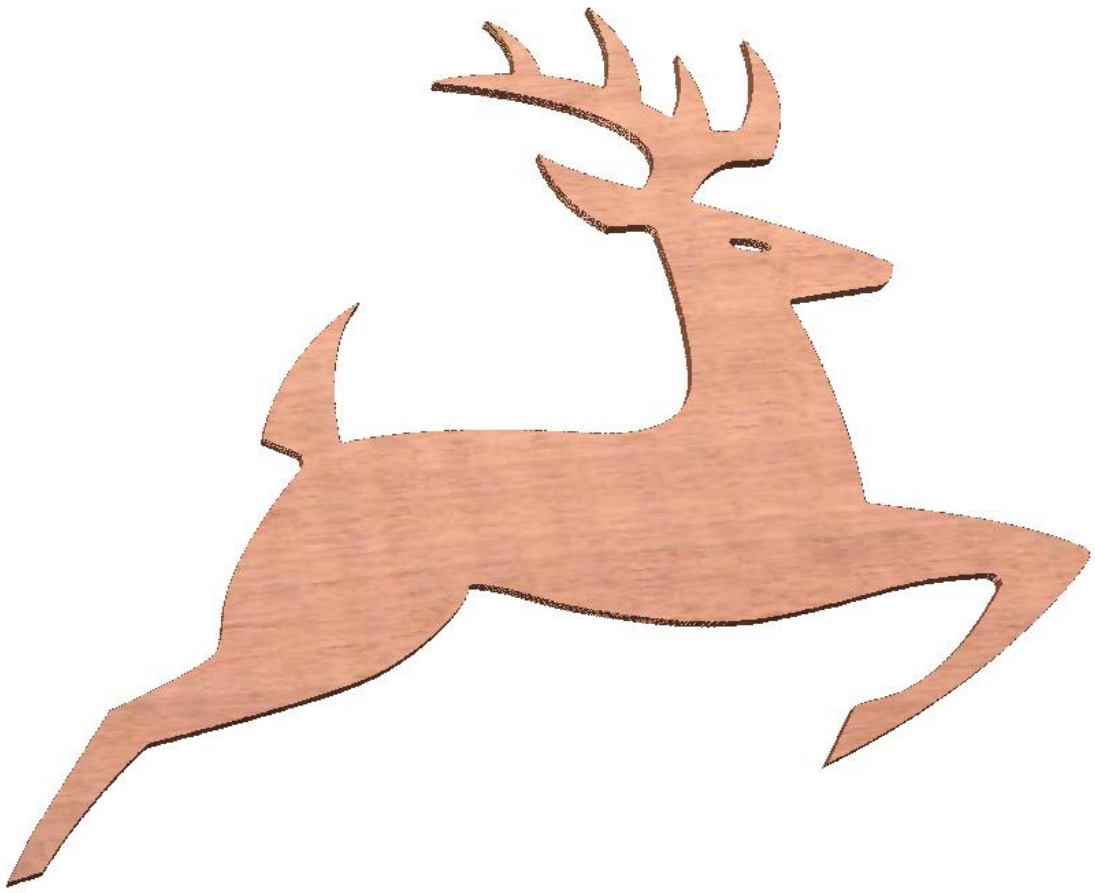
Getting Started With

VCarve Pro 4



Tutorial
Yard Ornament - Reindeer

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.

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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. This manual 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 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 (1/8th) 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, Personalised 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
Switch off all patterns or colour fills
Export as 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 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 Downloadable from the web site and Windows Media Player is required to view the video files.

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.

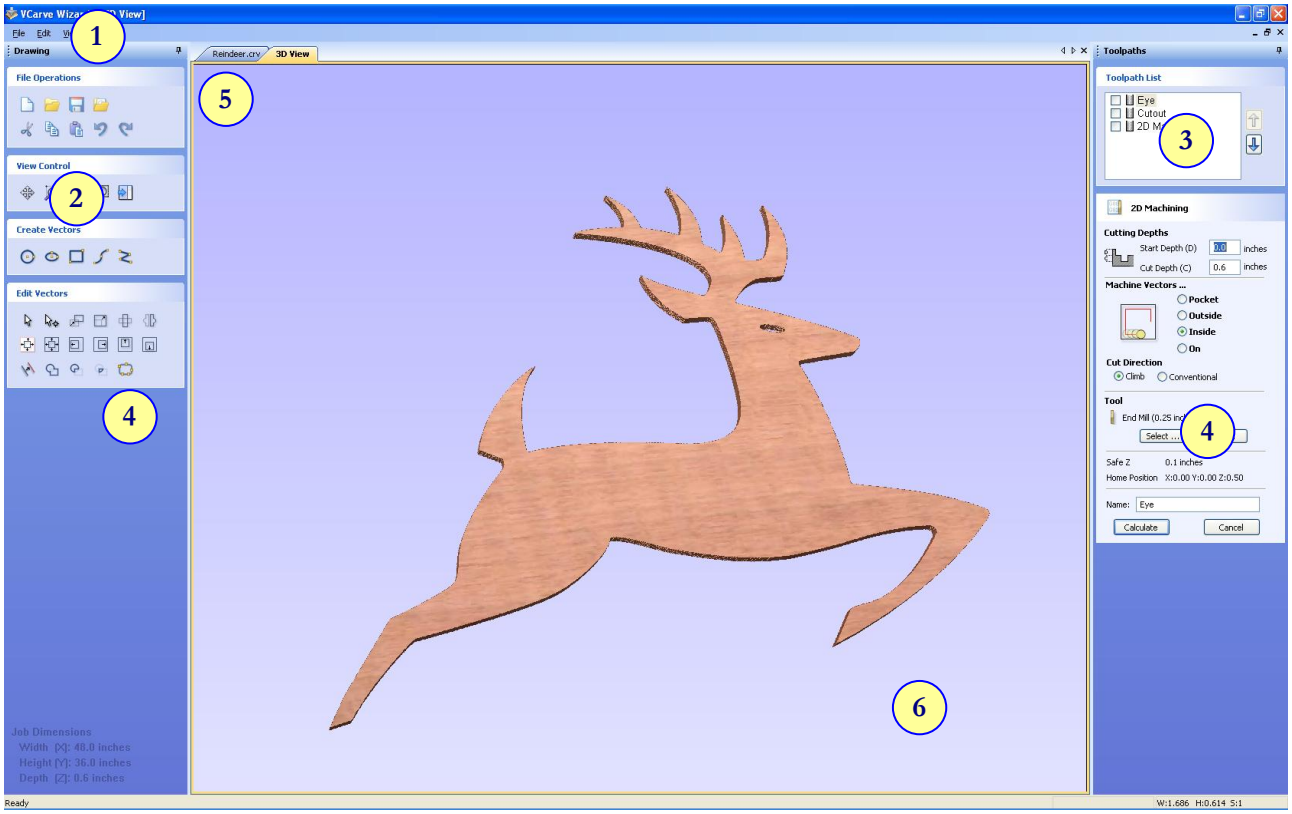
2. The **Drawing Tab** on the left side of the screen provides general drawing tools for design modification, sizing, alignment etc. prior to machining.

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 Wizard. 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.

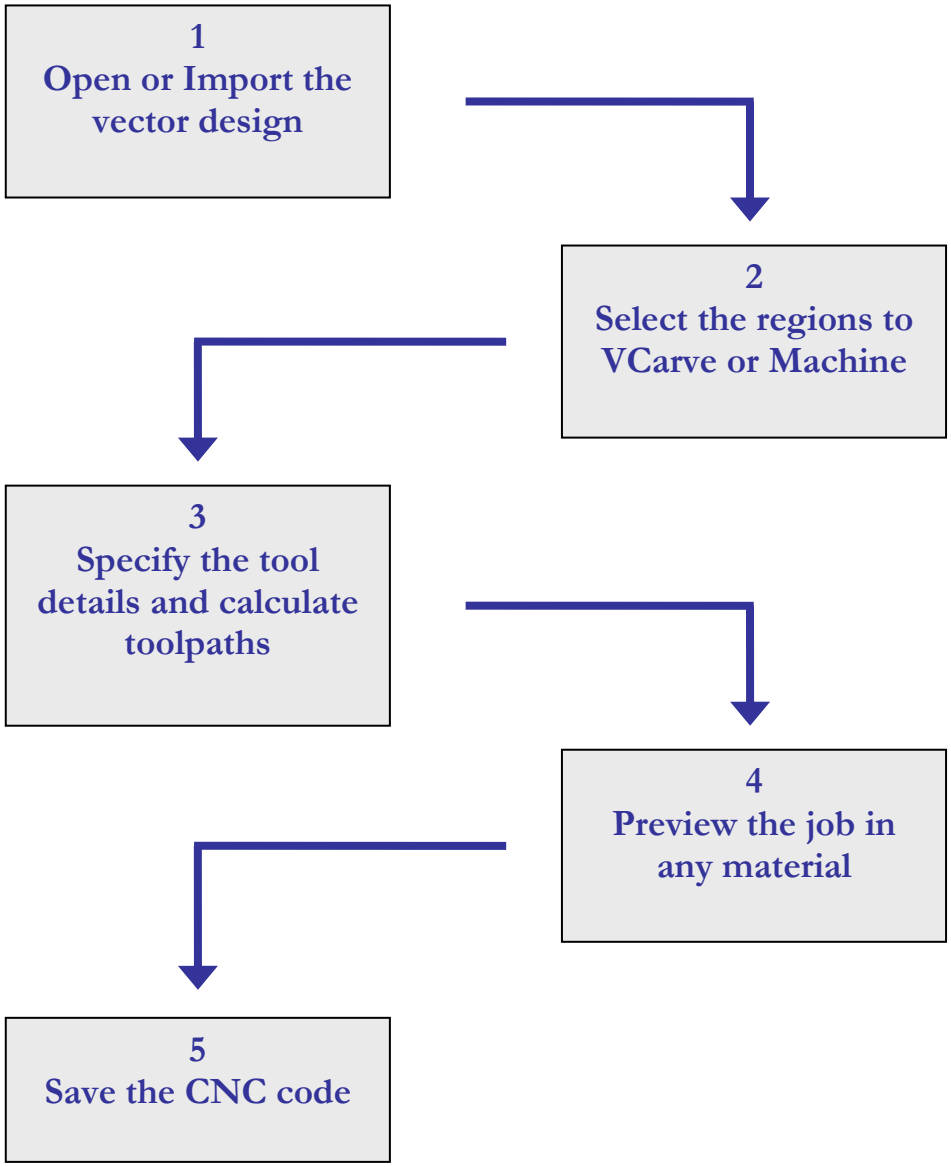
6. The **3D Preview window** shows the calculated toolpaths and colour shaded carved job are displayed.



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.



Although VCarve Wizard's key strength is the toolpath engine it also includes drawing and editing tools that allow design modifications such as positioning and alignment changes to be made. Multiple design elements an also be imported, scaled, positioned and interactively edited to make a new design.

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 all vector geometry 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 usually be imported from another drawing package such as Corel Draw, AutoCAD etc. rather than being completely drawn in VCarve Wizard. 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 the left mouse button to the Top Left or Bottom Left of the objects and then click the corresponding opposite Bottom Right or Top Right corner. This selects all objects fully inside the 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 the left mouse button Top or Bottom Right corner of the objects and the click the corresponding Bottom or Top Left corner. This 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. Pressing the **Esc key** (top left corner on most keyboards) or alternatively

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.

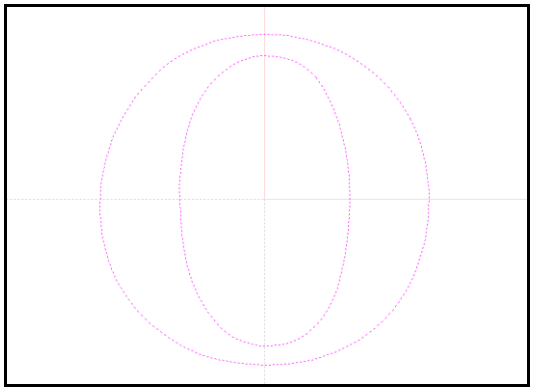
Vector editing

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.

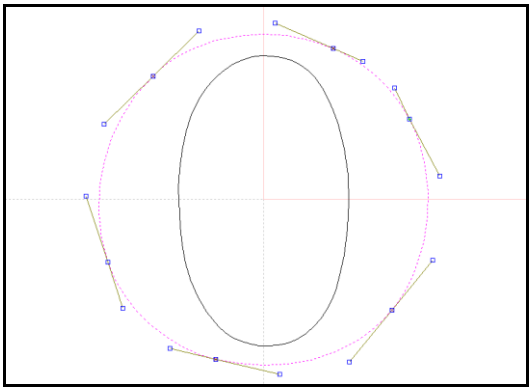
Vector Selection Tool Selected from the Drawing tab on the left

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 the left mouse button over a node to select it, then clicking left mouse button to move the node to a new position.

The shape of lines, arcs and bezier spans can be edited by clicking on the nodes or control points then clicking where the point is to move to.

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.

We recommend that you watch the **5 minute Video** for this Tutorial before proceeding.

The estimated time needed to complete this tutorial is **10 minutes**.

Warning **DO NOT** run this job on your CNC machine unless you are 100% sure that you fully understand how to setup and operate your machine.

Introduction

This tutorial will show you how to open an existing design, calculate simple 2D cut-out toolpaths, preview the results and save the cnc code ready to cut the design shown below on your own cnc machine.

The job is approximately 48" (1220 mm) wide by 36" (915 mm) high and is cut from 0.5" (12 mm) thick material. Both the size of the design and the cutters can be changed to suit whatever you have available.

The complete job will be cut using a 1/4" End Mill.

The finished Yard Ornament

There are 5 simple stages in designing and preparing toolpaths for this job.

1. Open the design
2. Check or modify the material size and thickness
3. Calculate the Profile Cut-out Toolpaths
4. Preview the completed job and estimate the machining times
5. Save the Toolpaths

The file required for this tutorial can be downloaded from the Vectric web site.

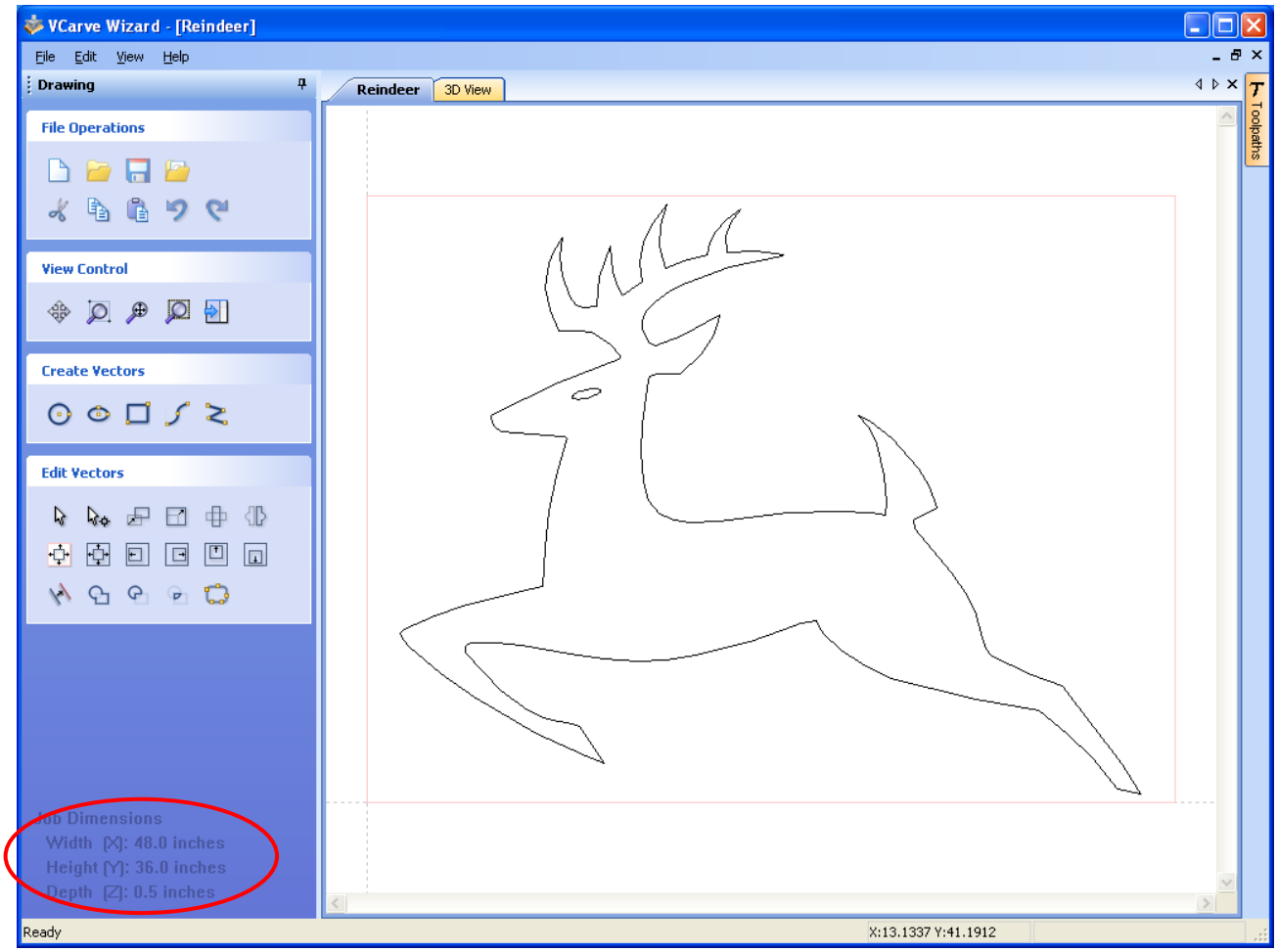
Note: The **Trial version** of VCarve Pro **will save** the toolpaths for this project.

1. Opening the Design

1. From the **Start Tasks** toolbar click on the **Open File**  option and select the file named,

   Reindeer.crv

   The dotted grey lines show where the X0 and Y0 axes are positioned and the pink rectangle represents the bounding box of the material. For this example the X0, Y0 origin position is the bottom left corner of the material.



Note that the physical size of the job is displayed in the bottom left corner of the screen.

Make sure the Units are set correctly!

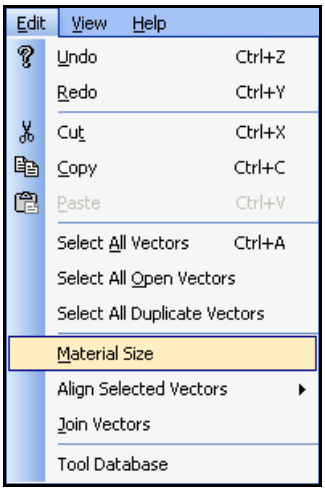
If you wish to cut this design at 48" x 36" into 0.5" thick material then jump to **chapter 3.**

The following chapter explains how to change the job size to suit your machine or the material you have available. In this example the job will be scaled to 36" x 27" x 0.25" thick.

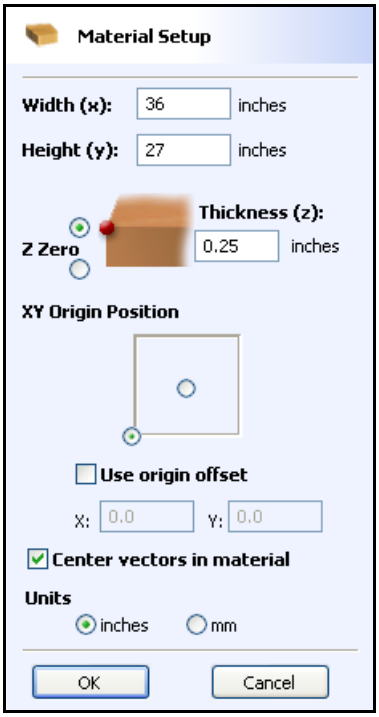
2. Changing the Material size

The default size for this design is 15" x 15" x 0.5" thick, which might be to big to cut on your CNC machine or you may not have a suitable piece of material. Changing the job size is very simple.

2. From the Main Menu along the top of the screen select the **Edit > Material Size**

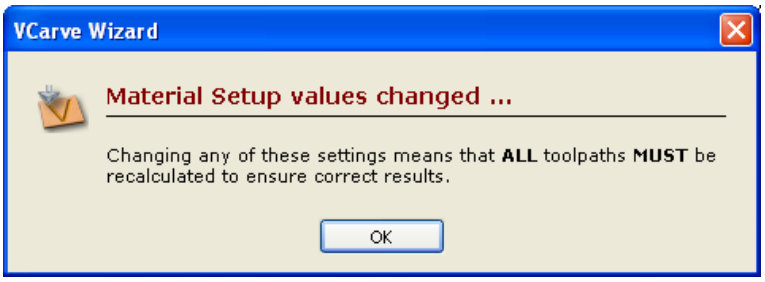


3. The **Material Setup** form is then displayed allowing you to change the Width, Height, Thickness X, Y Origin and units as required.



Note Check the option to **Centre vectors in material** as this will automatically place the design in the middle of the material.

4. Click the **OK** button and the following message will be displayed.



This simply reminds you that the toolpaths in the file need re-calculating for the new material size.

5. Click the **OK** button to continue.

   The new material will be shown as a **Pink rectangle** in the 2D Design Window, with the vectors for the design placed centrally in the window.

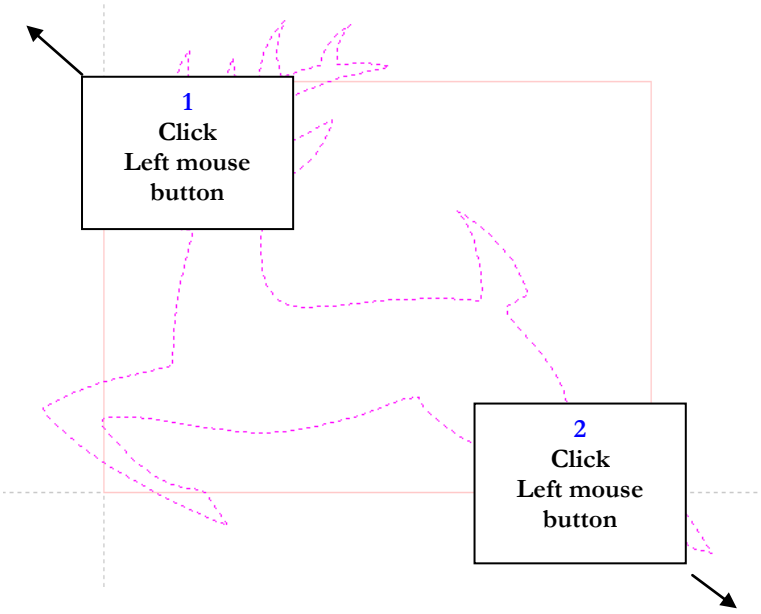
   Next scale the vector design to fit the new material size.

6. Select all of the vectors ready to scale them to the required size.

7. Click the **Left mouse** button on the top **left corner** of the design.

8. Click the **Left mouse** button on the bottom **right corner** of the design.

   Alternatively, press **Ctrl +A** to select the complete design.

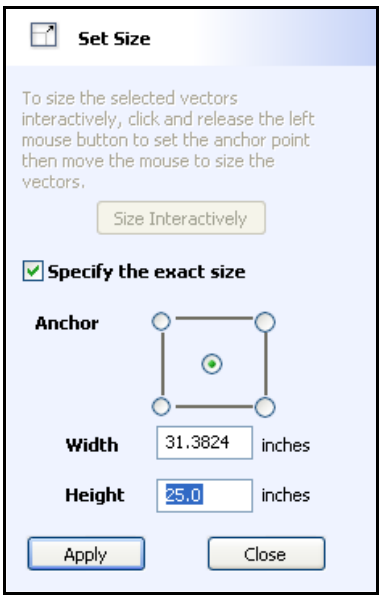


The selected vectors are shown as dotted purple lines

9. From the **Edit Vectors menu** click the **Scale Selected Vectors**  icon.

10. Click the **Specify the exact size** check box and enter the Height = **25"** (the width will automatically scale) as shown on the form below.

    Alternatively, enter the size you wish to cut the design on your machine.

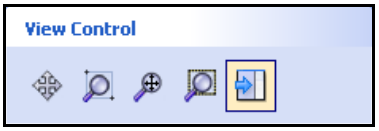


11. Click the **Apply** button and the vectors in the design will be scaled to the specified size.

12. Press the **Close** button to close the form.

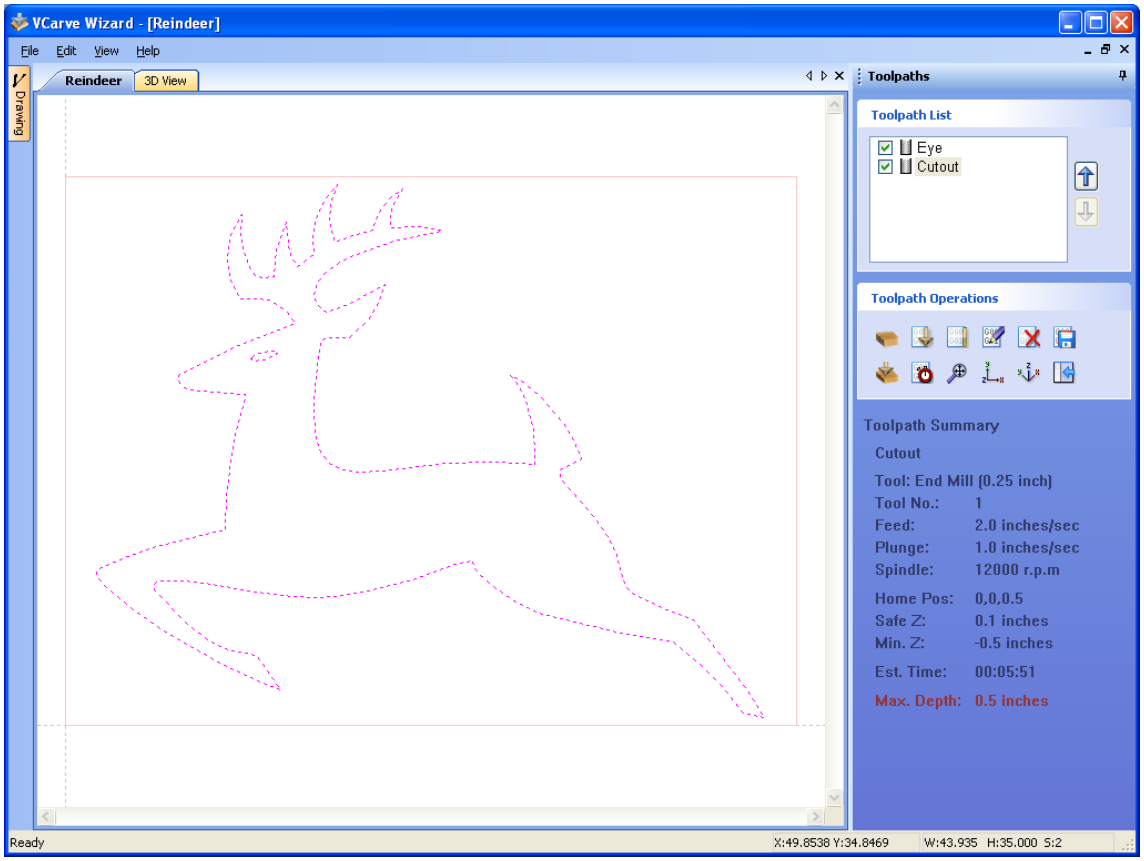
    The design work is now complete and ready for the toolpaths to be recalculated.

13. Click the **Switch to Toolpaths Tab**  icon. This closes the Drawing Tab and opens the Toolpaths Tab on the right side of the interface



3. Calculating Toolpaths

The material size and vector design are now the required size and the interface should show the Toolpath Tab open on the right side of the screen, as shown below.

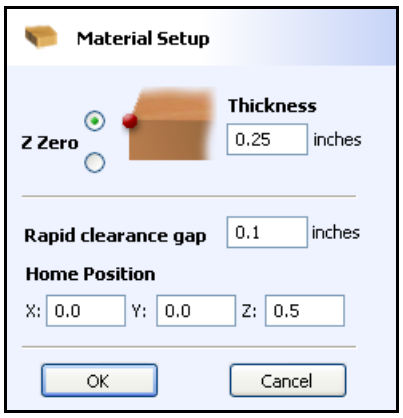


14. Select the **Material Setup** icon  and specify,

    Thickness = **0.25”**

    Rapid Clearance Gap = **0.1”**

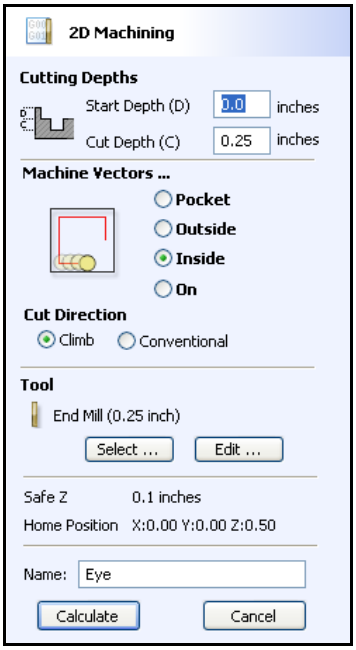
    Home positions to be **X 0, Y 0, Z 0.5”**



Note that the Z Zero position is set on the material surface.

15. Click the **OK** button to accept the settings and close he form.

16. **Double click the Left mouse** button on the first toolpath in the list – **Eye** and the toolpath form will be opened ready for editing.

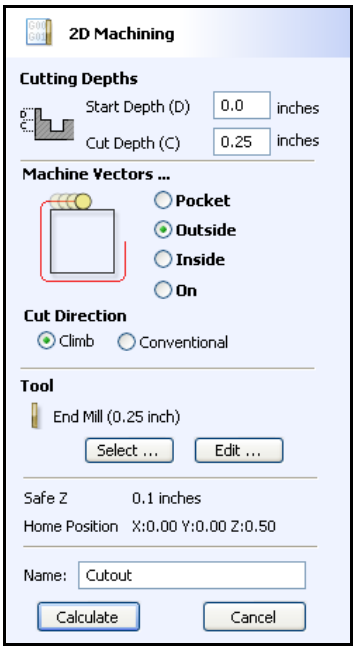


The vector for the Eye of the design is automatically selected in the 2D window

Click **Select** to use different Tool and **Edit** to modify the Speeds and Feedrates etc.

17. Click the **Calculate** button to re-calculate the toolpath for the new job size.

18. Double click the Left mouse button on the second toolpath in the list - **Cut Out** and the toolpath will be opened ready for editing.



Note that the vector to profile machine around is automatically selected in the 2D window

Click **Select** to use different Tool and **Edit** to modify the Speeds and Feedrates etc.

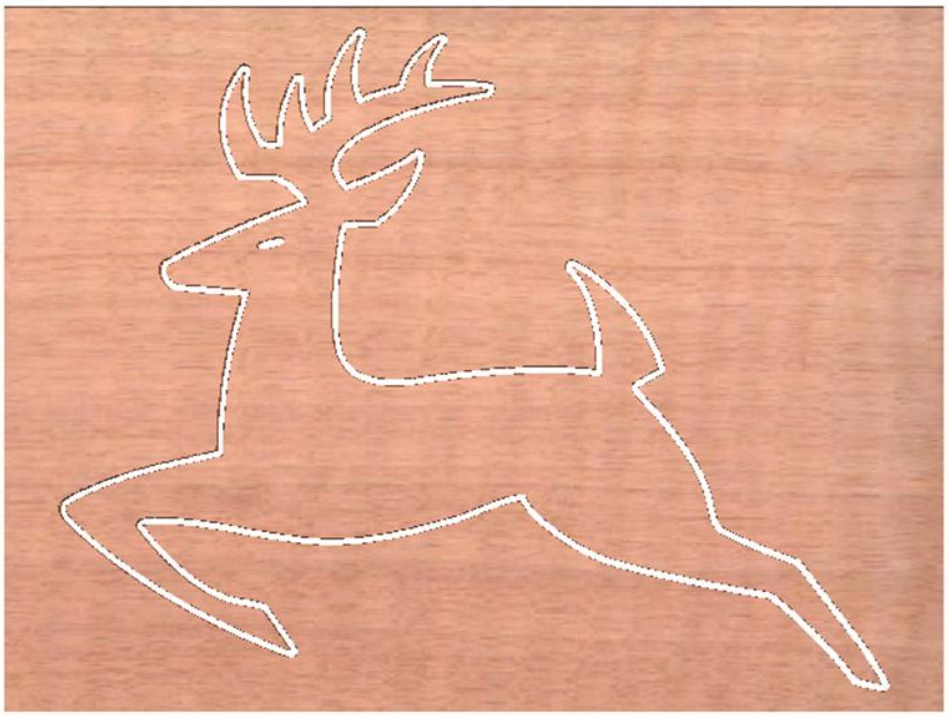
19. Click the **Calculate** button to re-calculate the toolpath for the new job size.

4. Previewing the Toolpaths

The 2 toolpaths can now be previewed to see exactly what they will produce when run on the CNC machine.

20. Click on the **Preview All Toolpaths** 

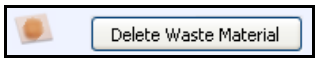
button and each of the tools will be shown simulating the cutting process in the 3D Window. The result is shown below,



Twiddle by clicking and dragging the Left mouse button

Zoom by Pushing / Pulling the Right mouse button

Pan using Ctrl + Right mouse or Left + Right mouse together

21. Click on the **Delete Waste Material** 

icon and the excess material will automatically be removed leaving the finished design.

    There is a known bug with this command that has been fixed for the next major release.

22. Click the **Save Preview** 

icon and save a bmp, jpg or gif image.

    Experiment with different material types and colour settings and save as different images.

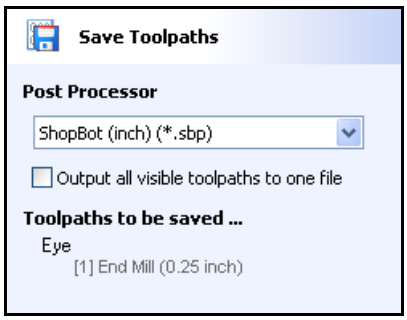
23. Click on the **Estimate Machining Times**  icon to see how long the job will take to cut

    At 35" x 27" this design should take approximately 5 minutes to cut-out the design. This estimate depends on the federates you have used for each cutter.

5. Saving the Toolpaths

24. Save the Toolpaths by clicking the Save  icon.

25. Select the appropriate postprocessor for your CNC machine from the pull-down list.



26. Click to select each toolpath in the **Toolpath List** and **Save** each file with a new name.

Notes: If your machine or controller is not listed please e-mail us at – **support@vectric.com**

Run the toolpath for the Eye first followed by the complete Cut out.

If you have a CNC machine that has an Automatic Tool Changer (ATC), it may be possible to save both toolpaths into a single file.

The **Trial Version** of VCarve Pro can be used to save these toolpaths and cut them on your own CNC machine

6. Technical Support

If you have any questions about this project or need further assistance please e-mail,

support@vectric.com