Creating a small box with the CarveWright/CompuCarve

I'd been itching to try a two sided carving when I saw a small heart shaped box posted on the Carvewright.com forum a few weeks ago. After carving the downloaded .mpc (project), I decided to figure out how to design myself. What follows is a brief write up coving the design and construction of a small apple shaped box. For this project we'll use two different patterns; one for the outside (Apple1.ptn) and one for the inside (Apple2.ptn). The inside pattern is the outside with the stem and leaf removed. These patterns should have been included in the .zip file along with this document. The patterns were created with Corel Draw (thanks to Jon Jantz at www.allcw.com for his excellent videos on how to use Corel with the CW), and then edited with the CW pattern editor utility that comes with the scanning probe. The techniques described here could be applied to many types of patterns and projects.

Well first things first, and the first thing we need to do to get started is to fire up Designer, start a new project and set up the board dimensions as follows: 10" long x 5.25" wide x 0.75" thick. This is basically a 10" length of a typical 1"x6". Note: measure your actual stock thickness as it may not be exactly 0.75", the exact dimension will be important later. If you haven't done so already, go ahead and import both apple patterns into your 'Favorites'. If you are unsure how to import patterns take a look at this free video tutorial from Jon Jantz, import-export.avi . It would probably be a good idea to save your project at this point as Designer has been known to lock up on occasion and you will loose all non-saved work if it does.

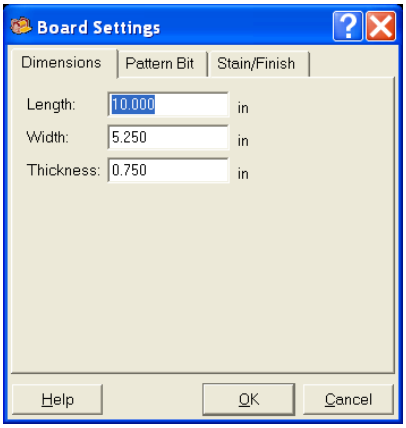

Figure 1

With our project created and board dimensions, it's time to layout our project. We'll start by adding an Apple1 pattern to the board to make the top-outside of our box. Open up the pattern list by clicking on the 'Shell' icon and select the Apple1 pattern, (the one with the stem and leaf), and place it towards the left side of the board. We would like the apple to be about 4" wide. We could resize it by grabbing one of the corners and stretching it out, but it can be hard to get it the exact size we want. As an alternative we can type the desired width (X dimension) into the 'Size:' text box in the Input toolbar. Type 4.00" into the first box (X dimension) and notice that the Y dimension is automatically changed in proportion to X. Cool, no? See Figure 2 for the location of the Input toolbar.

Now, we need to properly position the pattern to make aligning features front to back a bit easier. First, let's center it vertically by right clicking on the pattern and selecting: Center -> Vertically. Next, we need to position the pattern in a known location horizontally and we will do this by attaching, or constraining, the right side of the pattern to the board's centerline. To do this; make sure that the pattern is selected (surrounded by white box), right click on the yellow dot in the center of the right side of the white box, select: Attach, and then move your mouse towards the boards center line. You will notice that a yellow arrow will appear pointing to the board's centerline. Now, left click with the mouse which will cause a small text box to appear. Enter 0.5 into the text box. What we have just done is attach a constraint to the pattern that positions it 0.5" from the board's centerline.

Next, set the carving depth to 0.70", or about 0.050" from the boards bottom edge (this is where the measurement of your stock is important), and then set the height to 300. The combination of carving depth and height will allow for a nice curve to the apple as well as leaving a bit of meat to the leaf so that it is not too fragile. **Depth** controls how deep into the board the carving will go, or the bottom of the carving. **Height** controls how close to the top of the board the carving will get; it stretches (scales) the pattern in the Z axis.

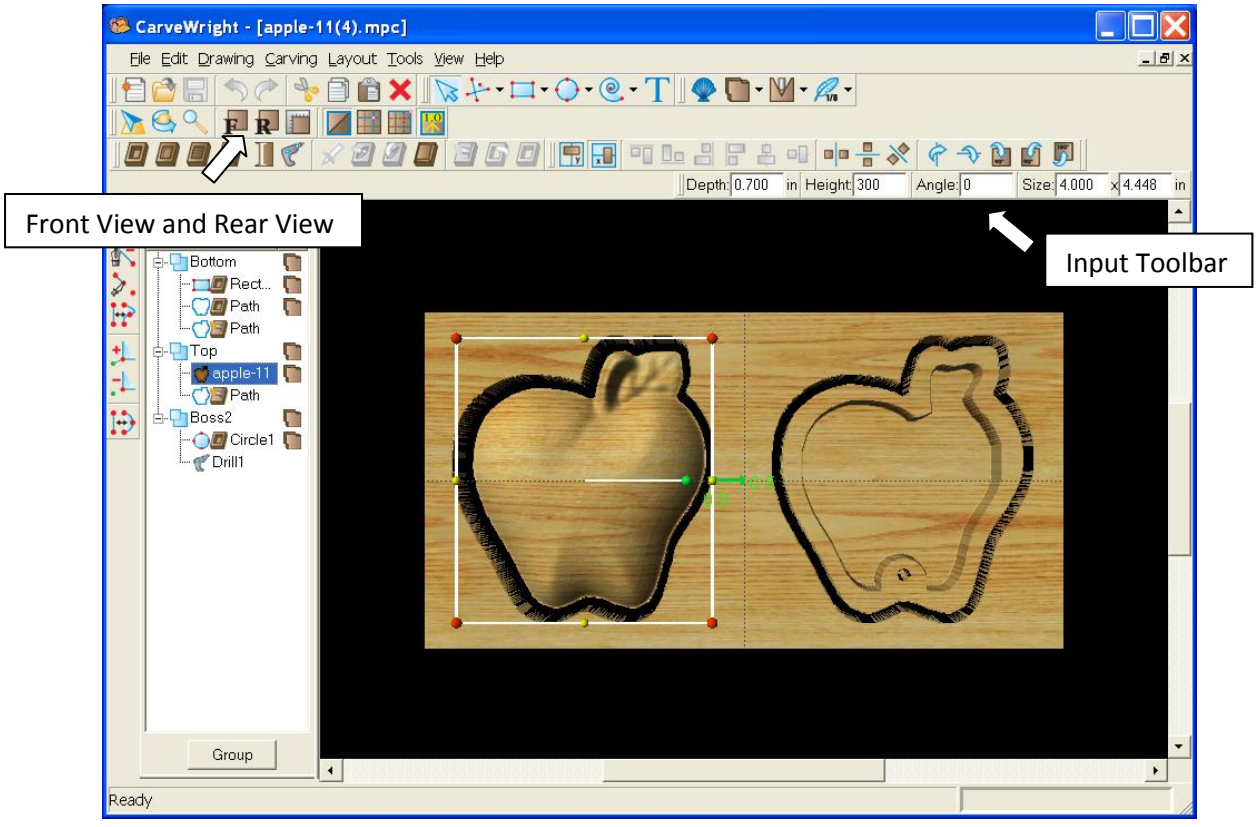

Figure 2

At this point we have laid out the apple shape for the box's top so let's go ahead and create an outline of the top and let the CW cut it out for us. To do this, right click on the pattern and select: Outline pattern(s). This will create a white vector path around the pattern that the 'Cut Path' tool can follow. To finish up this step select the 'Cut Path' tool and then press the 'Flip Cut' button on the dialog box that pops up. Note: we want to cut on the outside of the path, press the 'Flip Cut' button as needed so that the resulting apple shape is largest of the two options and then click on 'Accept'.

Now that we have the top-outside of the box done, let's flip the board over and work on the top-inside. To flip the board over press the 'Rear View' button and notice that it turns the board about the X-axis; which means the top of the board in the front view is the bottom of the board in the rear view. You will notice that our cut-out from the front side shows through the back of the board. This will help us align the inside of the top to the outside. Start by selecting the Apple2 pattern (just the apple, no stem/leaf) and place it on the board. Now, let's turn the pattern upside down by right clicking on it and selecting: Flip & Rotate -> Rotate 180, and invert it so that it carves into the board by right clicking and selecting: Invert. Now grab one of the corner handles, make it a bit smaller and center it inside the partial outline from the front. See Figure 3.

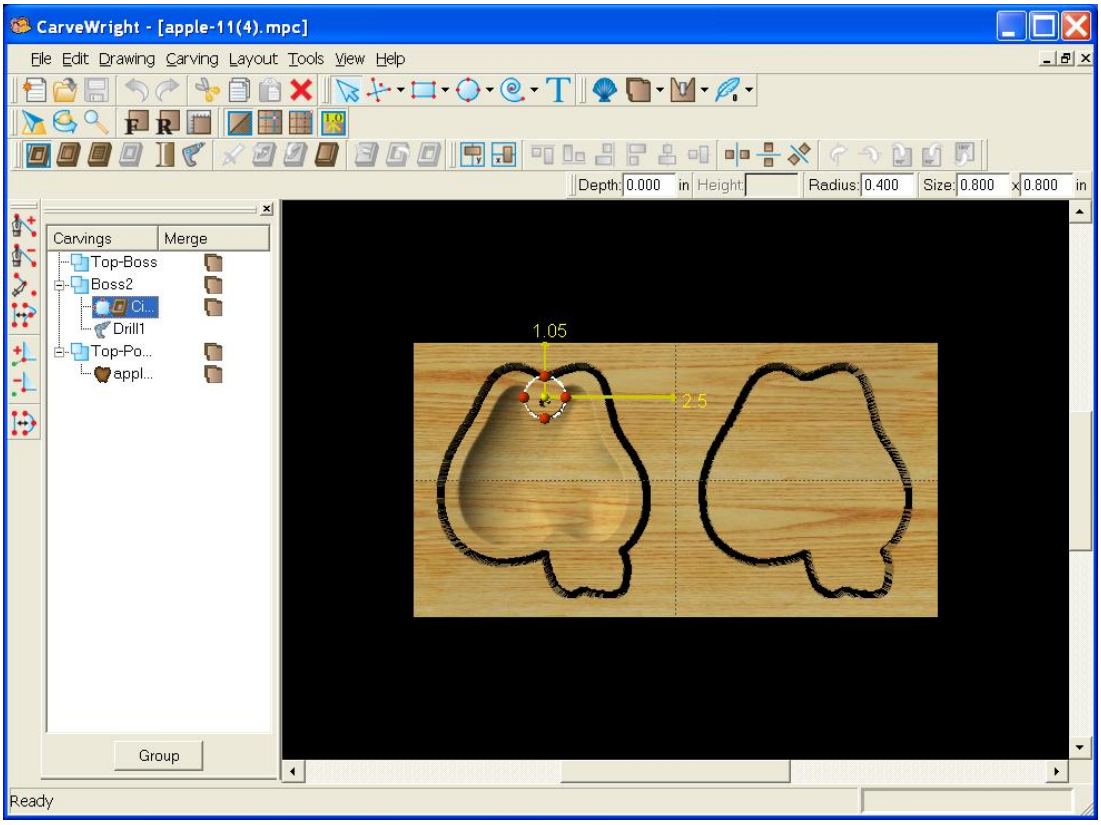

Figure 3

We need some method of keeping the top and bottom halves of the box together and aligned and now would be a good time to add that in. We will add two small bosses, that is small cylindrical areas to our carvings and drill a small hole in them. A 5/32" spring pin, ¾" long will be used to hold the two halves of the box together and provide a pivoting action to the top. To accomplish this, select the circle tool and place a 0.4" diameter circle towards the bottom of the apple. We will once again attach constraints to the circle to position it exactly where we want it. The green dimension lines that automatically appear on the circle are the distance to the circles edge (circumference) NOT to the circle's center. However, we can point to the yellow dot in the circle's center (center point), right click and select: Attach, to create a constraint to the center. We want to position this circle 2.5" from the center line and 1.05" from the (visible) top edge of the board. Now, click on the "Carve Region" button and set the depth to 0.00". Notice that we actually added material to our carved region; pretty cool! Finally, let's add a drilled hole, using the 'Drill Hole' tool, with the following specifications, Diameter: 5/32" (you can type 5/32 in the text box), X position: 2.5", Y position 1.15" and a depth of 0.25".

Now, let's start working on the bottom-inside of the box; switch back to the front of the board by pressing the 'Front View' button. Note: the carving list will still show the back of the board; select an object on the board's front to update it. First copy the Apple1 pattern we already placed on the board and then paste it to the right side, center it vertically and attach a constraint, 0.50" from the right side of the board. Note: this places the bottom of the box exactly the same distance from the right edge of the board as the top is from the center; this will make lining up the boss and drill hole in the bottom much easier. Outline the newly placed apple and then use the 'Cut path' tool as we did for the top. As the outline is all we were really after we can go ahead and delete the apple pattern and leave only the outline. It's also worth knowing that if you are using a fixture or sled to hold you stock you CANNOT use the 'Cut Path' tool. The extra height seems to confuse the machine. If you need to user a sled you can use the 'Select Bit' tool, selecting the 1/8" cutting bit and setting the depth to within 0.030" of the board's bottom, but you will need to enlarge the vector path a bit as the 'Select Bit' tool cuts on the line, not to either side.

In a similar manner place a copy of the Apple2 pattern, made slightly smaller, in the center of the apple cut-out we just created, outline it and then delete the Apple2 pattern. Apply a 'Carve Region' to this outline and set the depth to leave 0.20" in the bottom of the box (0.75" – 0.20" = 0.55"). Now go ahead and add the boss and drill hole like we did on the top. You can use the same dimensions to constrain the boss and hole, except they will be constrained to the right side and bottom of the board, but the depth should be set to 0.55"

Well, that about does it. When saving this project to the memory card, Designer may give you a warning about cutting too close to the edge and suggest using 'Auto-Jig', as shown in Figure 4. If you run this project and select the 'Stay Under Rollers' option on the machine you can safely click 'Ignore' here. When using 'Stay Under Rollers' your stock must be at least 7" longer than your board as laid out in Designer. For example, we laid out our board in Designer to be 10" long, 10" + 7" = 17", so our stock needs to be at least 17" long. To use 'Auto-Jig' you would need an additional inch of width to the stock compared to what was laid out in Designer. The project will take about 54 minutes to carve at 'Best' quality. The machine will carve the backside of the project first and then prompt you to turn the board over. If you are looking from the front of the machine the board gets flipped F-R just like the board is flipped in Designer (that is the left and right sides stay in the same place.)

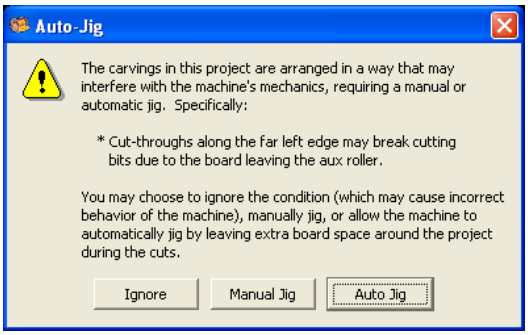

Figure 4

Figures 5 and 6 show a finished box done in MDF. The pin was hot glued into the top half and the hole in the bottom half was adjusted until the top could rotate freely. The left side of the top has a slight lip due to the cut path generated with the outline tool. This can easily be sanded out with a diamond point bit in a Dremel tool.

Figures 5 & 6