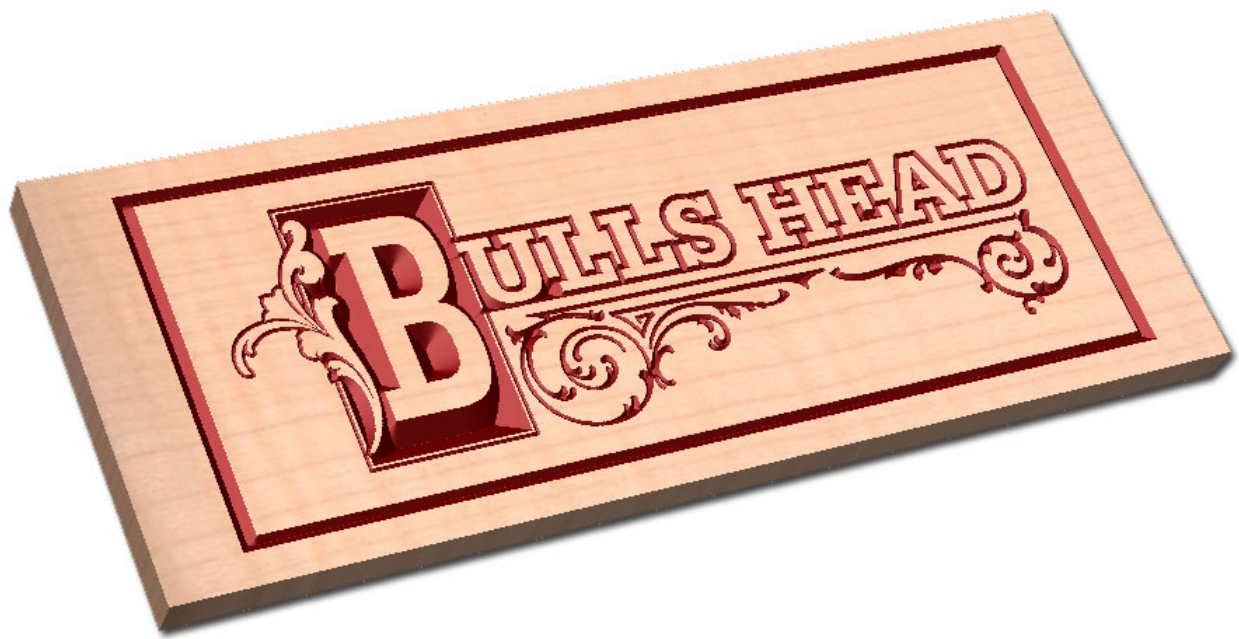# Getting Started With

VCarve Pro 4

Tutorial 1
Bulls Head Sign

Vectric

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.

Table of Contents

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 tutorials that shows and explains exactly how to use the 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 V-Carving?

V-Carving produces a constantly varying and flowing 3D carved effect on the job, which is similar to how a craftsman would carve by hand. Imagine a 'hand-carver' cutting letters into a piece of wood or stone, starting at a sharp corner, pushing the chisel deeper where the font stroke gets wider and pulling the tool out to form precise, sharp corners. V-Carving, also known as 3D Engrave or Intaglio engraving allows a V shaped or engraving tool to cut at varying Z depths that are directly linked to the width of the geometry in which the cutter is moving.

This is effect is difficult to describe in words, but imagine using a flat-bottom end mill to cut 3mm ($1/8^{th}$) deep inside the text shown below. The tool, being round will always leave a fillet radius in the corners and will not actually cut the complete letter where the diameter of the tool is too big to pass through the small gaps.

Sign including V-Carved 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?

VCarve Pro will open files that have been saved in the following formats.

DXF	Drawing Exchange Files from CAD systems
EPS	Encapsulated Postscript from Adobe Illustrator and Corel Draw etc.
AI	Adobe Illustrator
PDF	Portable Document Format for industry standard print data

ⓘ 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 on the installation CD or Downloadable from the web site. Windows Media Player is required to view the video files.

If you experience problems running these files or need assistance please visit the technical support area on the web site and follow the links.

Overview of the interface

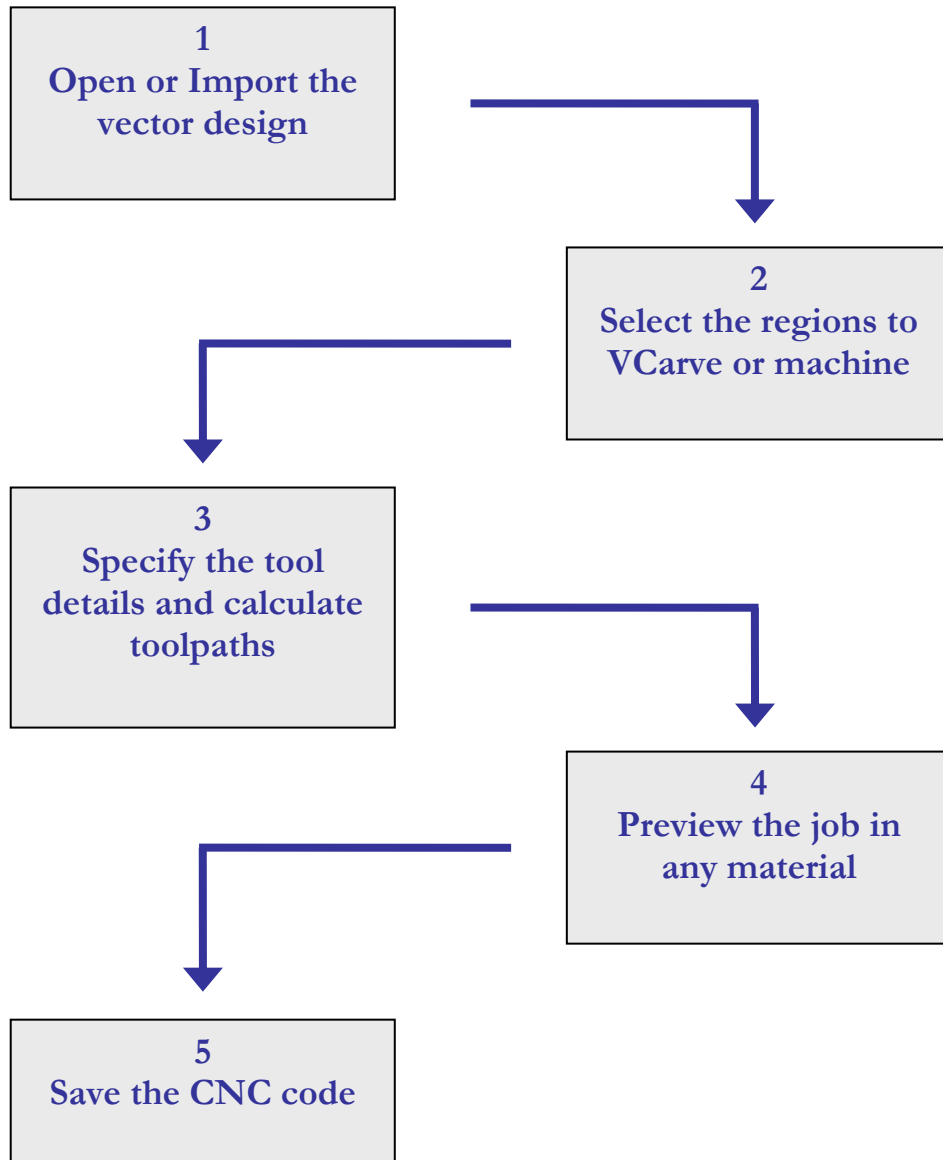The screen area is split into 6 main regions.

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.
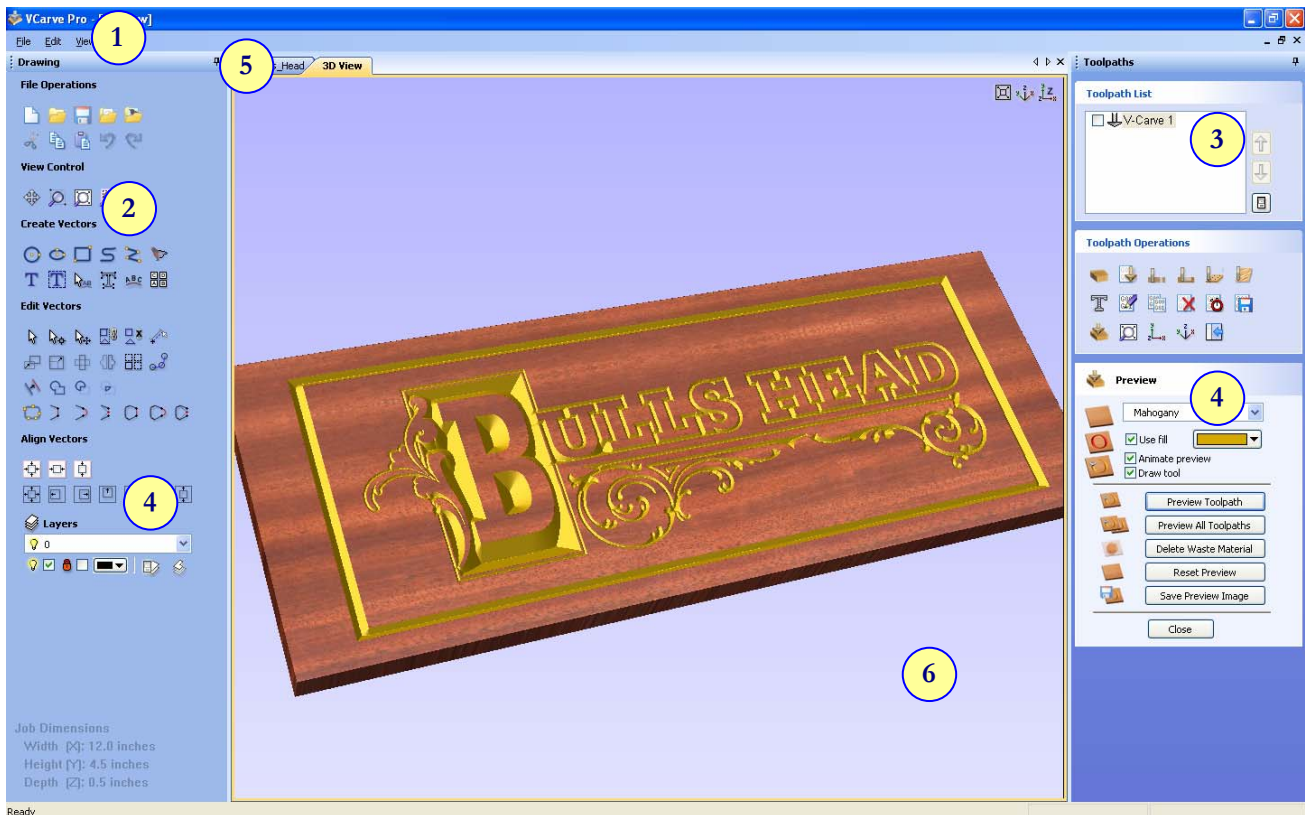
The User Interface

The VCarve Pro Logic

VCarve Pro has been developed specifically to open decorative designs and calculate perfect 3D V-Carve / 3D Engrave toolpaths as quickly and easily as possible. The general work flow logic to apply to most jobs is explained in the diagram below.

1
Open or Import the vector design

2
Select the regions to VCarve or machine

3
Specify the tool details and calculate toolpaths

4
Preview the job in any material

5
Save the CNC code

VCarve Pro is an excellent toolpath engine 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.

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.
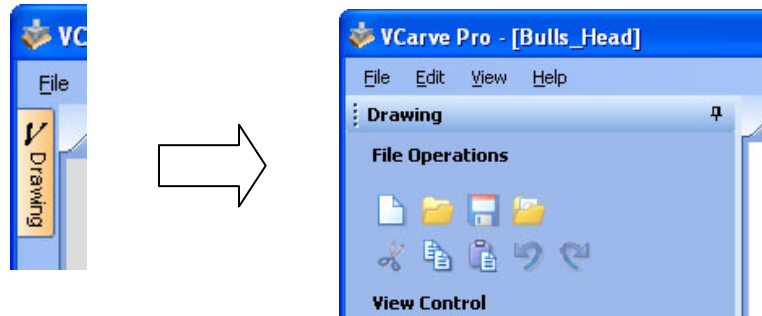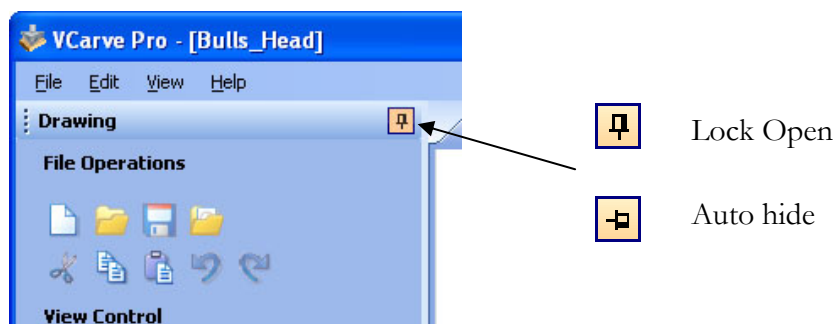

Click on the Drawing Tab to open the Drawing Window
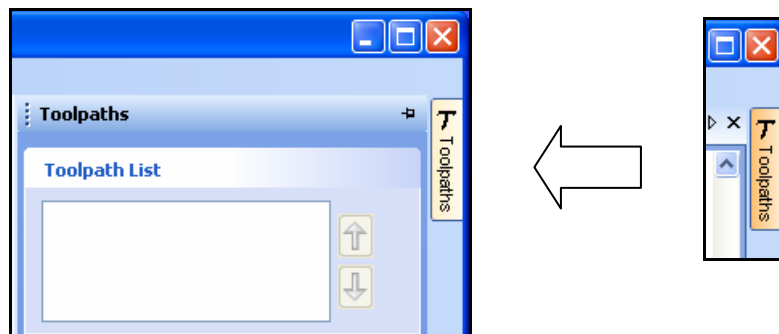
Click on the Toolpaths Tab to open the Toolpaths Window

ⓘ   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

ⓘ   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

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

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

ⓘ   Selected vectors are displayed as dotted purple lines.

Vector deselect

Selections can be cancelled by simply,

1.   Left clicking on an area outside the selection

2.   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.
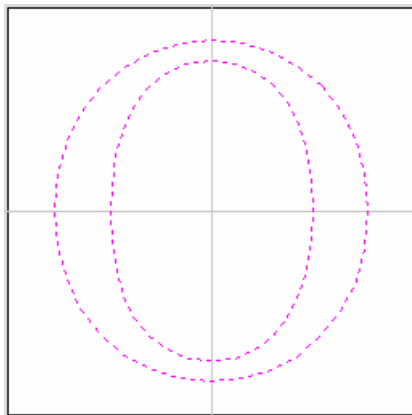
  Vector Selection Tool   Selected from the Drawing tab on the left

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.
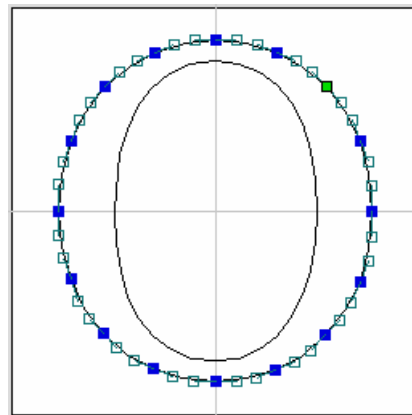
  Node Editing Tool   Selected from the Drawing tab on the left

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 optiosn 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.

Drawing shapes is covered in more detail during the tutorials in this manual.

We recommend that you watch the **5 minute Video** for this Tutorial before proceeding. The video can be found on the installation CD or downloaded from the web site at www.vectric.com

Introduction

This tutorial will show you how to 3D V-Carve the Pub Sign shown below in Figure 1, which is approximately 12" (300mm) wide by 4.5" (115mm) high. The artwork for this sign has been drawn using Corel Draw and saved as a DXF file.

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

Figure 1. The finished Pub Sign

There are 6 key stages in opening and preparing toolpaths for this sign.

1. Open / Import the design
2. Select the vectors to V-Carve
3. Calculate the 3D V-Carved toolpath
4. Preview the completed job
5. Estimate the machining time
6. Save the Toolpaths

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

C:\ Program Files\VCarve Pro 4.0\Sample Files\Bulls_Head.dxf

NOTE: If you are using the **Trial** version of VCarve Pro, you will need to load the file **Bulls_Head.crv** if you want to be able to save and cut the toolpaths.

1.   Opening the Design

1. From the **Startup Tasks** tab toolbar click on the **Open an existing file** icon.

2. Navigate to the folder - **C:\ Program Files\VCarve Pro 4.0\Sample Files**

3. Select the file named – **Bulls_Head.dxf** and click the **Open** button

    The design shown below in Figure 2 will now be displayed in the 2D window and the Material Setup form is opened.
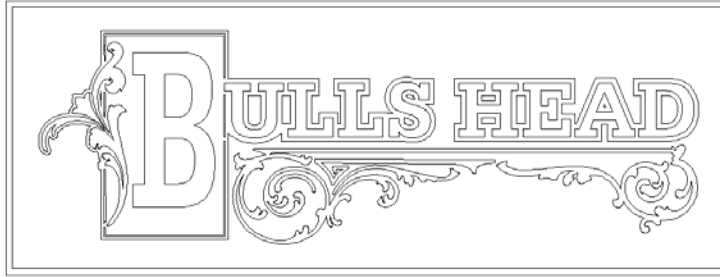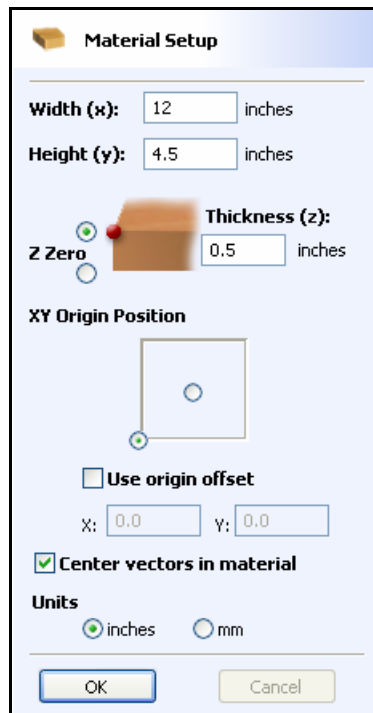

Figure 2 Original vector design

ⓘ   **Note**:   The horizontal and vertical **dotted pale grey lines** in the bottom right corner represent the **X0 and Y0** axes.

4.   Complete this form as shown above

Width (X)= **12"**   Height (Y) = **4.5"**

Material Thickness = **0.5"**

Z Zero on the **Material Surface**

Click X0, Y0 Origin to be bottom **Left corner**

Check the option – **Center vectors in material**

Select the Units = **Inches**

Click **OK** to set the material size and place the vector design in the middle

2.   Select the Vectors to V-Carve

5.   Use the **Box selection** mode to select al the vectors in this design as shown in Figure 3.

Click and hold the **Left mouse button** in the **Top left** corner and then drag the mouse to the **Bottom right** corner and release it.
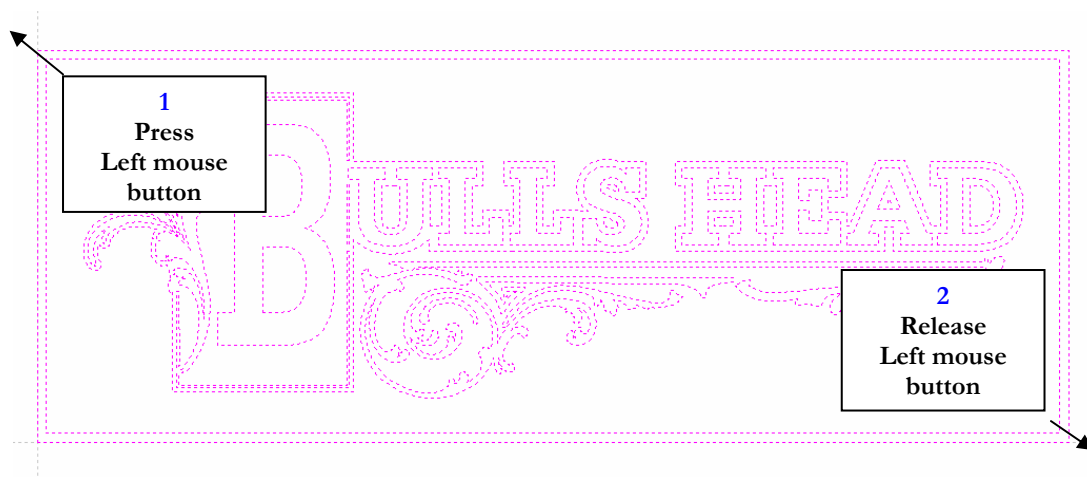
Figure 3. Select the vectors to V-Carve

Note: The selected vectors are drawn as **dotted purple lines** as shown in Figure 3 below.

ⓘ Alternatively - Press **Ctrl + A** to select all the vectors in the design.

ⓘ Individual vectors can be selected or unselected by holding the **Shift** key and clicking the **Left** mouse button to select and unselect as required. If you make a mistake, click on the white background to unselect all vectors and start again.

3. Calculate the V-Carve Toolpath

The design is now ready to calculate the v-carving toolpath.

6. From the **View Control** area select the **Switch to Toolpaths tab** .

This automatically **closes** the **Drawing Tab** and **opens** the **Toolpath Tab** on the **Right** side of the screen as shown below in Figure 4.
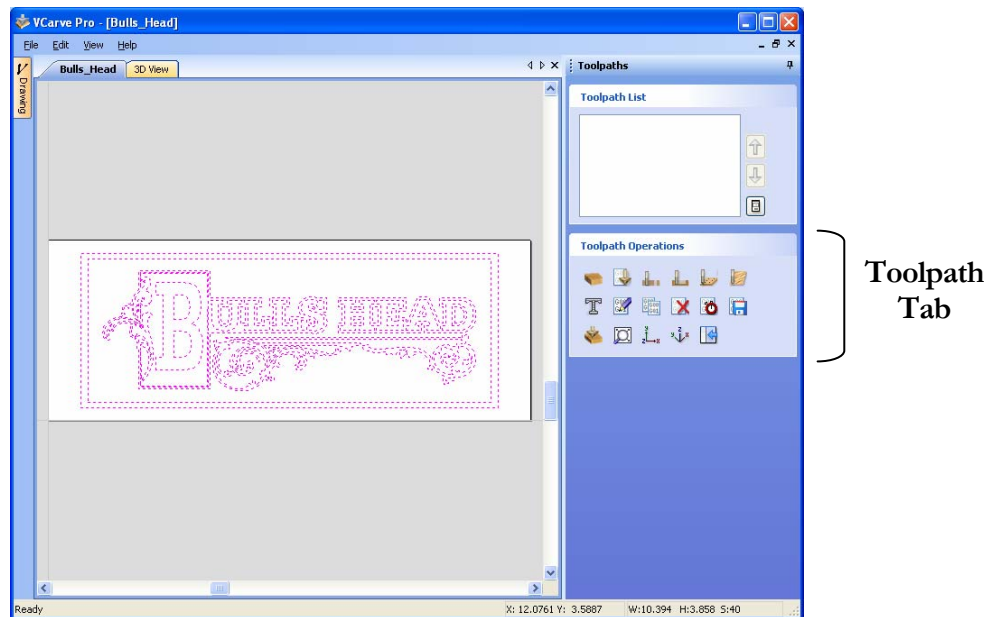

Figure 4. Toolpath Tab

ⓘ 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 screen area.

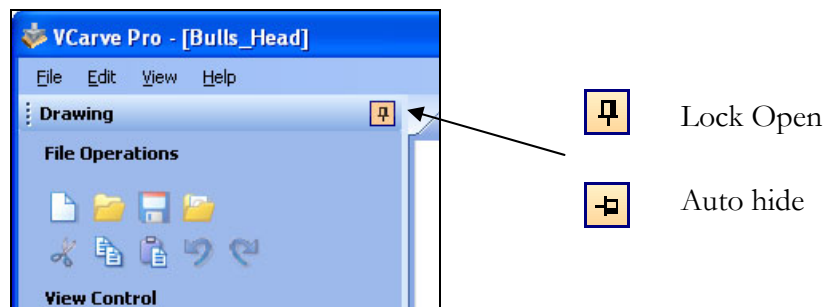Click the **Push-Pin** to lock them in the Open position as shown below in Figure 5.

Figure 5. Auto Hide & Show windows

7.   Select the **Material Setup** icon from the **Toolpath Operations** list on the Toolpaths tab and specify the Rapid Clearance Gap to be **0.2"** and Home positions to be **X0, Y0, Z2"** as shown below in Figure 6.

Note
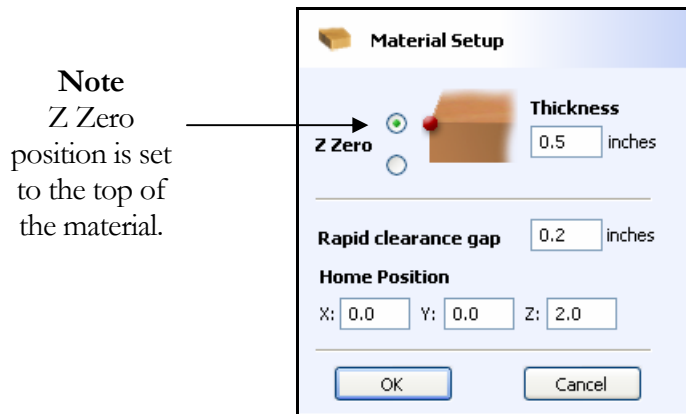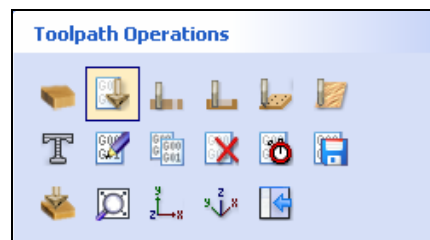Z Zero position is set to the top of the material.

Figure 6. Material Setup

8.   Next, select the **Create V-Carve Toolpath** icon from the **Toolpath Operations** list and complete the form as shown below in Figure 7.

In this example we are cutting wood with a **0.5" (12mm) Diameter, 90 degree included angle V-Carving tool** and the maximum cut depth per pass will be set to 0.20" (5mm), this can be greater if cutting soft materials.

Select a **V-Bit** Tool from the Tool Database

Edit the cutting parameters to suit your machine and the material being cut
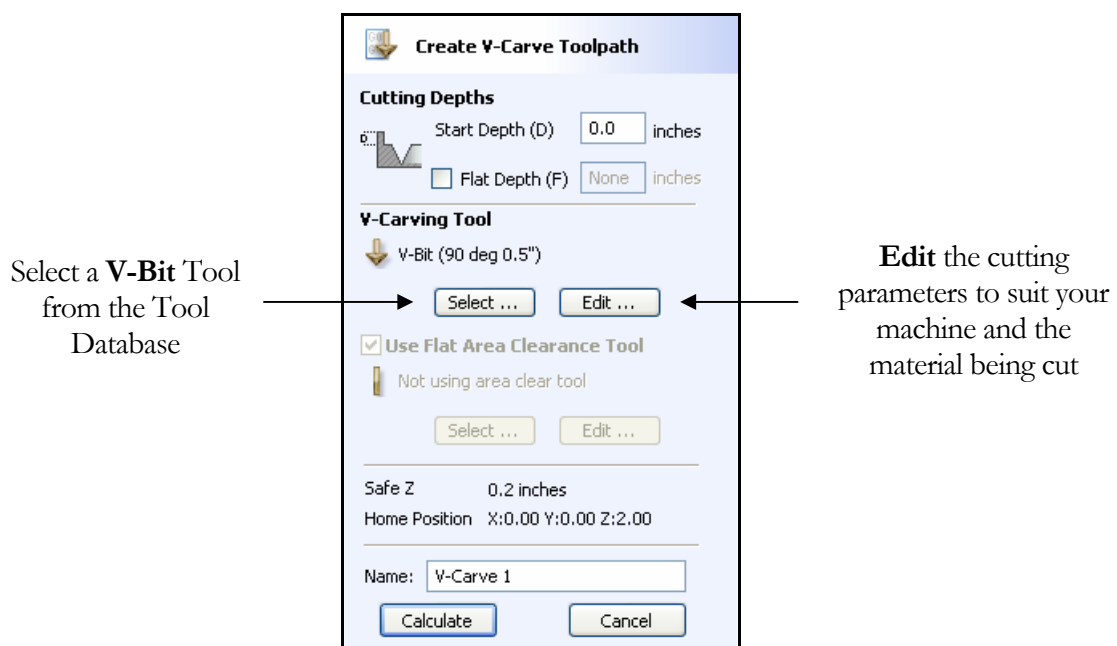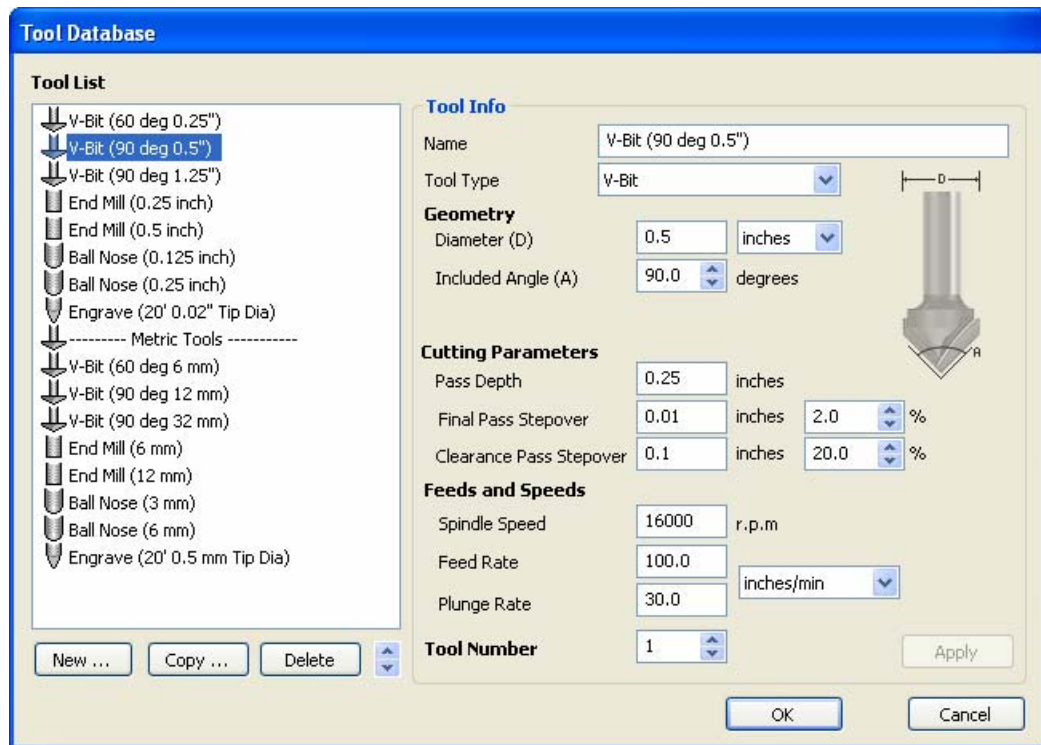

Figure 7. V-Carve Toolpath parameters

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

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

9.   Click the **Calculate** button and the resulting toolpath will automatically be drawn in the **3D view** and the **Preview job** form opened, as shown below in Figure 8.


Figure 8. 3D View showing Toolpath & Material

To rotate the model **Click** and hold the **Left** mouse button.

To zoom, use **Middle Wheel** on mouse **or Push / Pull** the **Right mouse button**

Pan using **Ctrl** + **Right** mouse button or the **Left + Right mouse buttons** together

For the standard views use the **ISO** [icon] and **Plan** [icon] view icons in the top right corner of the 3D view.

4. Preview the finished job

After calculating a toolpath the **Preview form** is automatically opened. This form is used to simulate the toolpath and also to define different material and colour fill settings, which can be changed to create realistic screen images.
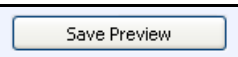

Figure 9. Job Preview

10.   Click the **Preview Toolpath** [icon: Preview 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.

11.   The finished design can be shaded in different Material types and Fill Colors as shown below in Figure 10 below which shows the sign in Wood and Slate with a painted fill.


Figure 10. Finished Sign shown in Oak + No Fill and Slate + Fill

12.   Click the **Save Preview** [icon: 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.

5. Estimating the Machining Times

13. Selecting the **Estimate Machining Times** icon displays the estimated time required to machine the job in hours, minutes and seconds.
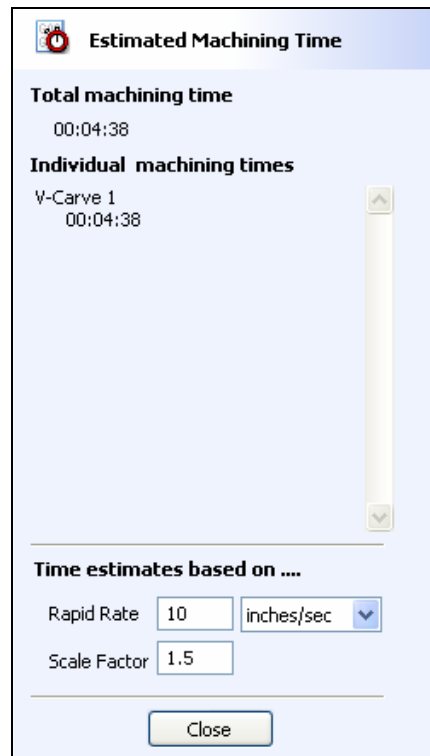
ⓘ The **Rapid Rate** is the maximum feed rate at which the machine travels.

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.

6. Editing and Saving the 3D V-Carved Toolpath

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.

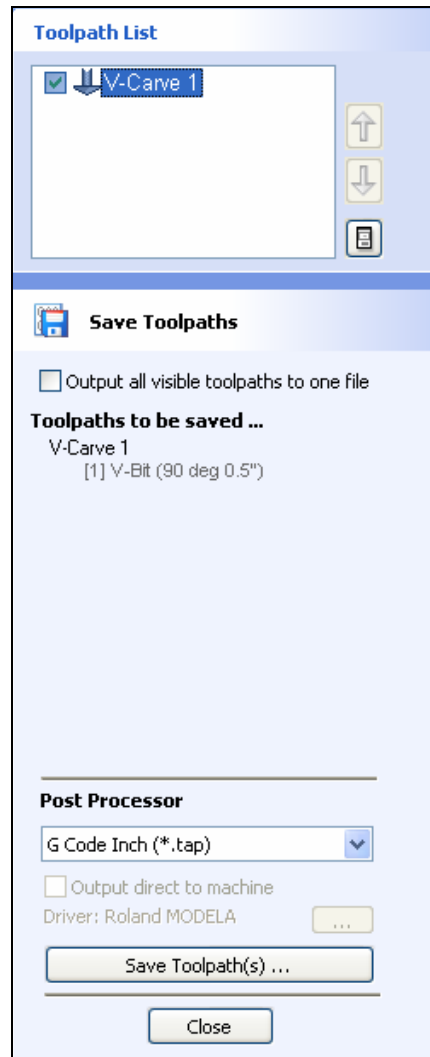14. **Save** the Toolpaths by clicking the **Save Toolpath** icon.

Figure 10. Save Toolpath form

15.   From the pull-down list of postprocessors, select the appropriate one for your CNC machine as shown above in Figure 10.

16.   Click the **Save** button and enter a name to save the toolpath with.

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

Note: If you are using the **Trial** version of VCarve Pro you must load the **Bulls_Head.crv** file to be able to save the toolpaths.

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Thank you for reviewing VCarve Pro and we hope you enjoyed using the software

If you have any questions or need assistance

E-mail - support@vectric.com

Visit the Vectric User Forum - www.vectric.com/forum