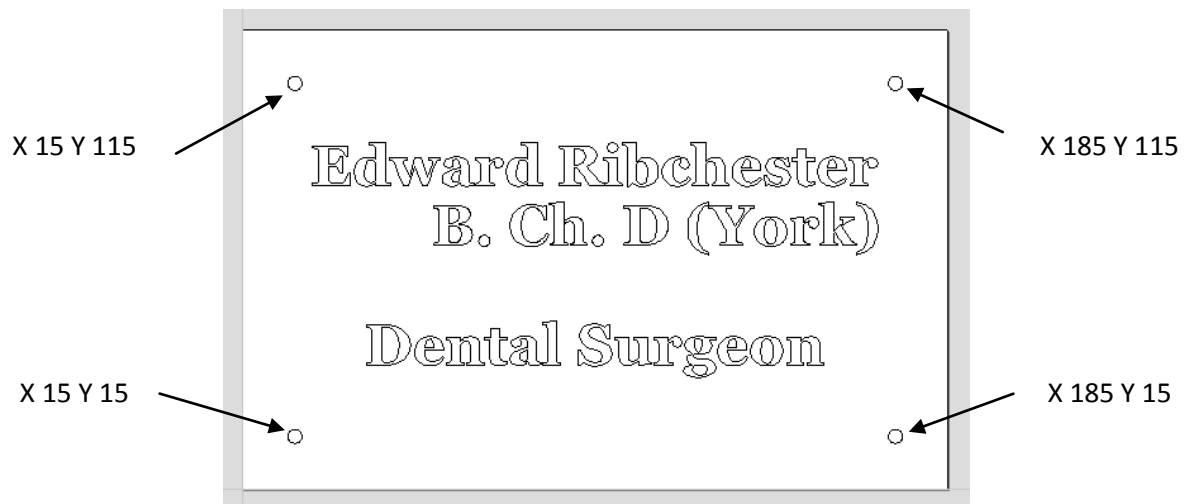
Holding the **Ctrl** key doubles the distance the characters move on each mouse click.

To add holes in the design simply draw circles in the 4 corners of the plate.

Click on the Draw Circles  icon and enter the XY Position and Diameter for each circle.



Diameter = 4.0mm



Hole 1	X 15	Y 15
Hole 2	X 15	Y 115
Hole 3	X 185	Y 115
Hole 4	X 185	Y 15

After entering the dimensions for each circle click the Apply button to draw the circle.

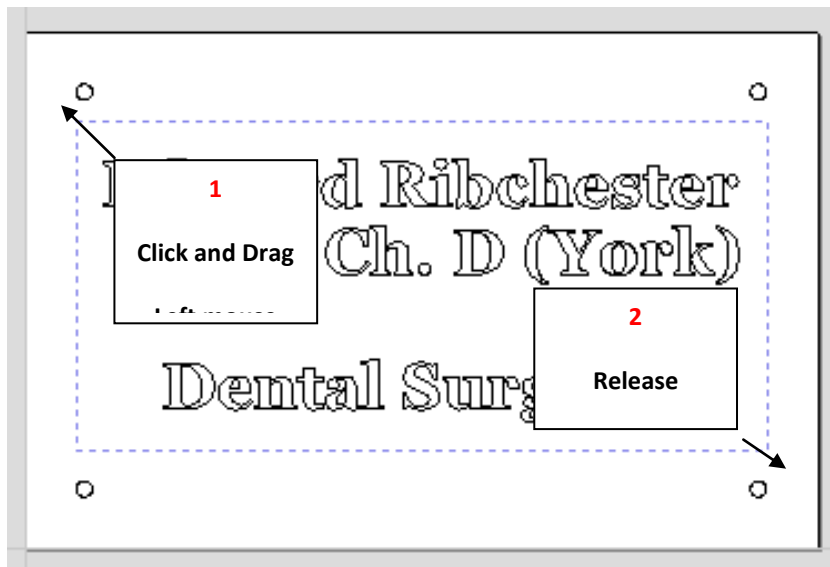
Note To change / edit the size or position of a circle, select the circle and open the Draw Circle form. The position and size of the selected circle will be displayed and can be edited


The plate is now ready to calculate the required engraving toolpaths

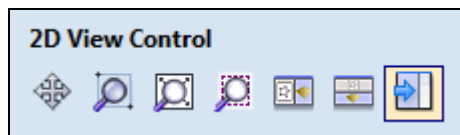
i The horizontal and vertical dotted pale grey lines represent the X0 and Y0 axes.

3. Calculate the Engraving Toolpaths

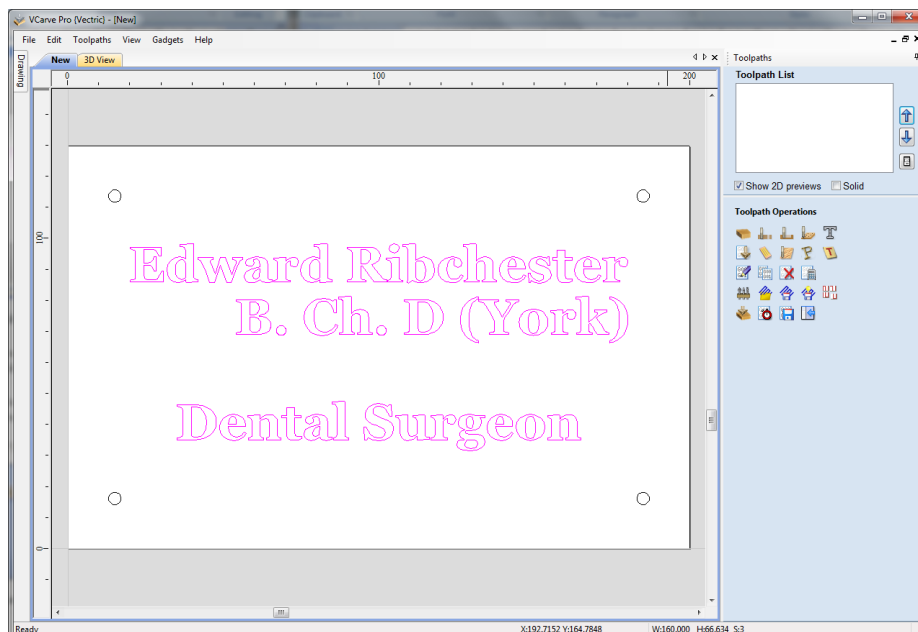
Select the text by either clicking and dragging the left mouse to enclose all the text or holding the **Shift key** and clicking on each line of text. The selected text is displayed in purple.



From the View Control section click on the icon to Switch to the Toolpaths Tab  that closes the left hand interface and opens the toolpath options on the Right Side of the screen.



This automatically closes the Drawing Tab and opens the Toolpath Tab on the Right side of the screen as shown below.



Toolpath Tab

Toolpath Tab

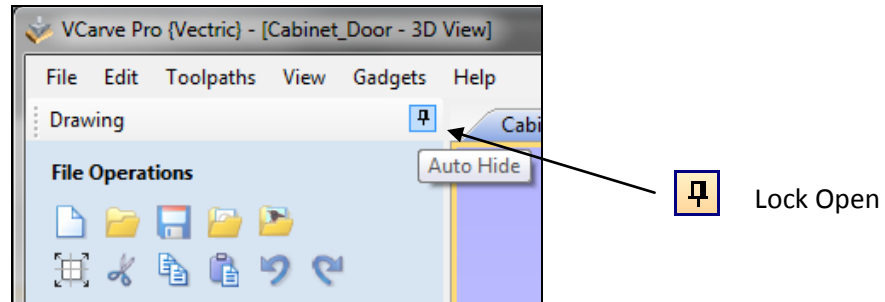


To re-open the Drawing Tab simply click the cursor on the Drawing icon in the Top Left corner of the screen and the drawing tools will automatically appear.



The Drawing and Toolpath Tabs have an Auto Hide and Show behavior, which allows them to automatically close when not being used, maximizing the working area.

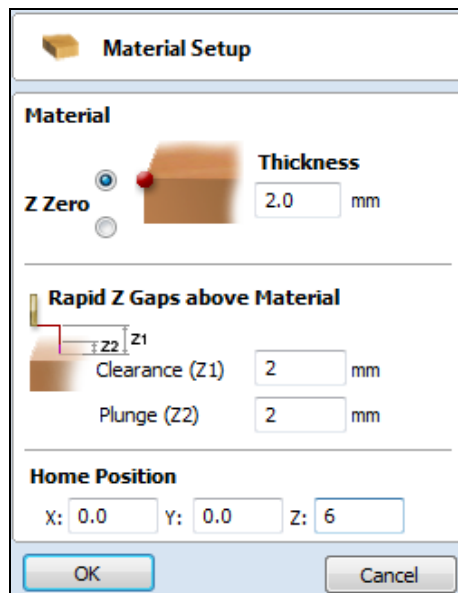
Click the **Push-Pin** to lock them in the Open position as shown below.



Auto Hide & Show windows



Select the **Material Setup** icon from the **Toolpath Operations list** on the Toolpaths tab and specify the **Rapid Clearance Gap** to be 2mm and Home positions to be X0, Y0, Z6mm as below.



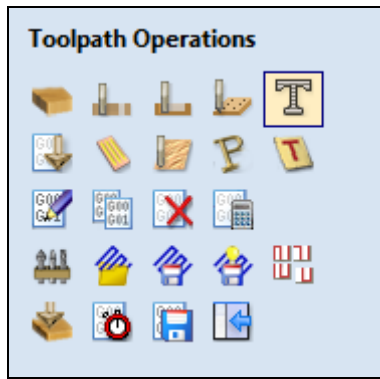
Material Setup

Note The Z Zero position is set to the material surface.

Click the **OK** button to accept the new settings.



Select the **Quick Engrave Toolpath** icon from the **Toolpath Operations list** and complete the form as shown below.



Quick Engrave

Tool: Engrave (20' 0.5 mm Tip Dia) Select ... Edit ...

Depth / Pressure: 2 mm

Outline Fill

Stepover: 0.2 mm

Offset Hatch

Hatch Angle: 45 degrees Cross Hatch

Use Nose Cone

Tool Depth: 0.2 mm

Number of Passes: 1

Safe Z: 2.0 mm

Home Position: X:0.00 Y:0.00 Z:6.00

Vector Selection: Manual Selector ...

Name: Quick Engrave 1 Calculate

Post Processor

Roland EGX-300

Output direct to machine

Driver: ...

Save Toolpath(s) ...

Close

Select the required cutter / diamond tool

Enter the Depth / Pressure to load the spring

Select the required Fill Pattern

Select this option when using a Nose Cone

Enter a suitable name and click Calculate

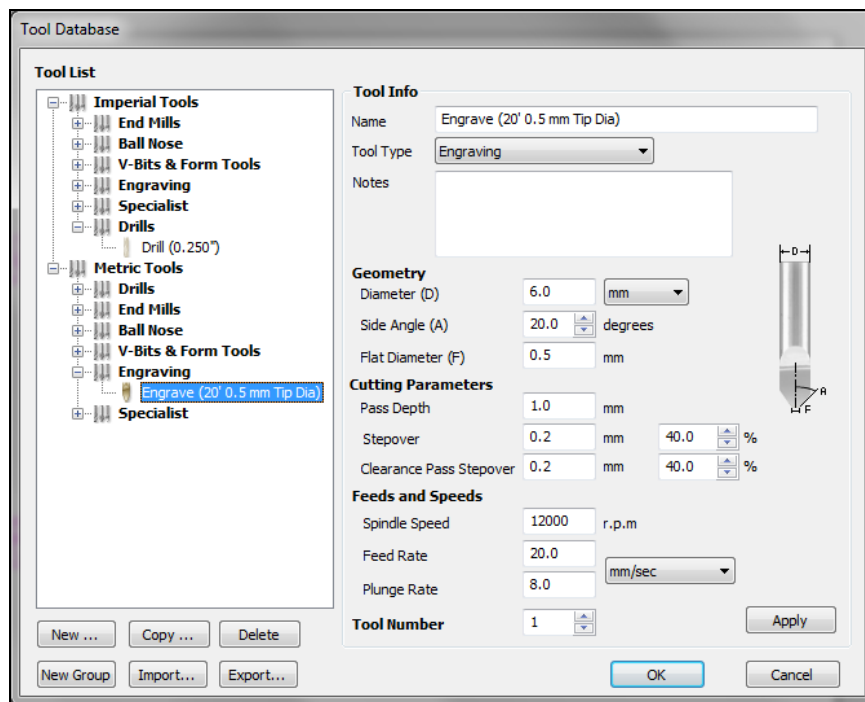
Select the required postprocessor for the CNC machine

Some machines include an option to Output toolpaths directly to the controller

Quick Engrave parameters

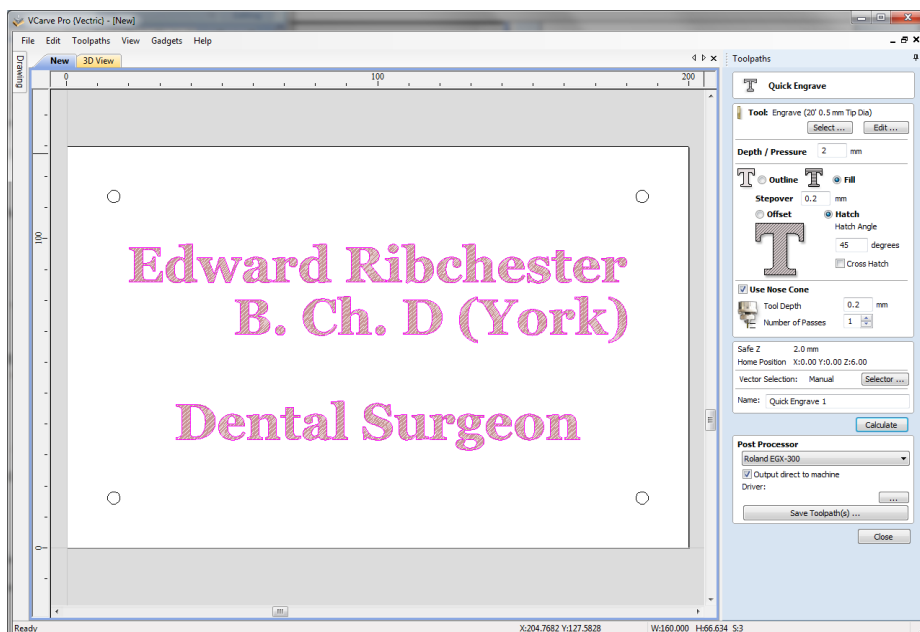
Click on the Select button to open the Tool Database and select the tool shown below.

In this example we are engraving brass with a standard 6mm diameter 20' side / half angle 0.5 Tip Diameter Engraving Cutter.



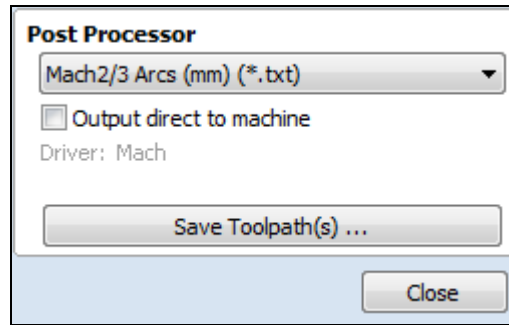
Important The Cutting Parameters should be set for the material you are cutting
Click the Edit button to modify the cutting parameters to match the tooling you are using and the material being machined

Click the **Calculate** button and the toolpath will automatically be drawn in the 2D view as shown below.



2D View showing Quick Engrave Toolpath & Material

This Toolpath can be saved by selecting the appropriate postprocessor and clicking **Save** Toolpaths.

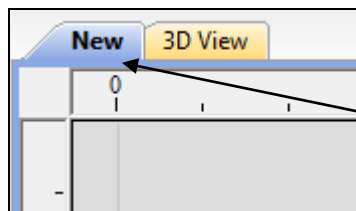


Important Ensure the engraving cutter has been loaded and set correctly on the machine before outputting a file to the machine.

4. Engraving the Fixing Holes

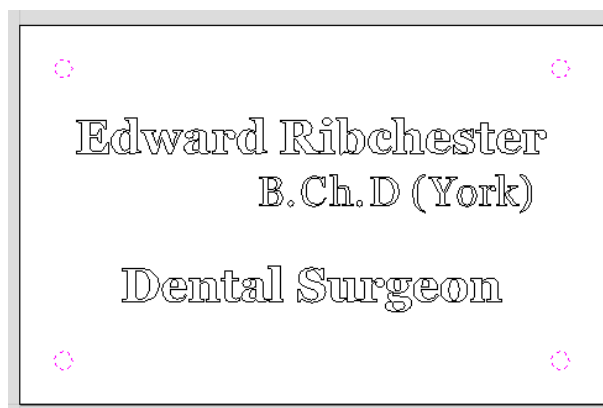
To engrave the holes in the late using the same engraving cutter used the Create Pocket Toolpath.

Open the 2D Window by clicking on the 2D View Tab




Click to Open the 2D Window

Holding the Shift key click the Left mouse button to select each of the 4 circles.



The selection will be drawn as dotted purple circles.

Select the **Pocket Toolpath**  icon and complete the form as shown below.

Pocket Toolpath

Cutting Depths
 Start Depth (D) 0.0 mm
 Cut Depth (C) 2.0 mm

Tool: Engrave (20' 0.5 mm Tip Dia)
 Select ... Edit ...

Use Larger Area Clearance Tool
 Not using area clear tool
 Select ... Edit ...

Clear Pocket ...
 Offset **Raster**
 Cut Direction
 Climb **Conventional**
 Raster Angle 0.0 degrees
 Profile Pass Last

Pocket Allowance 0.0 mm

Ramp Plunge Moves
 Distance 3.0 mm

Use Vector Selection Order

Safe Z 2.0 mm
 Home Position X:0.00 Y:0.00 Z:6.00

Vector Selection: Manual Selector ...


Name: Holes

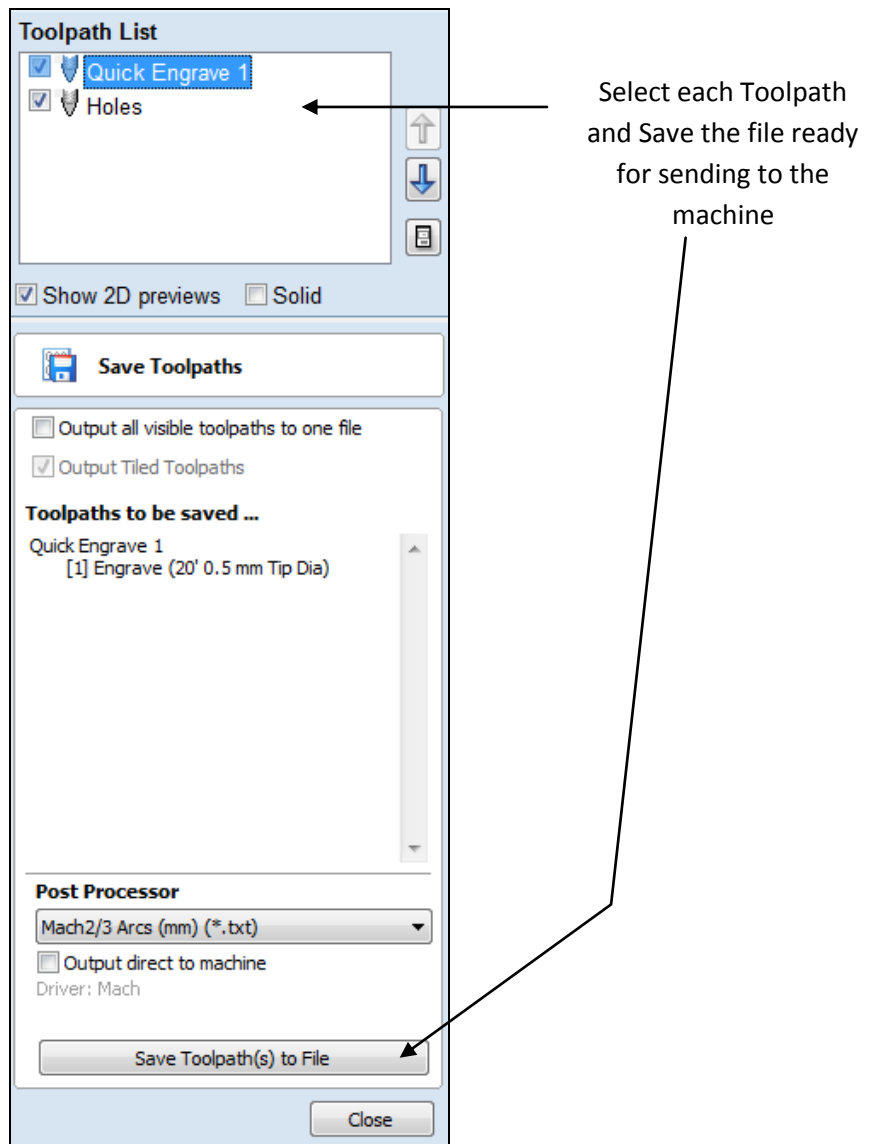
Calculate Close

Annotations:
 - Enter the Cut Depth = Material Thickness (points to Cut Depth field)
 - Select the Engraving cutter being used (points to Tool Select button)
 - Select Offset machining (points to Offset radio button)
 - Switch on the Ramping option to ease the cutter into the material (points to Ramp Plunge Moves checkbox)
 - Calculate the Toolpath (points to Calculate button)

5. Saving Toolpaths

Before saving a toolpath, select postprocessor for your specific machine control system.

Save the Toolpaths by clicking the **Save Toolpath**  icon.



Output Toolpaths

Click the **Save Toolpaths** button to save the selected Toolpath.

Note Calculated toolpaths can be edited by either,




Clicking the Edit Toolpath icon or Double clicking on the name of the Toolpath name in the Toolpath List.

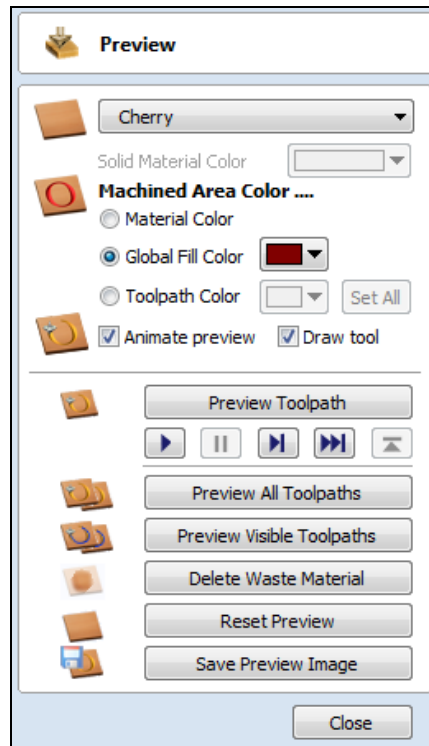
Take extreme care to ensure the material and cutter are setup correctly before running the toolpaths on the engraving machine.

6. Preview finished job and Estimate Times

After calculating a Quick Engrave toolpath the Preview Toolpaths form then needs to be opened.

Close the Quick Engrave form and open the **Preview Toolpaths**  form.


This form is used to simulate the toolpath and show what the engraved job will look like. Different materials and colour fill settings can be changed to create realistic screen images.



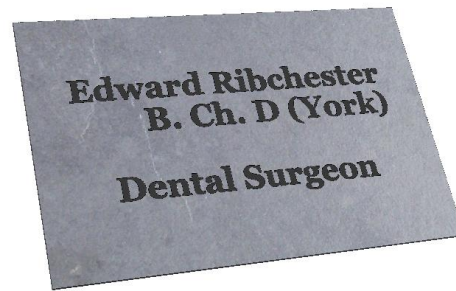
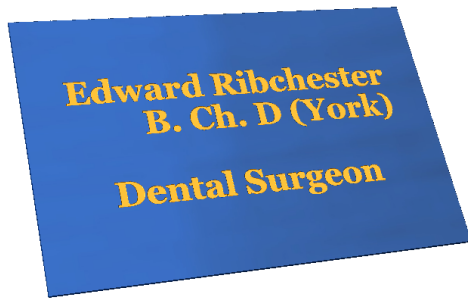
Preview All of the
Toolpaths

Job Preview form


Click the **Preview All Toolpath**  icon and an animated representation of the Tool cutting into the material will be shown in the 3D window.

-  If running the software on low performance / old hardware, you might wish to switch off the Animate Preview and Draw Tool options, as this will increase the simulation speed.

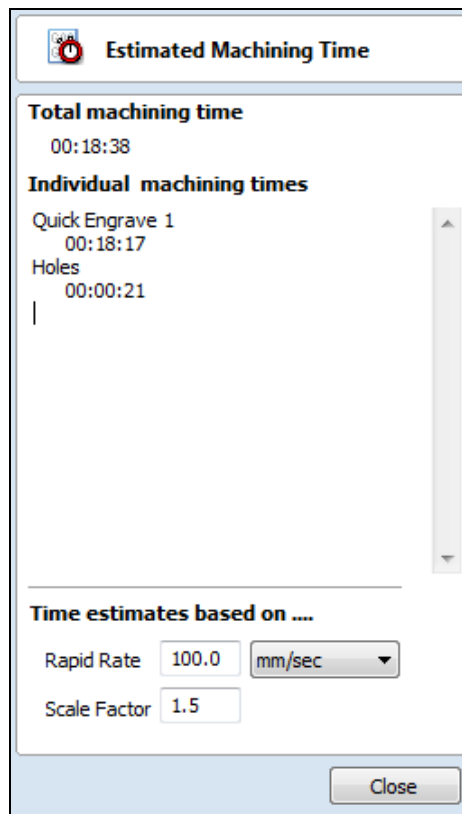
The finished design can be shaded in different Material types and Fill Colors as shown below which shows the sign in Wood and Slate with a painted fill.




Finished Sign shown in Blue Plastic and Slate with Fill colours

Click the Save Preview  button to save the 3D window as an image file (bmp, jpg or gif) for use in customer quotations, marketing brochures or web site pictures etc.


Selecting the **Estimate Machining Times** icon  displays the estimated time required to machine the job in hours, minutes and seconds.




 The Rapid Rate is the maximum feed rate at which the machine travels.

The Scaling Factor can be set to obtain more realistic estimates for jobs that include lots of complex 3D carved moves, where the machine may not run at the programmed feed rates due to the need to accelerate and decelerate when the tool changes direction.

7. Saving the finished project

The finished project can be saved on the PC using the **Save File**  icon

This will save the complete project - Design + Toolpaths so it can be opened and edited at any time in the future.

-  Take extreme care to ensure the material and cutter are setup correctly before using the toolpath.