Getting Started with

VCarve WIZARD

Tutorial 4
Working with Clipart

Vectric

VCarve Wizard

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.

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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 a number of illustrated tutorials that show and explain exactly how to use the VCarve Wizard 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, Personalised gifts
Stone cutting	Memorials, Commemorative engravings

What file formats can be used?

VCarve Wizard 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 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 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 Wizard 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

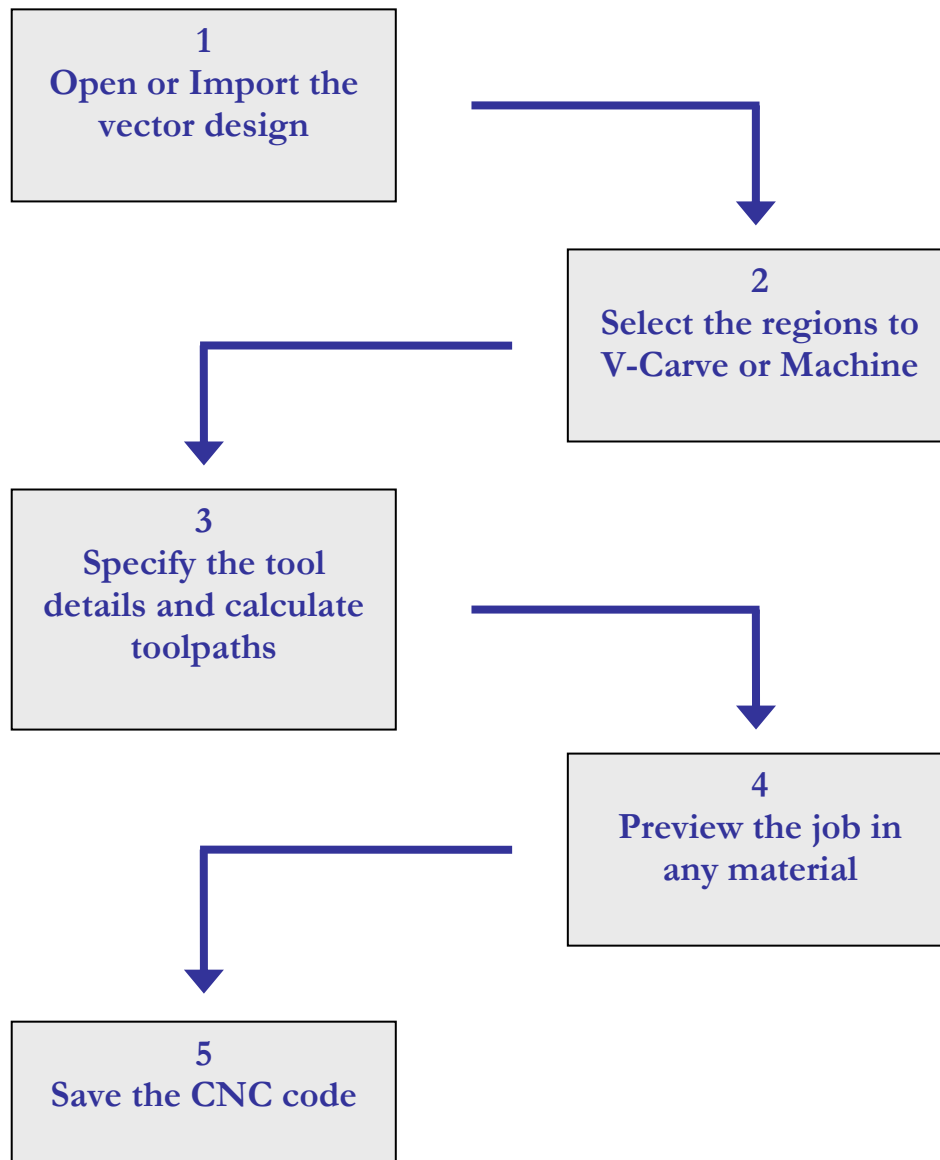The screen area is split into 6 main regions.

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 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 Wizard Logic

VCarve Wizard 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 │
             ▼            │   V-Carve or Machine │
┌─────────────────────┐  └─────────────────────┘
│          3          │
│   Specify the tool  │────────────┐
│ details and calculate │           │
│      toolpaths      │            ▼
└─────────────────────┘  ┌─────────────────────┐
             ┌───────────│          4          │
             │           │   Preview the job in │
             ▼           │    any material     │
┌─────────────────────┐  └─────────────────────┘
│          5          │
│   Save the CNC code │
└─────────────────────┘
```

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 can also be imported, scaled, positioned and interactively edited to make a new design.

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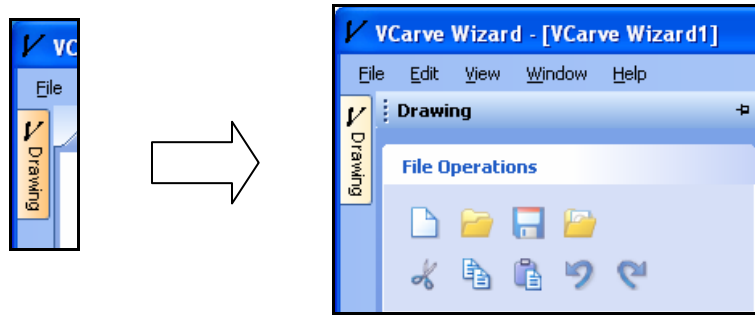
Click on the Drawing Tab to open the Drawing Window
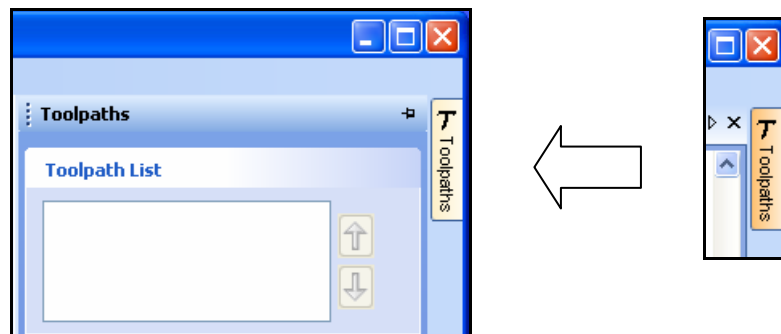
Click on the Toolpaths Tab to open the Toolpaths Window

ⓘ   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.
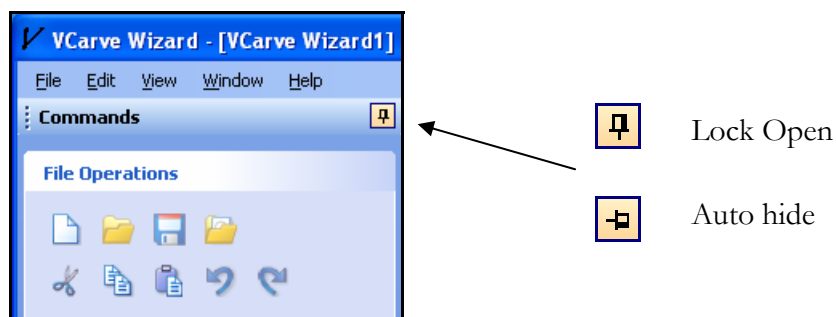
Auto Hide / Show windows

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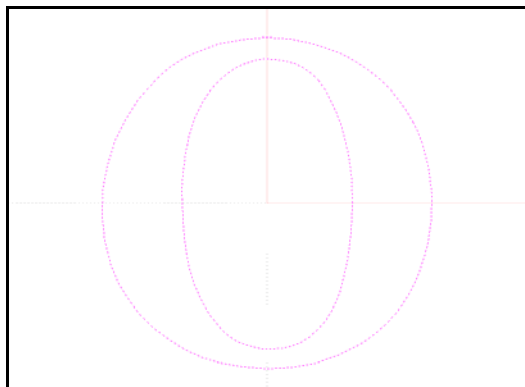
 Vector Selection Tool   Selected from the Drawing tab on the left

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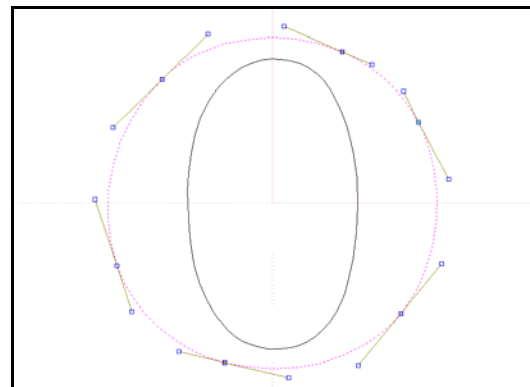
 Node Editing Tool   Selected from the Drawing tab on the left

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.

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

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

NOTE: If you are using the **Trial** version of VCarve Wizard you must load the **Clipart.crv** file to be able to save the toolpaths.

Introduction

This tutorial will show you how to work with multiple pieces of vector clipart to design and V-Carve signs. The sample file includes standard borders and designs that can be mixed and matched to create multiple finished designs. The initial size of the material is 24" (600mm) x 24" (600mm).

The vector designs used in this tutorial are from the commercially available Vector Art clipart library.

Signage from mixed clipart designs

Visit **www.vectorart.com** for more high quality v-carveable vector clipart

This tutorial will explain how to.

1. Open the design
2. Edit the material size
3. Move, Scale and Offset vectors
4. Calculate the 3D V-Carved toolpath
5. Calculate the Profile Cut-out toolpath
6. Preview the completed job
7. Save the Toolpaths

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

C: Program Files\VCarve Wizard\Sample Files\Clipart.crv

1.   Restroom Sign

The file containing these vector designs has been saved as a VCarve Wizard file.

1. From the **Startup Tasks** tab toolbar click on the **Open an existing file** icon, then navigate to the folder,

    C: Program Files\VCarve Wizard\Sample Files

2. Select the file named: **Clipart.crv** and click the **Open** button.
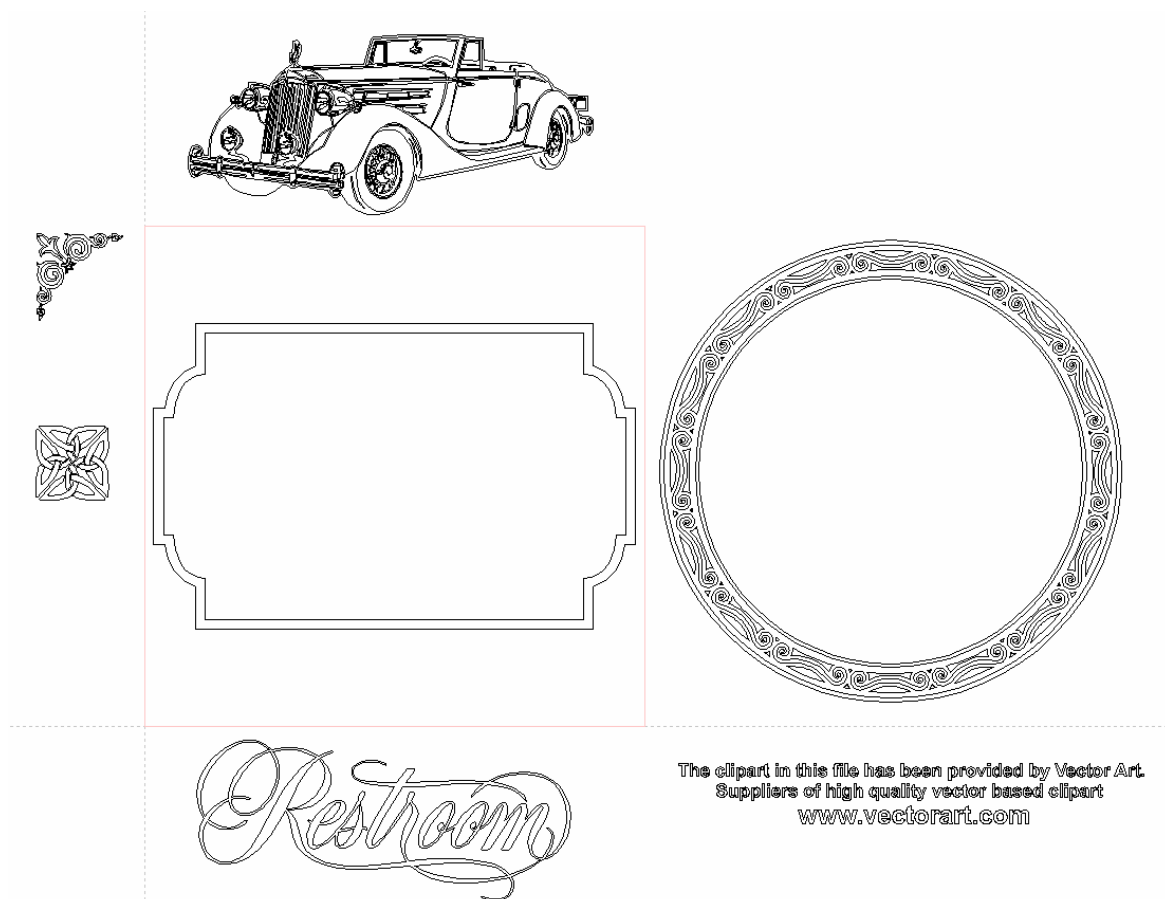
3. The Material size for this job is 24" x 24".

   If you wish to change the material size or thickness select,

   Edit > Material Size from the **Main menu.**

   Specify the material size required and continue

The rectangular sign border positioned in the middle of the job will be used with the Restroom clipart to create a simple sign.

4. Select the '**Restroom'** clipart by clicking **Left** mouse **Top Left corner** and **Bottom Right corner**.

5. Click the **Move** [icon] icon or press the **M** key.

6. Place the cursor approximately in the middle of the selected vectors and Click the Left mouse button. This specifies the origin or anchor point and the vectors are moved relative to this point.

7. The selected vectors now follow the cursor. **Move** the cursor into the middle of the sign and click **Left** mouse button to reposition the selection.
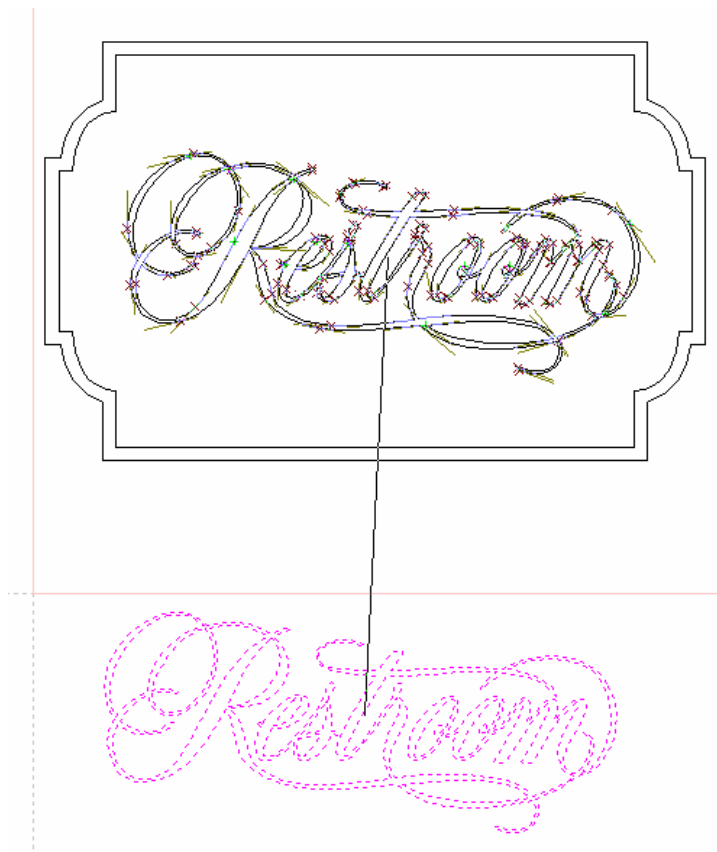
ⓘ Alternatively, use the **Alignment** tools or press **F9** to Center the selection in the job

Next calculate the V-Carve Toolpath using a 90 degree included angle 1" diameter tool.

8. Switch from the **Drawing Tab** to the **Toolpaths Tab** by clicking the **Switch** [icon] icon.
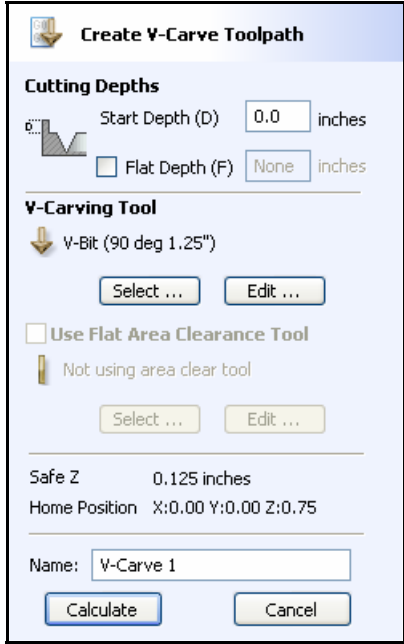
This closes the Drawing tab and opens the Toolpaths tab on the **Right side o**f the interface.

1. Click the **Left mouse** button **Top Left corner** and **Bottom right corner** to select the vectors.
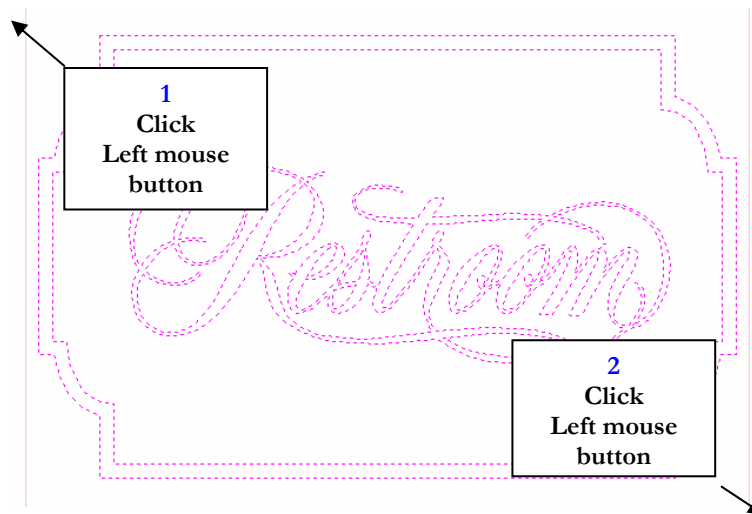
The selected vectors are shown as dotted purple lines

9. Click the **Create VCarve Toolpath** icon and complete the form as shown below

In this example **Select** a 1.25" Diameter – 90 Degree included angle tool. from the Tool Database

The feed rates should be set to suitable values for your machine and the material being cut.

A unique name can be entered or simply left as the default..
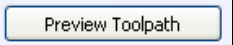
10. Click the **Calculate** button and the V-Carving Toolpath will be calculated. The **3D Window** and the **Preview form** are automatically opened.

11. Click the **ISO View** icon and the job + toolpath will be shown as below.
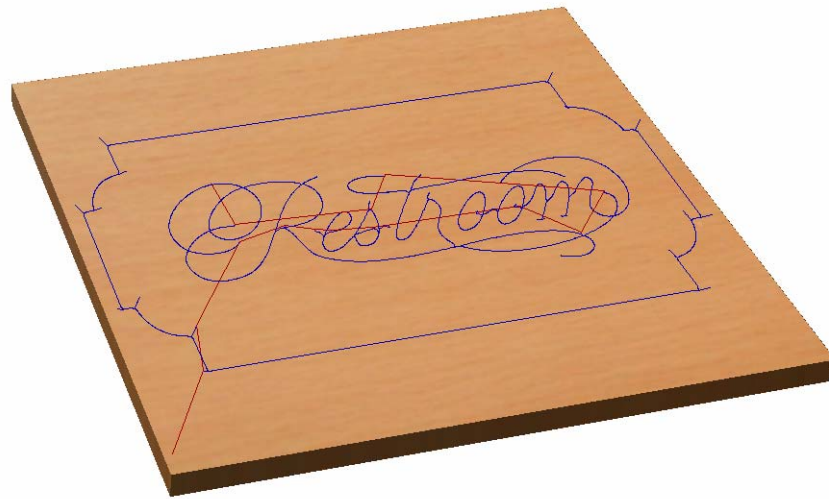
12. The name of the calculated toolpath appears in the **Toolpath List** in the top right corner of the interface.

    A simulation of the toolpaths cutting into the material can now be shown in the 3D Window

13. Click the **Preview Toolpath** [Preview Toolpath] icon and the tool will be shown cutting into the material.

14. Experiment with different **Material types** and **Fill colors** to display the Preview image in the material that the job will be routed from.

Next offset the outer vector and create a Profile around this shape that can be used to cut the finished job out of the material.

15. Switch to the **Drawing Tab** by clicking the Switch to Drawing [icon]. This opens on the Left side of the interface.

16. Open the 2D Window by clicking on the [Clipart_tutorial 3D View] tab or Pressing the **F2** key.

17. Select the outer most vector by **Click the Left** mouse button on it.

Click Left mouse button
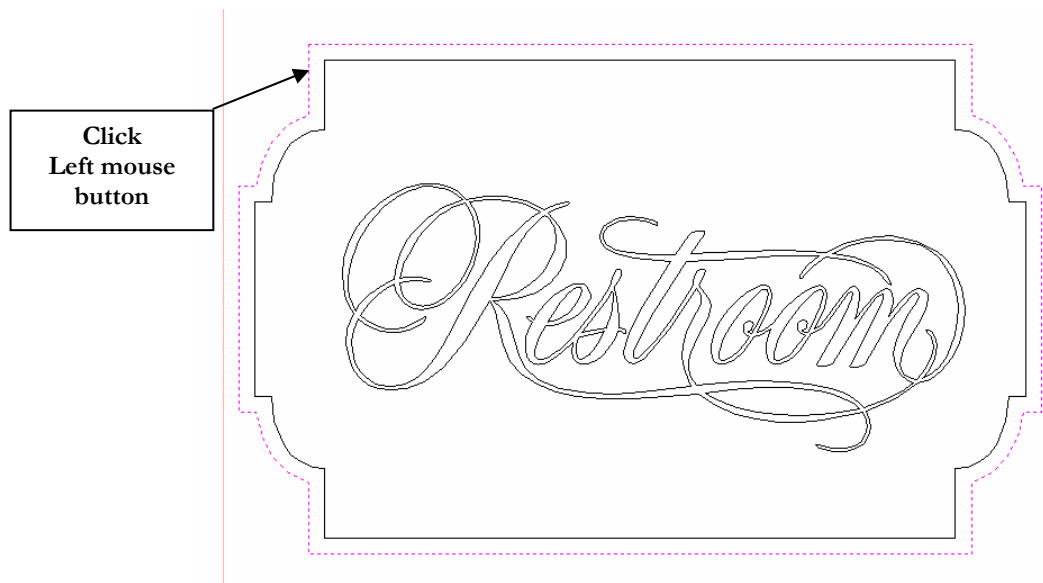
The selected vector is displayed as a dotted purple line

18. Click the **Offset** icon and enter a distance of **0.5"** and select the **Outwards** option as shown below.
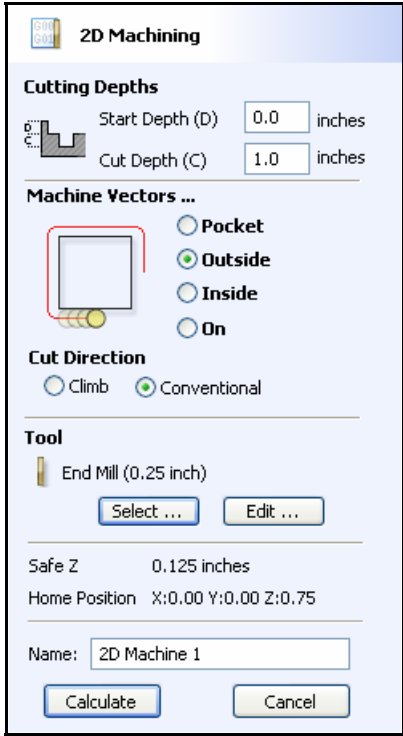
Offset Vectors

- ● Outwards
- ○ Inwards

Distance: 0.5

[Offset]   [Close]
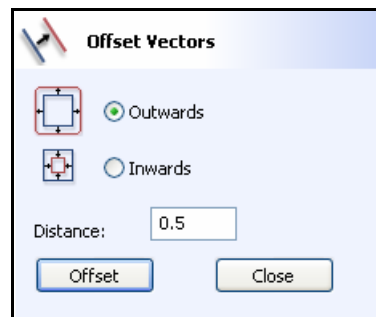
19. Click the **Left mouse** button to select the new line around the outside of the design.

Click Left mouse button
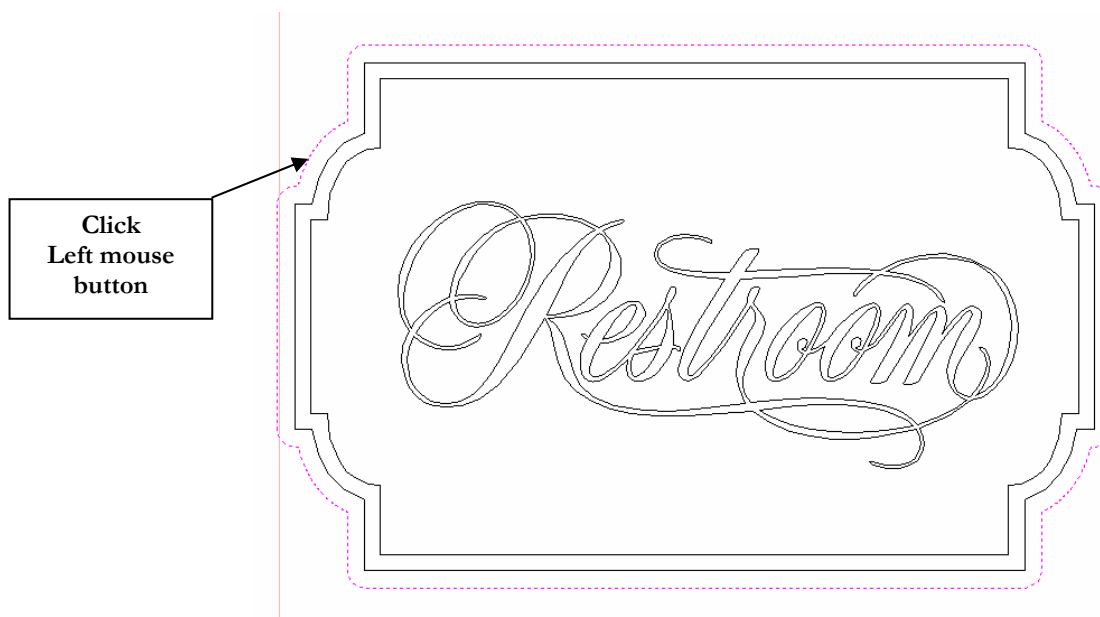
20. Switch from the **Drawing Tab** to the **Toolpaths Tab** by clicking the **Switch** icon.

21. Click the **Create 2D Toolpath** icon and complete the form as shown below

In this example **Select** a 1/4" diameter End Mill from the Tool Database and specify the Pass Depth to be 0.4", which will cut through the material in 3 passes.

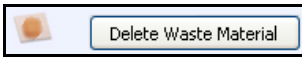The feed rates should be set to suitable values for your machine and the material being cut.

A unique name can be entered or simply left as the default.

22. Click the **Calculate** button and the Profile Toolpath will be calculated. The 3D Window and the Preview form are automatically opened.
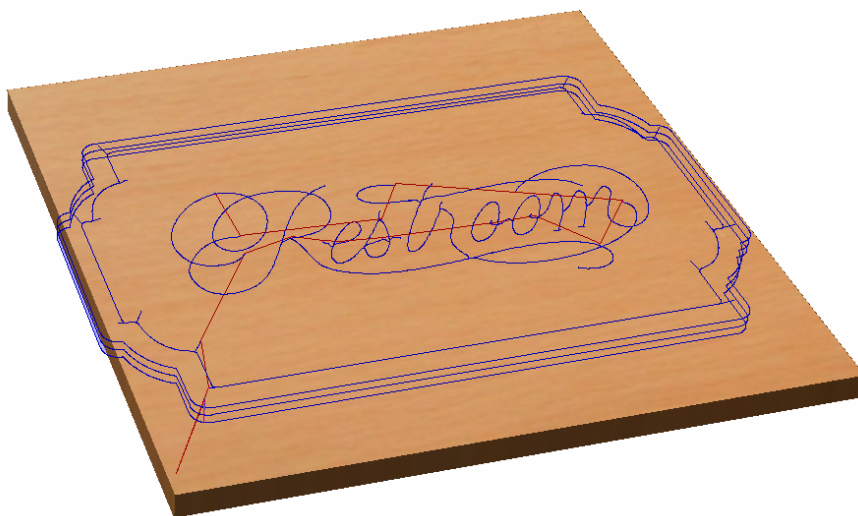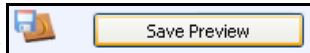

The 3D Window and the Preview form are automatically opened.

23. Click the **Preview All Toolpaths** [Preview All Toolpaths] icon and each tool will be shown cutting into the material.

24. Click the **Delete Waste Material** [Delete Waste Material] icon to remove the excess material, showing the finished job.

25. Experiment with different **Material types** and **Fill colors** to display the Preview image in the material that the job will be routed from.

26. When the sign looks the way it should, click the **Save Preview** [Save Preview] icon and save the image to a file so it can be printed or e-mailed etc.

27. Save the Toolpaths by clicking the **Save** [icon] icon.

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

29. If you have a CNC machine that has an **Automatic Tool Changer** (ATC), both toolpaths can be saved into a single file.

Important   It is very important that the toolpaths for ATC machines have different tool numbers and are saved in the correct sequence. Use the Arrows on the right side of the Toolpath list to order the toolpaths.

NOTE: If you are using the **Trial** version of VCarve Wizard you must load the **Clipart.crv** file to be able to save the toolpaths.

2.   Carved Car Sign

The second part of this tutorial follows on from the previous section and uses the Restroom design. The middle part of the sign is selected and deleted, then the car and corner details will be scaled and positioned for the new design.

1.   Select the '**Restroom'** clipart by clicking **Left** mouse **Top Left corner** and **Bottom Right corner**.
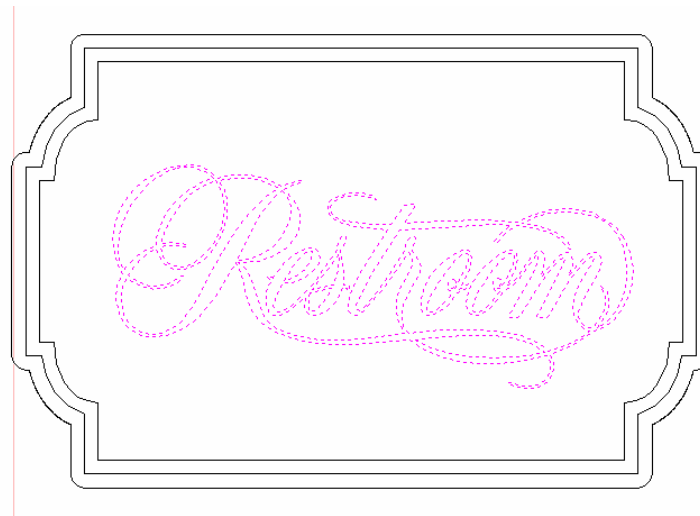

2.   Press the **Delete key** on the **keyboard** or click the **Right mouse** button and select **Delete**.

3.   Click the **Left mouse** button **Top Left corner** and **Bottom right corner** to select the vectors for the car design.

1
Click Left mouse button

2
Click Left mouse button

3
Shift + Click Left mouse button
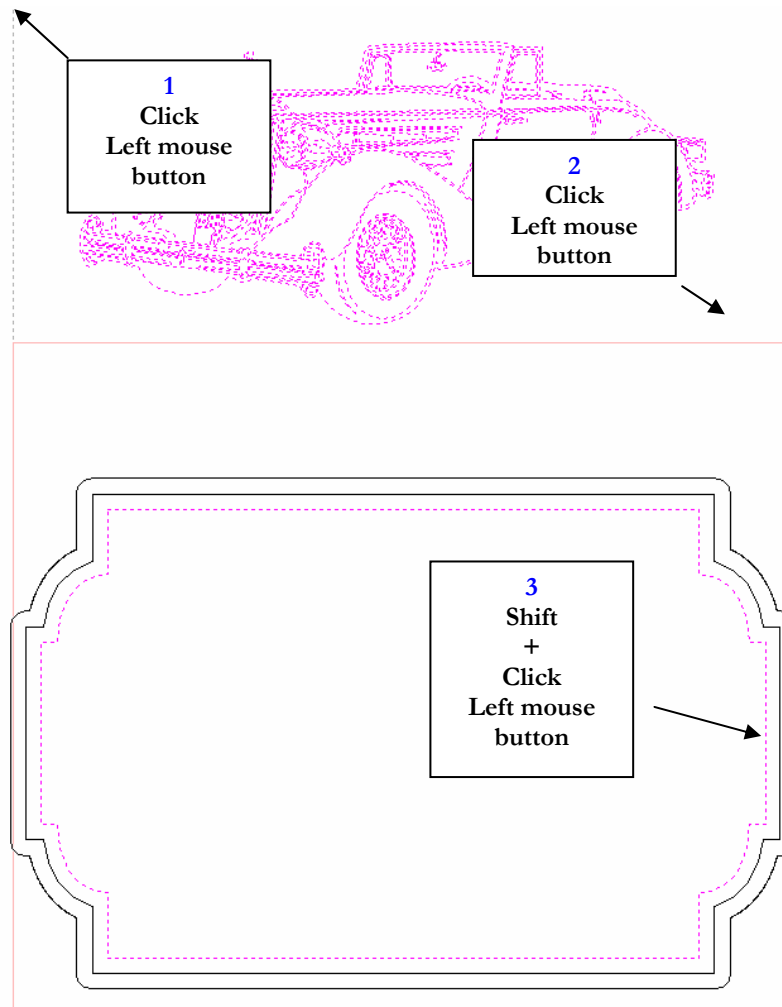
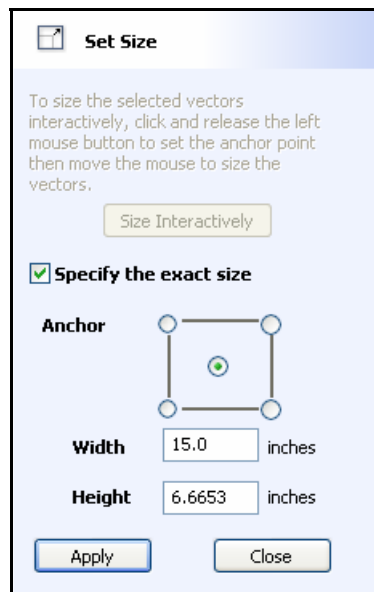4. Holding the **Shift key** down select the **Inner most vector** of the sign border as shown above.

5. Click the **Center Vectors** icon and the Car will be positioned in the middle of the sign
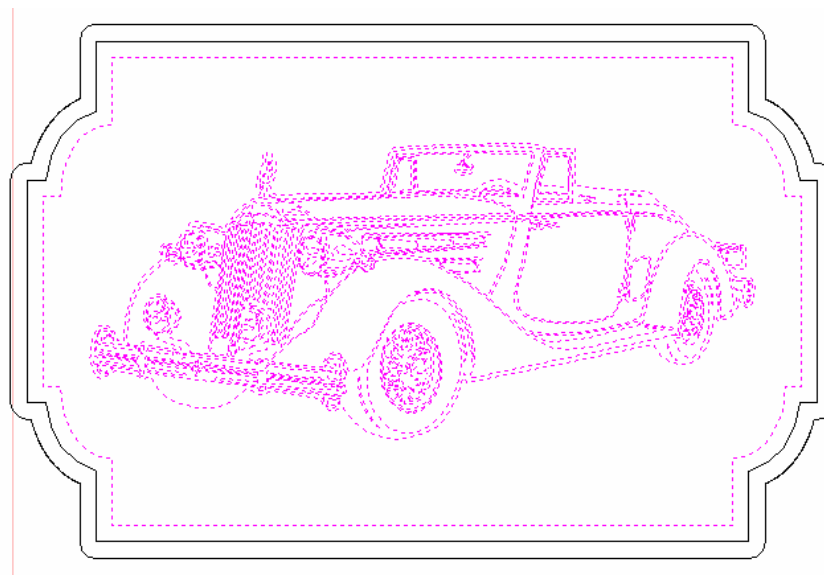
6. Deselect the **Inner** border vector by holding the **Shift key** down and click **Left mouse** button.

This will leave only the car selected.

7. Click the **Scale** selected vectors icon and complete the form as shown below.

Set Size

To size the selected vectors interactively, click and release the left mouse button to set the anchor point then move the mouse to size the vectors.

Size Interactively

☑ **Specify the exact size**

Anchor

Width 15.0 inches

Height 6.6653 inches

Apply   Close

Alternatively, scale the car design interactively by,

Clicking the Left mouse approximately in the middle of the design

Moving the cursor to scale the vectors to the required size

Clicking the Left mouse to complete the scaling operation

8. Press the **Esc key** to deselect the vectors.

Or click the **Right mouse** button and select **Unselect All** from the quick menu list.

9. Move the corner flourish into the design by clicking Top left corner and Bottom Right corner to select the design.

1
Click
Left mouse
button

2
Click
Left mouse
button
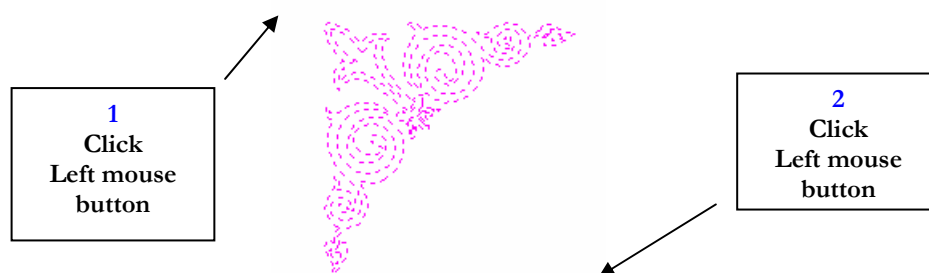
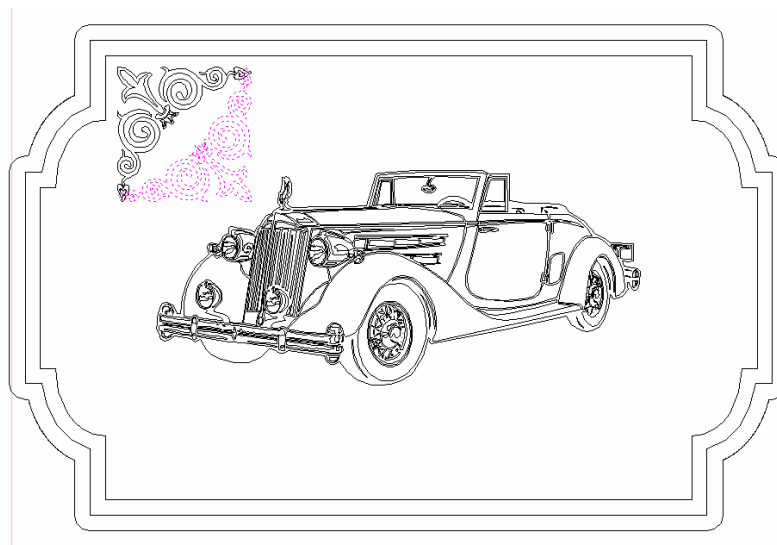10. Click the **Move** icon and click **Left mouse** to specify the 'origin point'

11. Move the cursor to the required position and **Click the Left** mouse button to finish the operation. You will see the selected vectors moving with the cursor.

1
Click
Left mouse
button

2
Click
Left mouse
button
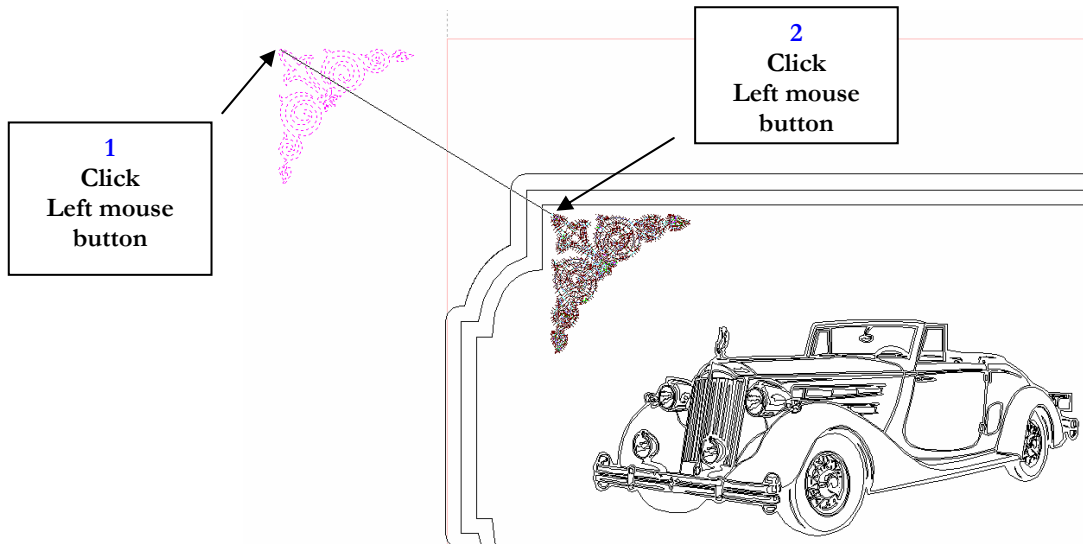
12. With the corner flourish still selected click the **Copy** [icon] and **Paste** [icon] icons. The new vectors are pasted directly on top of the originals.

13. Click the **Mirror** [icon] icon.

14. Click **Flip Horizontal** then **Flip Vertical** to leave the second flourish as shown below.

15. Click the **Move** [icon] icon (or press **M** on the keyboard) and click **Left mouse** to specify the 'origin point'.

16. Move the cursor to the bottom right corner on the design and **Click the Left** mouse button to finish the operation. You will see the selected vectors moving with the cursor.
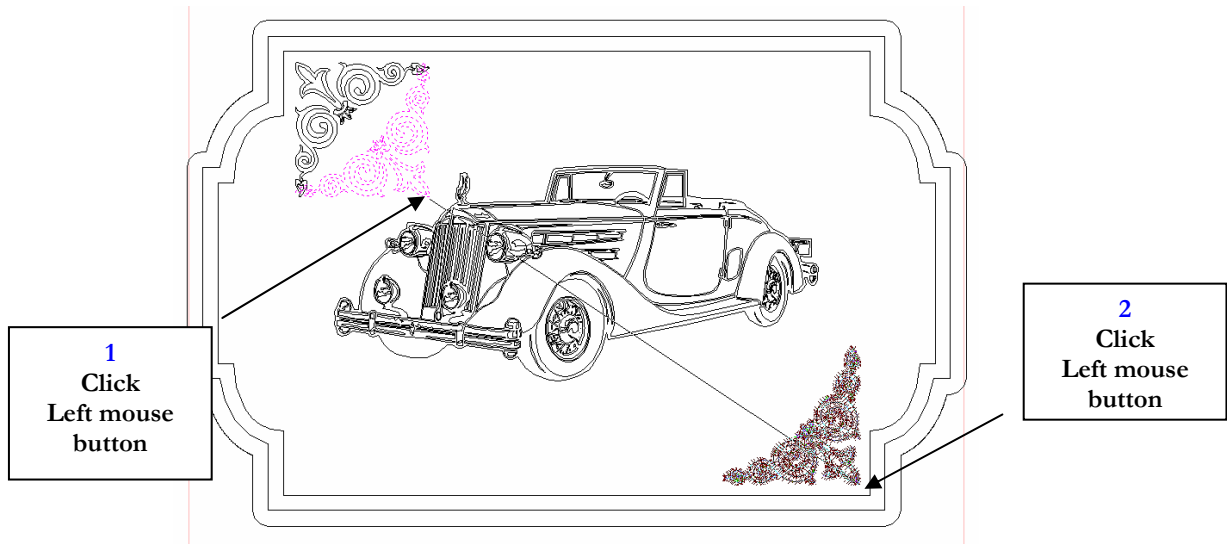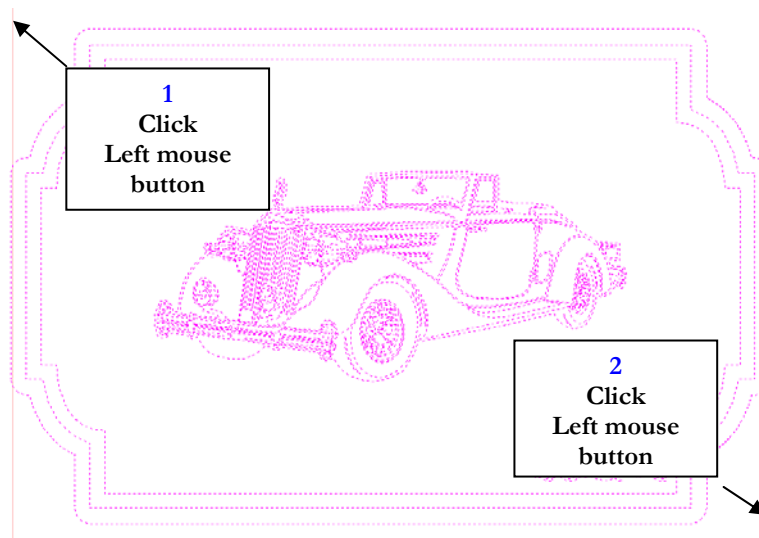
The design is now complete and ready for calculating toolpaths.

17. Switch from the **Drawing Tab** to the **Toolpaths Tab** by clicking the **Switch** icon.

    This closes the Drawing tab and opens the Toolpaths tab on the **Right side o**f the interface.

18. Click the **Left mouse** button **Top Left corner** and **Bottom right corner** to select the vectors.

    The selected vectors are shown as dotted purple lines

19. Deselect the outer most vector of the border design by **Holding the Shift key** down, click **Left** mouse on it. The unselected vector is then drawn as a Black line.

20. Click the **Create VCarve Toolpath** icon and complete the form as shown below
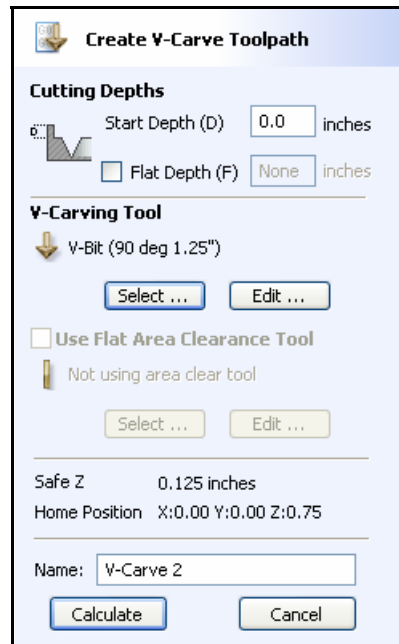
In this example Select a 1.25" Diameter – 90 Degree included angle cutter from the Tool Database.

The feed rates should be set to suitable values for your machine and the material being cut.

A unique name can be entered or simply left as the default..

21. Click the **Calculate** button and the V-Carving Toolpath will be calculated. The **3D Window** and the **Preview form** are automatically opened.

22. Click the **ISO View** icon and the job + toolpath will be shown as below.
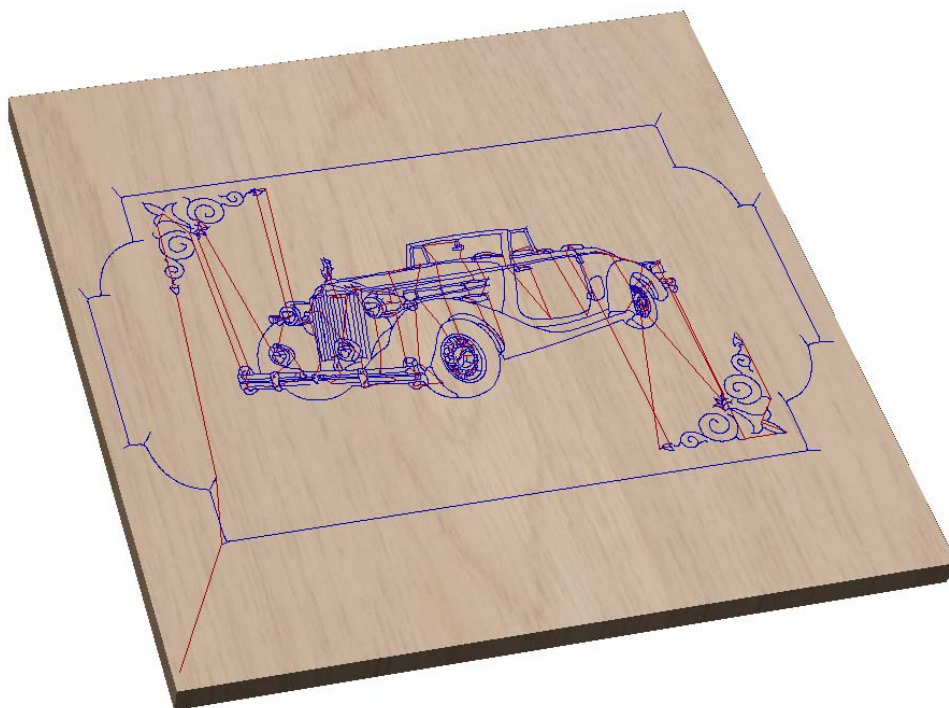
23. The name of the calculated toolpath appears in the **Toolpath List** in the top right corner of the interface.

A simulation of the toolpaths cutting into the material can now be shown in the 3D Window

24. Click the **Preview Toolpath** [Preview Toolpath] icon and the tool will be shown cutting into the material.


25. Experiment with different **Material types** and **Fill colors** to display the Preview image in the material that the job will be routed from.
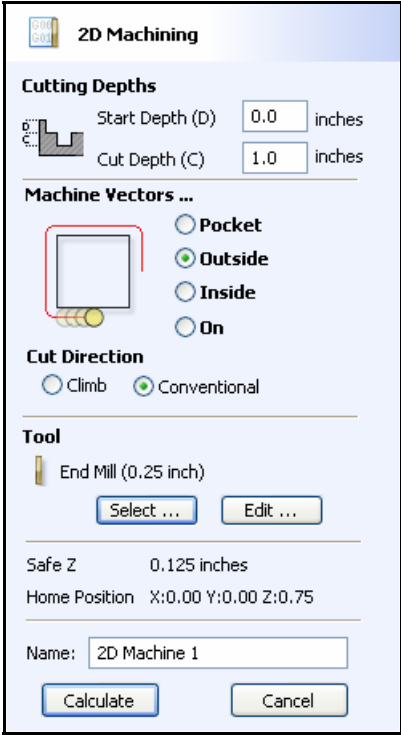
26. Switch from the **Drawing Tab** to the **Toolpaths Tab** by clicking the **Switch** icon.

27. Open the **2D Window** by clicking on the [Clipart_tutorial / 3D View] tab or Pressing the **F2** key.

28. Click the **Left mouse** button to select the outer line around the outside the design.

Click
Left mouse
button
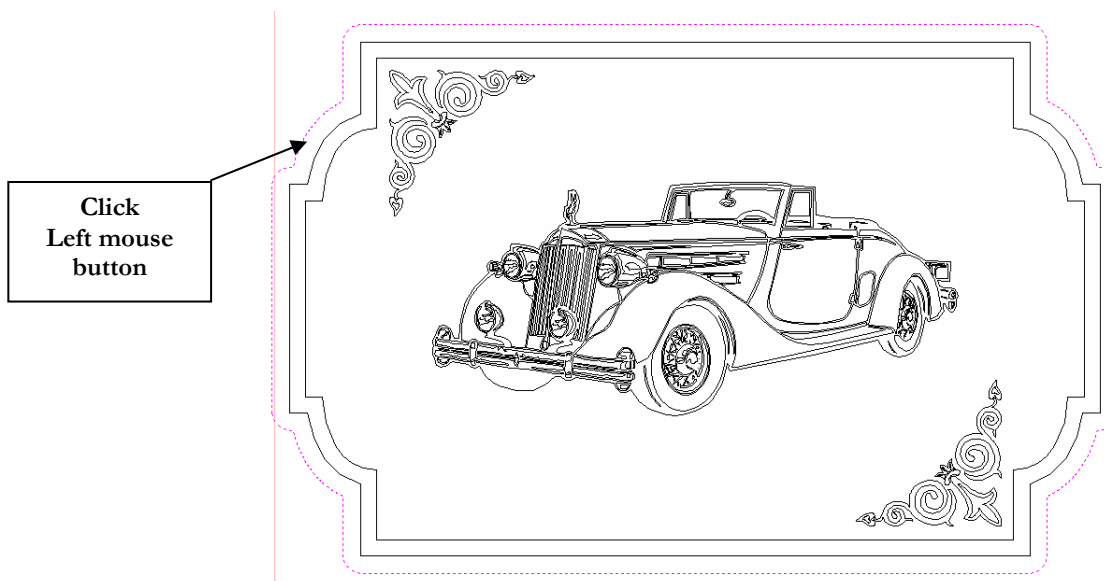
30. Click the **Create 2D Toolpath** icon and complete the form as shown below

In this example **Select** a 1/4" diameter End Mill from the Tool Database and specify the Pass Depth to be 0.4", which will cut through the material in 3 passes.

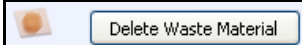The feed rates should be set to suitable values for your machine and the material being cut.

A unique name can be entered or simply left as the default.

29. Click the **Calculate** button and the Profile Toolpath will be calculated. The 3D Window and the Preview form are automatically opened.


The 3D Window is opened and the Preview form is opened.

30. Click the **Preview All Toolpaths** [Preview All Toolpaths] icon and each tool will be shown cutting into the material.

31. Click the **Delete Waste Material** [Delete Waste Material] icon to remove the excess material, showing the finished job.

32. Experiment with different **Material types** and **Fill colors** to display the Preview image in the material that the job will be routed from.
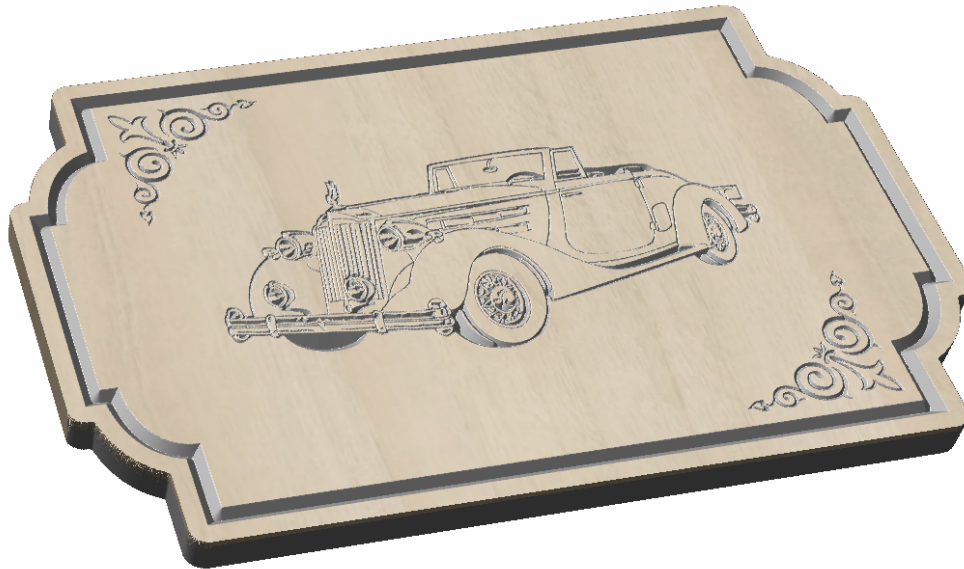
33. When the sign looks the way it should, click the **Save Preview** [Save Preview] icon and save the image to a file so it can be printed or e-mailed etc.

34. The estimated machining times can be determined by clicking the [icon] icon. This displays the total machining time and time for each toolpath.

35. Save the Toolpaths by clicking the **Save** [icon] icon.

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

37. If you have a CNC machine that has an **Automatic Tool Changer** (ATC), both toolpaths can be saved into a single file.

   Important   It is very important that the toolpaths for ATC machines have different tool numbers and are saved in the correct sequence. Use the Arrows on the right side of the Toolpath list to order the toolpaths.

NOTE: If you are using the **Trial** version of VCarve Wizard you must load the **Clipart.crv** file to be able to save the toolpaths.