TreeSoft Spirals

Spirals was written by Paul Rowntree, based on information and sample source codes provided by Vectric and other 'gadgeteers'. Any flaws in this package were introduced by me. I believe it works well, but no guarantees are given for its use in any application. **Spirals** works with Aspire 4.0 (or greater) and VCP 7.0 (or greater). **It will not work with previous versions of either program.** Although Rowntree retains copyright, you are free to use the components in any way you wish, including personal and commercial applications. You are not permitted to redistribute the files, nor remove the copyright information that they contain, without written permission.

Spirals is shareware, meaning that you are not required to purchase the software in order to use it.

Check this site and Vectric.com for updated versions of **Spirals**.

Change Log

April 26 2013	- Added Tool Diameter and Stepover direct-edit fields
April 17 2013	- Registry-recovered fields added
April 14 2013 ?	- First draft written and working

Disclaimer

By downloading, installing and using this program you are accepting full responsibility for any and all consequences. CNC machinery is potentially dangerous, and the user is 100% responsible for ensuring that the output of **Spirals** is safe to use, and that it will have the desired effects.

As always with CNC equipment, think many times before running code, and doing air cuts is often a good idea with new files. Verify the X,Y and Z limits of the loaded files before cutting to ensure that you are not going to destroy your table top, spindle, or both.

<div align="center">Work and Play safely.</div>

What is Spirals ?

Spirals is a 'gadget' for Vectric's Aspire 4.0 (and higher) and V-Carve Pro 7.0 (and higher) CAD/CAM tools. It builds spiral vectors that can be profiled to make toolpaths that behave very much like conventional Vectric concentric-circle pockets, except that

1) The CNC tool velocity is more constant throughout the profile, which may make for faster, smoother cuts;
2) The CNC tool approaches the outer wall of the pocket tangentially, and does not leave a mark on the wall;
3) The CNC tool pulls off the wall tangentially before lifting, again avoiding the vertical mark;
4) The Aspire 4/VCP7 software provides more flexibility on the pass-depths of profiles than the standard pocket toolpaths, so you can control the finishing passes as you wish;
5) You can control the direction that the tool is moving at the end of the spiral more precisely, which allows you to align it with the grain of the material.

The gadget works in Aspire and VCP in exactly the same way.

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Unpacking Spirals

If using a Vectric installer, the files are already in their correct locations and are ready to run. Alternatively, the archive can be opened with Windows, WinZip, Z-zip, or any other standard unzipping program. Extract the files to any directory, then move the individual components in the directories shown below. Aspire or VCP will find the gadgets and show them in the Gadgets menu lists.

Windows Path	Contents
Aspire and VCP User Gadget directories, created during Aspire or VCP installation **C:\Users\Public\Public Documents\Vectric Files\Gadgets\Aspire Vx.y** or **C:\Users\Public\Public Documents\Vectric Files\Gadgets\VCarve Pro x.y**	**TreeSoft Spiral Profiles.lua** **TreeSoft Spiral Profiles.html** If you want, you can create a subdirectory and place these files inside it. This unclutters the Gadgets menu of Aspire and VCP.
Anywhere you want	**TreeSoft Spirals.pdf** (this file)

Using Spirals

The following values describe a Spiral's properties:

| Data Field	Meaning	Values
Tool Diameter	Diameter of the tool used to make the profile.	>0
Stepover	Distance that the spiral moves outwards on each complete rotation about the centre of the spiral	>0
Direction	Direction that the tool rotates about the centre of the spiral; CW corresponds to conventional machining, CCW is Climb machining	CW or CCW
End Spiral Position	The spiral reaches the final diameter at a specific position, then does a complete 360o circle along the outer wall of the pocket to end at the same position. Can be used to align the spiral with the grain of the material.	12h00, 3h00, 6h00, 9h00

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1) After installing the files, restart Aspire or VCP, and verify that it has found the TreeSoft Spiral Profile.lua file by checking the Menu>Gadgets listing.

2) Before running the gadget, create a project and create one of more circular vectors on the 2D presentation. Although circular vectors make the most sense, Spirals can use any vector to define the position and size of the spiral : **Spirals calculates the diameter as the smaller of the vector's width and height.**

3) Select all of the circles, *but do not group them*.

4) Run the **Spirals** gadget, which will present a dialog box similar to the one shown below.

5) The text bar just below the explanatory text should identify the number of vectors that you selected.

6) Choose a tool from the standard Vectric Tool database. **Spirals** will accept end-mills, ball-nosed bits, and radiused end-mills, but all calculations assume an end-mill. The **only** reason to pick a tool is to simplify entering information for step (7).

7) When a tool is selected, its diameter and stepover are converted to the current project's units, and displayed in the numerical entry fields. You are free to edit these values here (instead of altering the Tool Database values directly), but there should be no reason to change the Tool Diameter. **Spirals** will warn you if the database diameter is different from the numerical value, but will construct the profile(s) as best it can. **Spirals always uses the numerical values, regardless of the current tool's properties.**

8) The cutting direction is controlled by the Direction 'Radio Buttons", and the "End Spiral Position" can be set as well. If you need finer control over the end position, you can use the Vectric rotation tools on the individual spiral vectors (they rotate about the centres perfectly).

9) Verify the settings. Repeat step (10) as many times as necessary.

10) Press "Ok" to accept or "Cancel" to reject the settings. If you accept them, the program will generate the profiles, group them, and put them onto a layer called Spirals. If a selected vector is too small for the selected tool diameter, nothing will be created for this position; a message box will alert you to the number of spirals it could not create.

11) If you pressed "Ok", the last set of parameters will be saved for the next use of **Spirals**.

12) When you make the profile toolpaths, you should use the correct tool, and make sure to use the 'Profile On' option. Set the Passes as you require, and you are set to go.

This is an example of 10 circles of varying diameters that will be used to create CCW spirals using a 0.25" diameter tool.
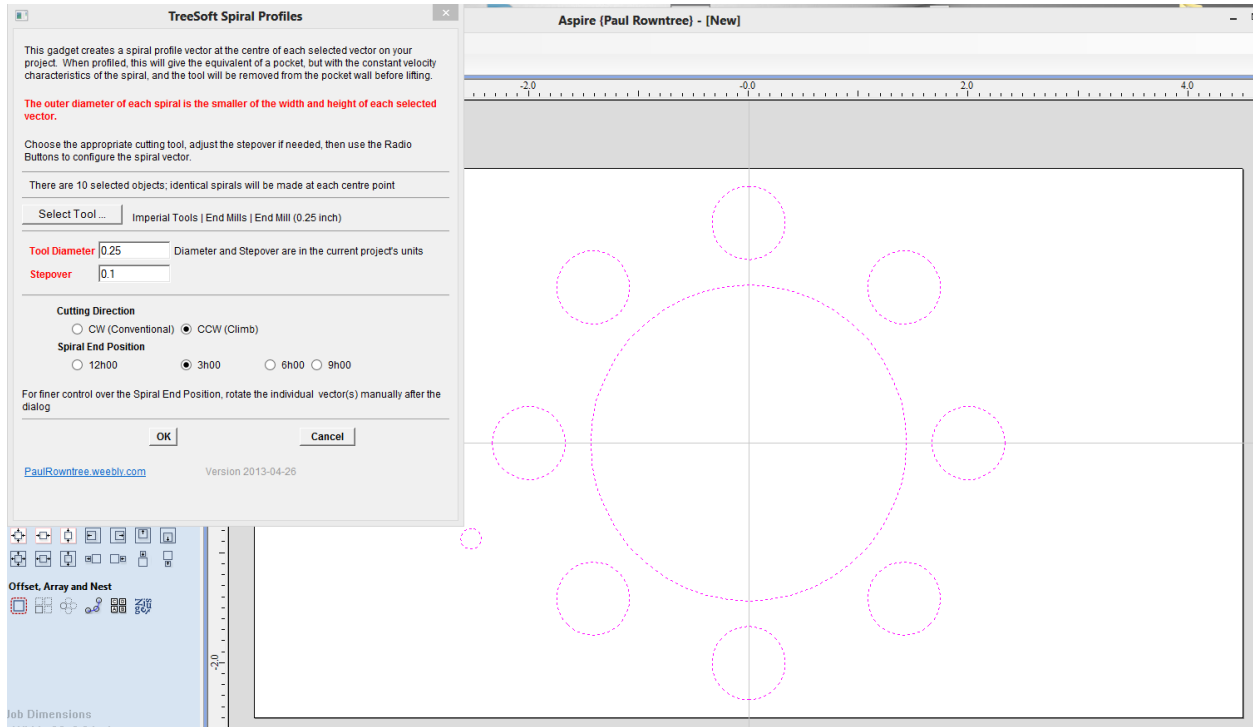
Here is the pattern of the resulting spirals. Note that one circle was too small for the tool, and no spiral was made for this site.
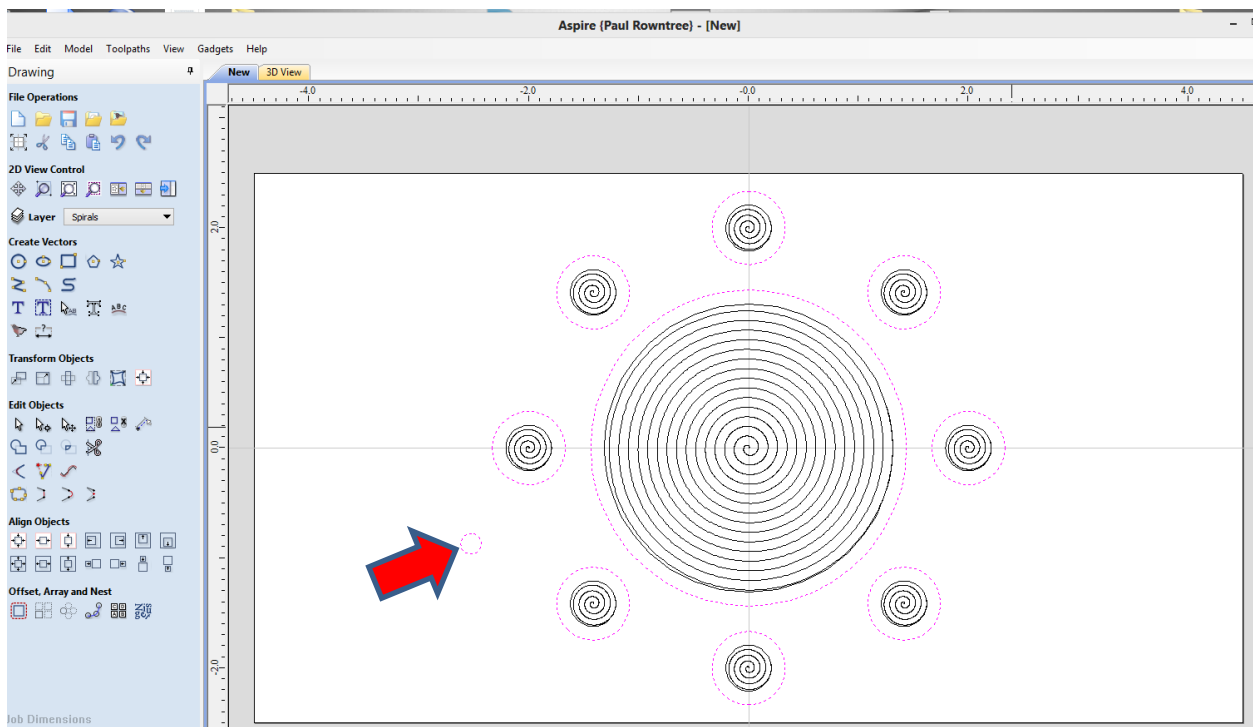
Here is a close-up of the CCW spiral vector for one of the smaller circles. The red arrow shows the end position at 3h00, the tangential approach is shown by the green arrow, and the tangential pull-back from the pocket wall is shown by the blue arrow.
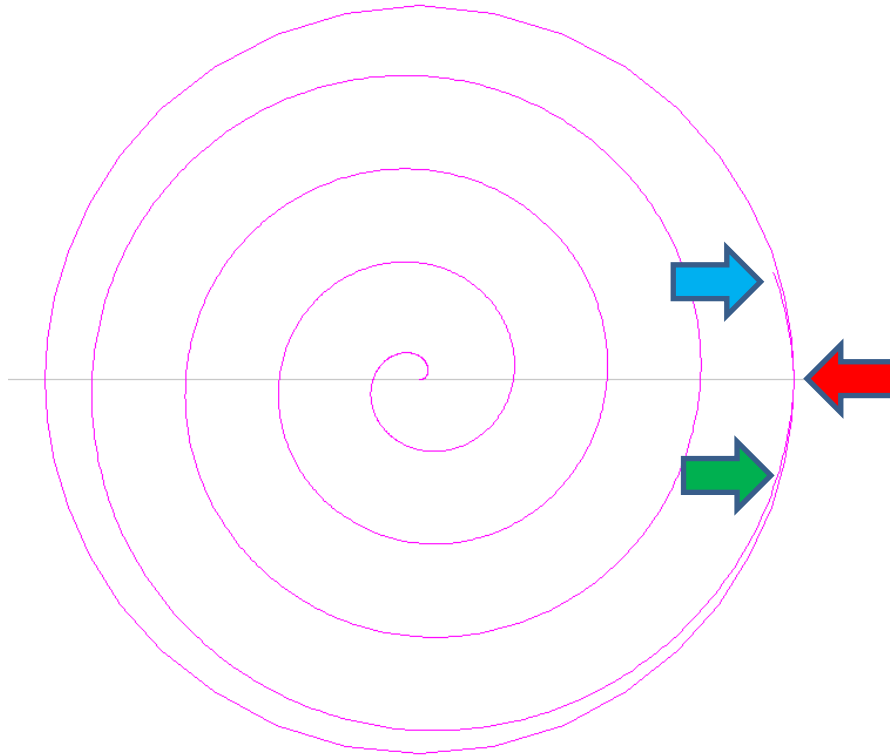
Tips for Using Spirals

1) **Spirals** will not make a profile with a tool that is too large for selected diameter.
2) The units associated with the tool and jobs can be freely mixed; use millimeter or inch unit systems as you see fit.
3) **Spirals** remembers the parameters between uses, simplifying development and design**.**

If you use **Spirals** to produce something interesting, please consider posting photos on the Vectric forums.   If you have any questions, I am frequently on the Vectric and CNCZone forums as PaulRowntree, or you can reach me via the PaulRowntree.weebly.com website.

If you find that Spirals has made a significant contribution to your use of the CNC toolchain, please consider making a supporting contribution at PaulRowntree.weebly.com. Registered users will be automatically informed of updates to the Spirals package.

Specialized toolpath models can be prepared upon request.

Cheers!

PR