Project Tutorial

Featuring compatibility with nearly all CNC Machines

It is our pleasure to provide our customers with fun and useful projects to enjoy!

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Aspire 4
(or greater)

Sample Carved with:
ShopBot Buddy
PRSalpha BT48
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"Honey, I Shrunk the Clock!"

Designed for Vectric™ by Michael Tyler

This month's project features a miniature version of a classic Grandfather Clock "shrunk" down to a height of about 42"!

Chances are, visitors to your home haven't seen anything quite like this and it should stimulate many interesting conversations! This unique floor clock design enables just about any woodworker/CNC owner to cut, assemble and finish the project over the course of only two or three weekends.

The clock is constructed in sections/layers with the Vectric Aspire files ordered and organized to correspond with the chronological build process.

The project goes together quite easily. Perhaps the greatest challenge is the cutting of a couple miter joints on one of the base layers and the topmost clock head bonnet, but even this task is a straight-forward process for the average woodworker.

The photos of the prototype show the clock without its final finish applied.

Finished Dimensions:
13" W x 8" D x 41.75" H

Main items you will need:

1) The Project Files - ***see page 2 for the included file listing and material dimensions***

2) A Pin Nailer for securing glued parts during construction...or use 1.25" drywall screws and 1.25" 3d finish nails instead (that's what I used)

3) Klockit 5 7/8" round clock insert
(I used model #15344 from www.klockit.com)

4) Saw for cutting miter joints (chop saw or table saw)

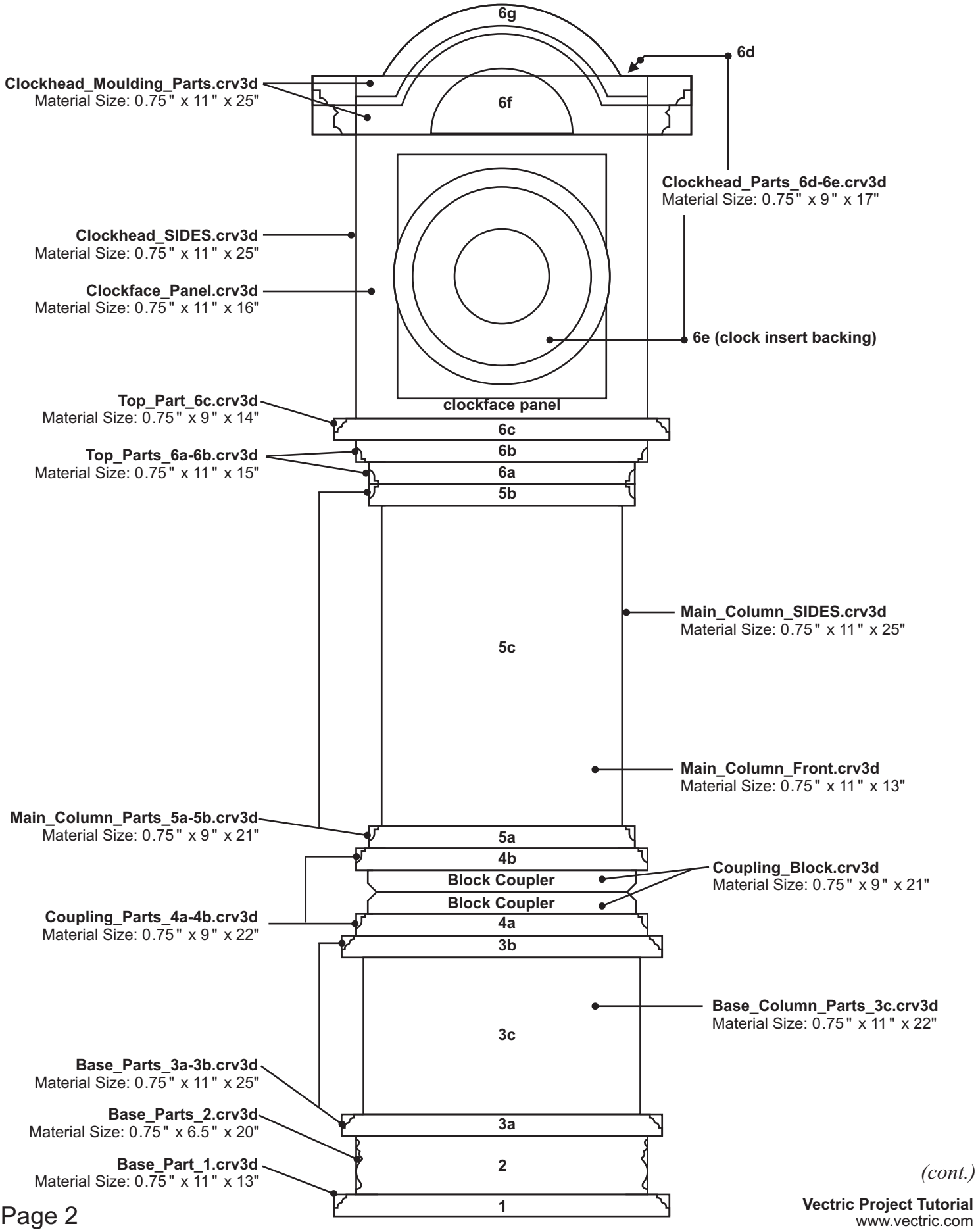
5) Drill, sandpaper, wood glue, CA glue (for "tacking" parts), clamps, wood stain and clear finish

6) A Dremel-type rotary tool with assorted sanding wheels and bits to sand small details and speed up preparation for finishing.

CNC Bits used for the Sample:

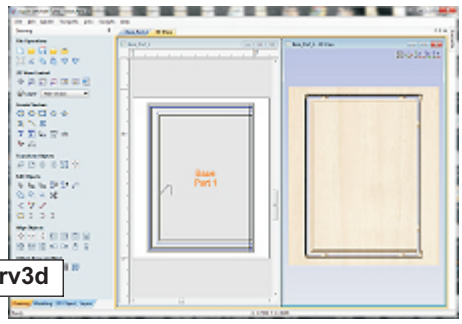
0.25" Down-Cut End Mill
0.125" Ballnose
0.5" Ballnose
90° V-Bit

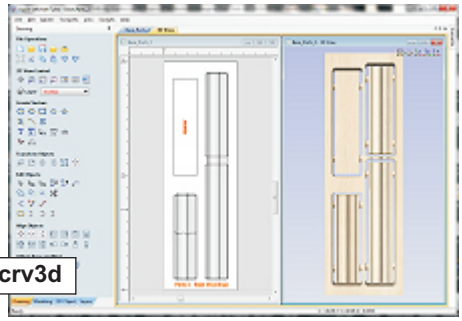
“Honey, I Shrunk the Clock!” (cont.)

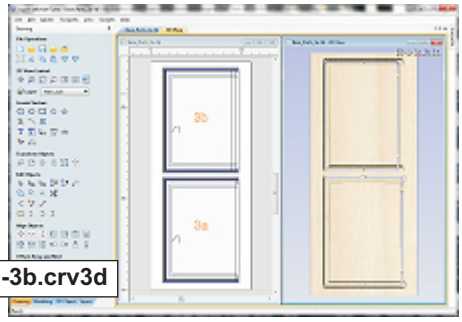


(cont.)

STEP 1 - Open and Review the Project Files
Start your Aspire software and open the project files for the Base section. (fig. 1)


Base_Part_1.crv3d


Base_Parts_2.crv3d


Base_Parts_3a-3b.crv3d

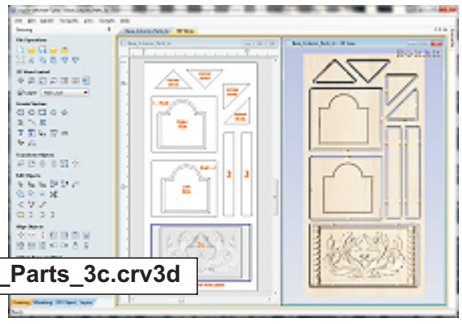

Base_Column_Parts_3c.crv3d

fig. 1

Carefully review all the toolpaths and make any necessary changes (feed/speed, RPM settings, etc.) to suit your particular bits and machine. The toolpaths are currently set with feeds, speeds, pass depths and so on, that were used in creating the original sample. Please don’t use them directly until you review them for your own setup. **It is very important to recalculate all toolpaths after making any edits/changes.**

Once you have recalculated the toolpaths for your own machine and bits, reset the preview, then preview all toolpaths again to visually verify the project outcome on-screen. The project is designed with tabs to hold parts in place during the final part cutouts. You may delete the tabs if you use some other reliable hold-down method.

STEP 2 - Run the Project Files
When you are satisfied with your settings, save the toolpaths to the appropriate Post Processor for your machine, place your material on your machine bed and proceed to run the files. (fig. 2a, 2b)


fig. 2a


fig. 2b

(cont.)

STEP 3 - Prep and Assemble Base Parts
LABEL ALL THE PARTS with a pencil, then separate the parts from the material. Sand off tab remnants and any undesirable toolmarks. (fig. 3a, 3b)


fig. 3a


fig. 3b

Mark and miter-cut the front ends of the moulding with a table saw or chop saw. "Creep up" on the ends of each part to **meet perfectly with the corner edge** so as not to alter the overall length of the parts. The profile cutouts yield the exact length of the moulding parts, so there is no margin for error. (fig. 3c, 3d)


fig. 3c

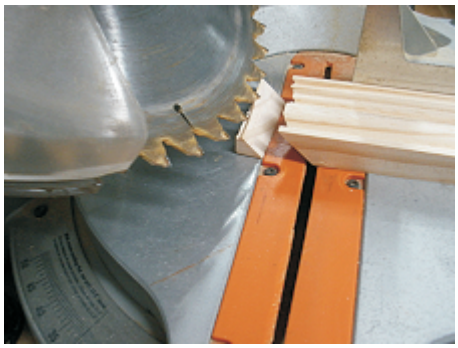


fig. 3d

Glue the mitered front ends together. Use the spacer to aid in clamping while the glue sets. (fig. 3e, 3f)


fig. 3e

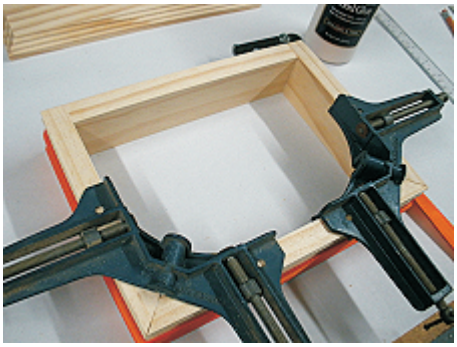


fig. 3f

Glue the moulding assembly to the Base Part 1. Center on width and flush with the back (flat) edge. Weigh down while the wood glue sets. NOTE: You may wish to further secure any glue-ups with nails or screws - this is optional throughout the entire assembly process, and at your own discretion. (fig. 3g)


fig. 3g

Glue panel part 3a on top of the moulding-base assembly. Centered and flush with back edge.


fig. 3h

Clamp until dry. (fig. 3h)

(cont.)

STEP 3 - Prep and Assemble Base Parts (cont.)
Glue a 1" x 8" rail on the top of part 3a, centered and flush with the back edge. Clamp until dry. (fig. 3i)


fig. 3i

Glue the other 1" x 8" rail on the backside top of the front panel 3c, centered and flush with the top edge. Clamp until dry. (fig. 3j)


fig. 3j

Glue the sides and front panel together and on top of part 3a. Glue two corner blocks in the front corners. Clamp until dry. (fig. 3k, 3l, 3m)

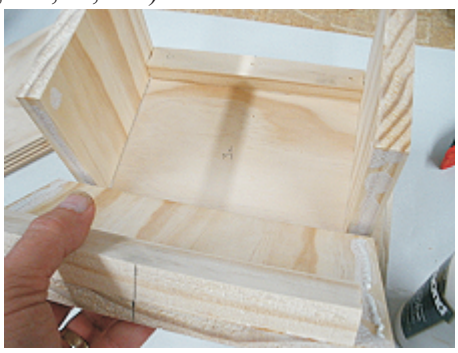


fig. 3k


fig. 3l


fig. 3m

Glue the assembly to part 3b by applying glue, then flipping the assembly upside down. Glue in the remaining two corner blocks to the sides and underside of part 3b (flush with back edges) and weigh down until dry. (fig. 3n, 3o)


fig. 3n

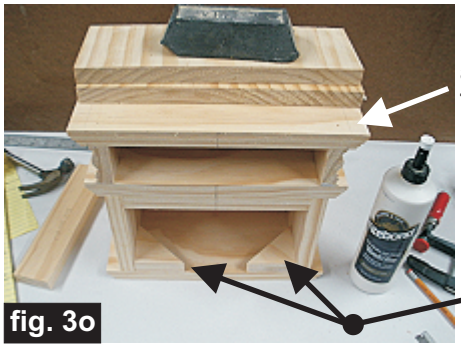
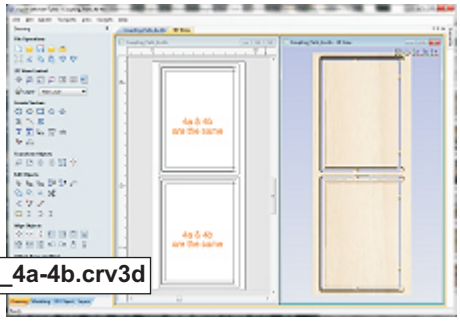
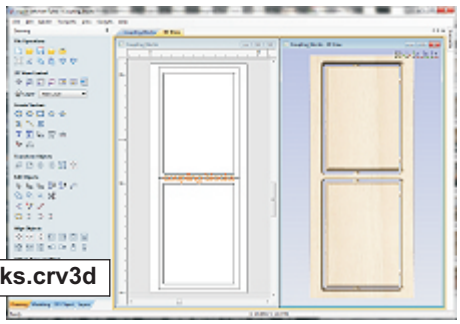


fig. 3o

STEP 4 - Run, Prep and Assemble Coupling Parts
While the main base assembly dries, proceed to run the **Coupling_Parts_4a-4b.crv3d and the Coupling_Blocks.crv3d** files. (fig. 4a)


Coupling_Parts_4a-4b.crv3d


Coupling_Blocks.crv3d
fig. 4a

(cont.)

STEP 4 -Run, Prep and Assemble Coupling Parts
Label then separate the parts from the material. Sand off tab remnants and any undesirable toolmarks, as before.

Glue part 4a to the top of 3b. (fig. 4b)

fig. 4b

Glue one of the coupling blocks with bevel side UP onto the surface of the part 4a (centered, flush with back edge, as usual). (fig. 4c)

fig. 4c

Glue the other coupling block directly over the first one, but this time the bevel side goes DOWN. (fig. 4d)

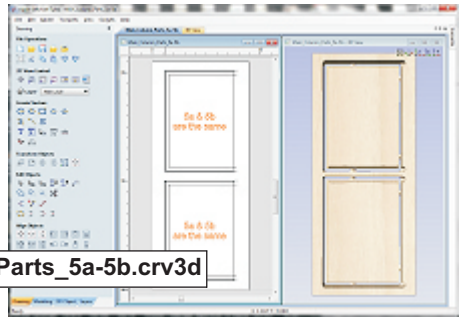
fig. 4d

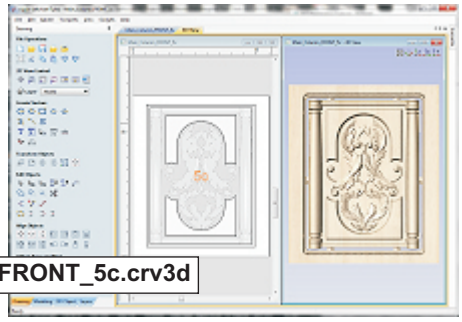
Glue part 4b, flat side down, on top of the last coupling block (centered, flush with back edge). (fig. 4e)

This completes the entire Base Assembly.

fig. 4e

STEP 5 - Run, Prep and Assemble Main Column
Proceed to run the following files. (fig. 5a)





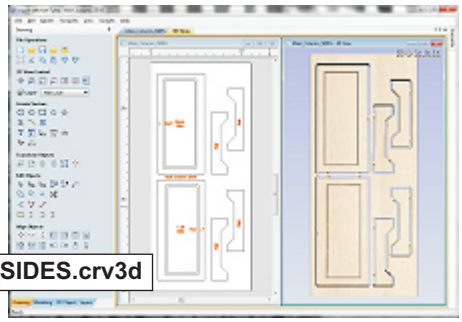


fig. 5a

Label then separate the parts from the material. Sand off tab remnants and any undesirable toolmarks, as before.

Glue a rail centered and flush with the back edge of TOP of 5a and a rail to the BOTTOM of 5b. (fig 5b, 5c)

fig. 5b

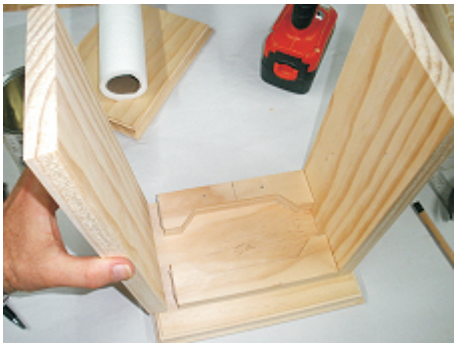
fig. 5c

(cont.)

STEP 5 - Run, Prep and Assemble Main Column

Glue a rail to the inside/top of the front panel 5c flush and centered with the top edge. (fig. 5d)

fig. 5d



Glue on sides and another rail onto the top surface of part 5a. (fig. 5e)

fig. 5e

Glue front part 5c assembly to sides. (fig. 5f)

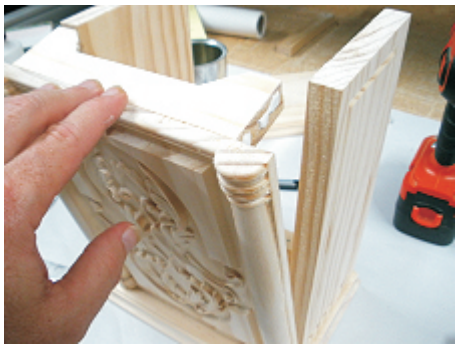


fig. 5f

Glue the 5b assembly (rail and part 5b) to the top of the sides and front assembly. Weigh/clamp until dry. (fig. 5g, 5h)

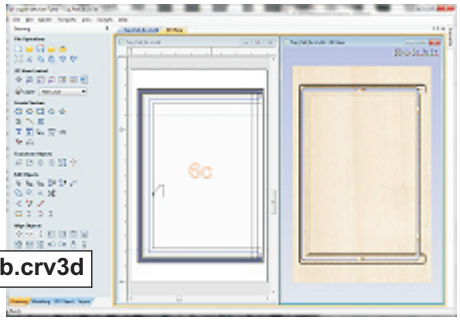
fig. 5g

fig. 5h

This completes the Main Column Assembly.

STEP 6 - Run, Prep and Assemble Top Parts

Proceed to run the following files. (fig. 6a)



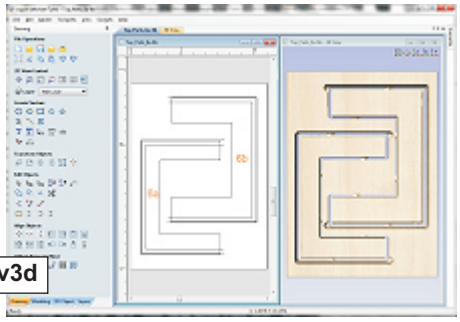


fig. 6a

Label then separate the parts from the material. Sand off tab remnants and any undesirable toolmarks, as before.

Glue part 6a (flat side UP), onto the top of 5b. Centered, flush with back edge, as usual. (fig. 6b)

fig. 6b

fig. 6c

Glue part 6b (flat side UP) onto top of 6a. Centered, flush with back edge. (fig. 6c)

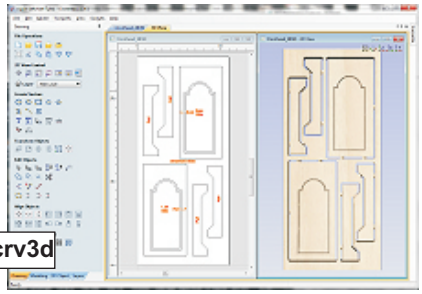
(cont.)

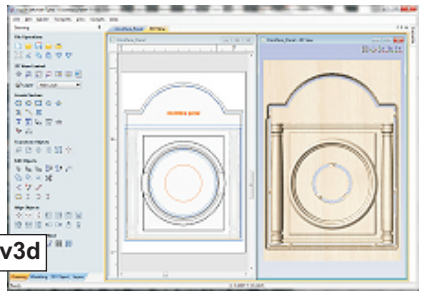
STEP 6 - Run, Prep and Assemble Top Parts (cont.)
Glue part 6c (flat side DOWN) onto 6b.
Clamp until dry.
(fig. 6d, 6e)

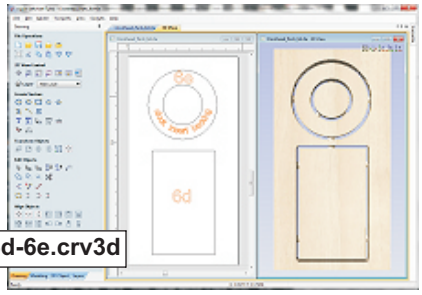

fig. 6d


fig. 6e

Proceed to run the following files. (fig. 6f)


Clockhead_SIDES.crv3d


Clockface_Panel.crv3d


Clockhead_Parts_6d-6e.crv3d

Label then separate the parts from the material. Sand off tab remnants and any undesirable toolmarks, as before.

Glue the four rails and sides to the top of 6c. Use painter's tape to help hold parts during assembly/gluing.
(fig. 6g)


fig. 6g

Glue part 6d flush with top of the side panels and glue on the clockface front panel. Clamp until dry.
(fig. 6h, 6i)


fig. 6h


fig. 6i


fig. 6j

Glue clock insert backing part 6e inside back of clockface panel. Clamp until dry. (fig. 6j)

(cont.)

STEP 7 - Run, Prep and Assemble Top Mouldings

Proceed to run the following file. (fig. 7a)

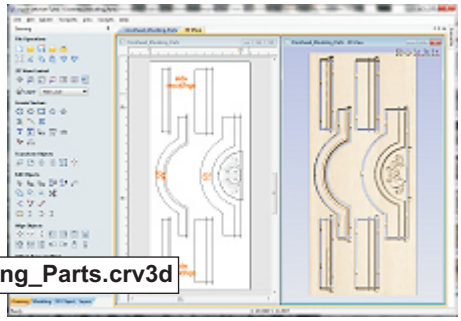


fig. 7a

Label then separate the parts from the material. Sand off tab remnants and any undesirable toolmarks, as before.

Glue the clockhead moulding parts 6g to 6f and the side moulding parts. Take careful note of the moulding orientation to make sure the side moulding profiles match the front moulding profile. Clamp until dry. (fig. 7b, 7c)

fig. 7b

fig. 7c

Mark and miter-cut the front corners of the clockhead moulding parts with a table saw or chop saw. "Creep up" on the ends of each part to **meet perfectly with the corner edge** so as not to alter the overall length of the parts. The profile cutouts yield the exact length of the moulding parts, so there is no margin for error. (fig. 7d, 7e, 7f)

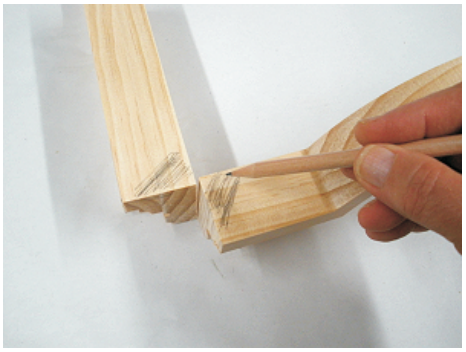


fig. 7d

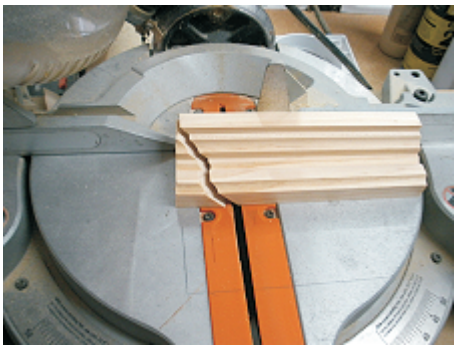


fig. 7e

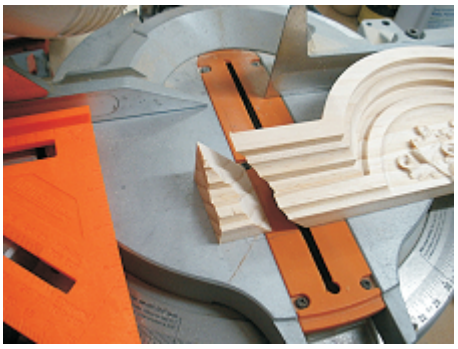


fig. 7f

fig. 7g

Glue the mouldings onto the clockface front panel. Clamp until dry. (fig. 7g)

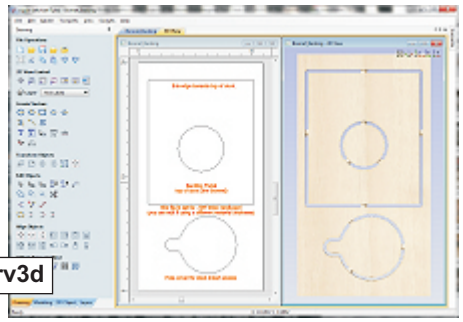
(cont.)

STEP 8 - Final Assembly and Finish

At this stage you may wish to apply your choice of finish before final assembly. It may be easier to handle the two separate sections (the base and column/top) during finishing. Either way, the top and bottom sections will need to be joined with glue and screws to make the final attachment.

At the time of this tutorial write-up, I had not made a final decision as to the final finish before going away for a short holiday. I figured I would use that time to ponder the possibilities! Mahogany stain? Two-tone?

After the finish is applied, you can run the final two files for the clock backing. (fig. 8a)


Bonnet_Backing.crv3d

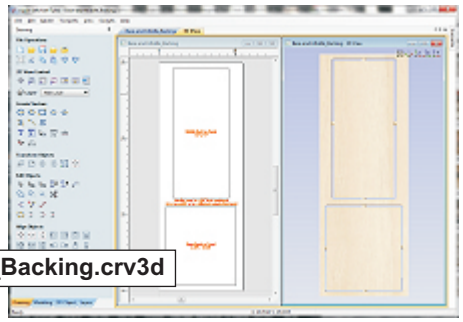

Base_and_Middle_Backing.crv3d

fig. 8a

After separating the parts from the material, lay the hole cover over the acces hole and drill a pilot hole for a small screw or bolt for the cover to pivot/swing. (fig. 8b)

This allows easy access to the clock insert for changing the battery or setting the time.


fig. 8b

IN CONCLUSION

Finally, all that's left to do is attach the backing with some small brads and install the clock insert.

I hope you have enjoyed building your very own Mini-Grandfather Clock!

Happy Carving!

Michael

(cont.)

Materials Source Page

• 3M Radial Bristle Discs from www.mcmaster.com
(stack 3 discs at a time on your rotary tool mandrel)

80-grit: part # 4494A19
220-grit: part # 4494A18

Krylon Clear Gloss Acrylic
from WalMart™

Items Purchased at Lowes™

• Zinnser Bulls Eye Seal Coat

• Rustoleum Ultimate Stain - Golden Mahogany

• Zinsser Bulls Eye 100% wax-free Clear Spray Shellac

• Denatured Alcohol

• Disposable Brushes and Paint Rags

Clock Insert Purchased Online from www.Klockit.com

• I used model #15344, but there are several styles to choose from

Additional Resources

RESOURCES...
There are numerous resources for Vectric software owners to make their experience with their products more enjoyable. The Vectric website includes video tutorials and more, to provide a good overview of the software products and how to use them. Please visit the Support page for a complete listing of available resources for you.

Vectric Support: http://support.vectric.com/

Vectric User Forum
Every owner should join the Vectric User Forum (http://www.vectric.com/forum/) where fellow users share their experience and knowledge on a daily basis. It is a FREE service that you will surely appreciate. A handy Search Feature helps you find answers to any questions you may have. There are Gallery sections as well, where you can post and view photos of projects created with Vectric software.

IMPORTANT: Before outputting any toolpaths you should carefully check all part sizes and the material setup to make sure they are appropriate for your actual setup.You should also check and re-calculate all toolpaths with safe and appropriate settings for your material, CNC machine and tooling.

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