TreeSoft GreenSquares

GreenSquares 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. **GreenSquares** 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, with no requirement to pay anything, to anyone, ever. You are not permitted to redistribute the files, nor remove the copyright information that they contain, without written permission.

Software development is time-consuming. If you feel that you have derived significant benefit from this or any other of the freely-provided gadgets, contributions to its continued development at **PaulRowntree.weebly.com** would be greatly appreciated. This also lets me know which types of software are most useful to the Vectric community, and allow me to target future projects better.

Change Log

Jan 23, 2014	- First version written and working, sent to beta testers

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 **FlutePlus** 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 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 GreenSquares ?

GreenSquares is a 'gadget' for Vectric's Aspire 4.0 (and higher) and V-Carve Pro 7.0 (and higher) CAD/CAM tools. It lets you control the 'direction' of any number of 2D vectors all at once. All 2D vectors have a StartPoint that is visible by selecting the vector with the Node Edit cursor, or pressing the 'n' key when you have already selected a vector. The StartPoint is shown as a green square. Many built-in Vectric operations and toolpaths use the StartPoint to control the way that they work, and toolpaths start at the StartPoint. It is easy to toggle which end of a Vector is identified as the StartPoint (select vector, toggle edit mode by pressing 'n', mouse over end-point and press 'p'), but there is no obvious way to align and control large numbers of vectors with the built-in tools. **GreenSquares** operates on all selected 2D vectors, and lets you apply 1 simple rule to control which end should be the StartPoint.

<div align="center" style="color:red">GreenSquares will reverse the majority of Vectors that are grouped based on the distances of the ends to a Reference Point.</div>

The Reference Point is the centre of the BoundingBox of the selected vectors.

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

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Unpacking GreenSquares

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**	**GreenSquares.lua** 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	**GreenSquares.pdf** (this file) ***.crv3d, *.crv**

Using GreenSquares

GreenSquares works by measuring the distance of each vector's StartPoint and EndPoint from the Reference Point, and grouping the vectors into two piles : those with the StartPoint closest to the Reference Point, and those with the EndPoint closest. It then reverses the direction of whichever pile has the *most* vectors, so that afterwards, all vectors are in the same pile. If you **GreenSquares** again with the same group of vectors selected (and therefore with the same Reference Point) all the vectors start in one pile, and therefore all vectors will get reversed. A third run will flip them all again. It never takes more than two runs to align them the way that you want, perfectly. As the examples will show, the trick is to adjust the BoundingBox to put the Reference Point where you want it in order to control the grouping and flipping.

There are no dialog boxes or on-screen controls for **GreenSquares**.

1. After installing the files, restart Aspire or VCP, and verify that it has found the GreenSquares.lua file by checking the Menu>Gadgets listing.
2. Before running the gadget, create a project and create one of more circular, curved or straight vectors on the 2D presentation. These examples are from the GreenSquares Sandbox file that is included in the gadget package.
3. Delibrately flip the direction of some of these vectors, simulating one problem that **GreenSquares** addresses. The closely spaced vectors in the GreenSquares Sandbox already have a number of mis-oriented vectors.
4. Select the group of vectors you want to align, *but do not group them*. This image is a screen-shot from the GreenSquares Sandbox file. It is important to know where the centre of the BoundingBox of the selected vectors is, because this is going to be the Reference Point that controls **GreenSquares.** If you click on one of the

selected vectors the BoundingBox will be shown, including the Reference Point.
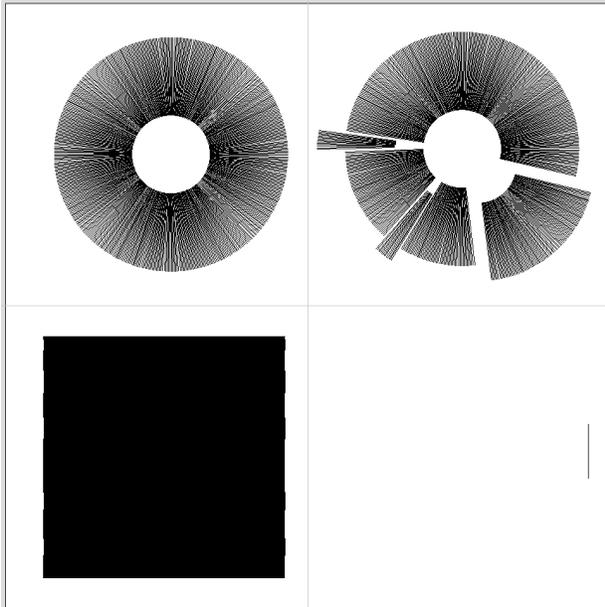

5. Run the **GreenSquares** gadget. The vectors will be erased and replaced by an equivalent-looking set of vectors, but the vectors will have their StartPoint determined by their distance to the Reference Point.

Example 1

A radial group of vectors is made by copying a vector along a circular pattern. If you manipulate these vectors by editing with the scissors, you can find that some of the start points are no longer in the expected pattern, and you want to use **GreenSquares** to get them back the way you want. This example has 9 bad vectors hiding among 1200 correctly arranged vectors.

Start with the vectors, some with the StartPoint at the centre of the pattern, the rest at the outside. The red circle marks the centre of the BoundingBox, the Reference Point. Most of these vectors (5 of 8) have the StartPoint closest to the Reference Point.	
GreenSquares flips the majority group, so now they are all arranged with the EndPoint closer to the Reference Point. If most of the vectors were initially arranged with the EndPoint close to the Reference Point, then **GreenSquares** would flip the vectors to have the StartPoint near the middle.	
Starting with the configuration shown above, if you wanted the vectors arranged with the StartPoint nearer the Reference Point, re-run **GreenSquares** with the same group of vectors selected. Initially the majority had the StartPoint far from the Reference Point, so they get flipped to have the StartPoint nearest the Reference Point.	
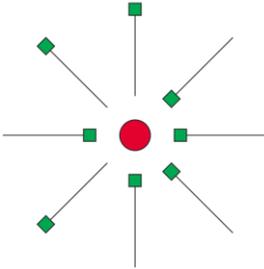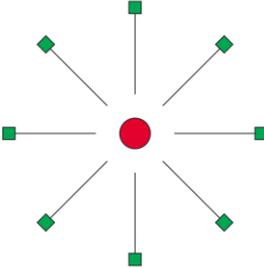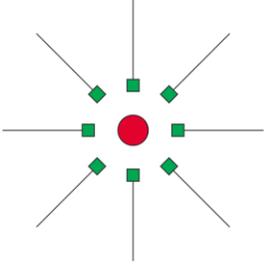
Example 2

Here is a bunch of vectors created by a copy process, but the StartPoints have somehow become disordered.

If you just use the vectors, the distance to the Reference Point may not describe the orientation that you want (e.g. left or right), especially if the lengths of the vectors are not all the same. As a result, **GreenSquares** may not behave the way you would wish. The majority of these vectors have their StartPoint on the right side.	
Now imagine that you have also added a vector off to the right. This expands the BoundingBox, and puts the Reference Point to the right of the vectors that we want to manipulate. The distances become more clearly defined, with 7 of the 12 vectors having their StartPoints closer to the Reference Point. You can put this new vector anywhere you want in order to control the BoundingBox and the Reference Point.	
Run **GreenSquares**. The vectors are reversed such that all of their StartPoints are farthest from the Reference Point, all on the left side. The vector that was added on the right will be treated as any other vector, but will probably get deleted when you are done.	
Run **GreenSquares** again to flip the StartPoints to the right, if this is what you want.	
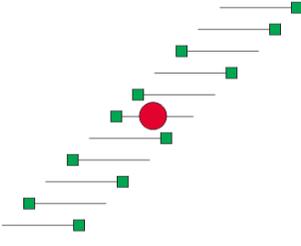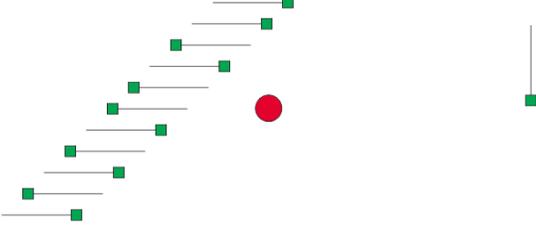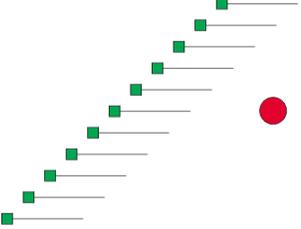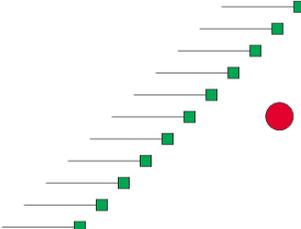
Tips for Using GreenSquares

GreenSquares erases the original vectors before replacing them with (possibly reversed) copies. It may be a good idea to copy the vectors to the clipboard (or another layer) before running **GreenSquares** just in case the gadget crashes before creating the new versions (thereby protecting your time and effort). That said, it hasn't crashed on me (recently).

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If you use these freely distributed gadgets 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.

Again, if you feel that these gadgets have improved your toolset or assisted your CNC work for pleasure or profit, please consider making an appropriate contribution to support its continued development, at **PaulRowntree.weebly.com**.

Cheers!

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