

Project Tutorial

Featuring compatibility with nearly all CNC Machines

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

Vetric Project Tutorial
www.vetric.com

Compatible with:
VCarvePro 7.5
(or greater)

and
Aspire 4.5
(or greater)

Sample Carved with:
ShopBot Buddy
PRSalph BT48

ShopBot®
www.shopbottools.com

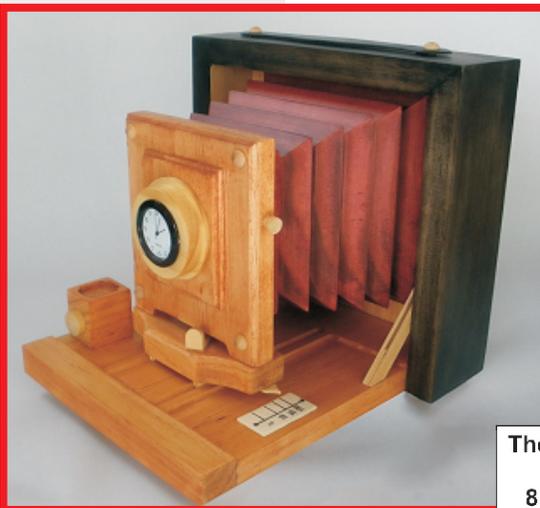
Retro Camera Timepiece

Designed for Vetric™ by Michael Tyler

You'll need to move in for a close-up for this intriguing timepiece! The clock insert is about the size of a wristwatch clock face and fits neatly into the area of the main "camera" lens. This novelty clock will make a great conversation piece as well as a unique gift for your photographer friends and family.

The retro design is based upon a bellows-style camera called the Pony Premo which was popular from the late 1800's to the early part of the 20th century. Sears Roebuck featured several versions of this camera in their mail order catalogue during this period, with pricing between \$14 to \$18. That's about \$350 to \$500 in today's dollars!

This project makes broad use of the Vetric software's precision drawing tools and toolpath features to create the various camera parts. Four of the bellows parts require two-sided machining to achieve the accordion-style appearance.



The finished dimensions of the assembled project are 8.25" W x 8.375" D x 7.75" H

We hope you will find this project interesting and informative as you look over the .crv files and proceed through the machining and build process.

Main items you will need:

1) The Project Files (included):

- 1-and-6_Bellows_Parts.crv
- Camera_Base_and_Box.crv
- Camera_Face_and_Details.crv
- SideA-2345_Bellows_Parts.crv
- SideB-2345_Bellows_Parts.crv

2) Boards with these dimensions:

- 1-and-6_Bellows: 0.75" x 7" x 12.5"
- Camera Base & Box: 0.75" x 9.2" x 26"
- Camera Face & Details: 0.75" x 7" x 12"
- Sides A and B Bellows*: 0.75" x 7" x 24"
- * (2-sided files use one board for machining)

3) 0.25" dia. dowels: two 5.625" long, one 1" long, two 1.5" long, scrap 0.625" dia. and 0.375" dia. dowels, six 0.25" dowel buttons, two 1"-long glue dowels

4) Standard popsicle sticks, one large popsicle stick or thin wood, a 1-7/16" Mini Clock Insert (I used model #15389 from klockit.com)

5) Glue, epoxy, sandpaper, clamps, stain and clearcoat

6) A Dremel-type rotary tool with assorted sanding wheels and bits to sand small details



CNC Bits used for the Sample:

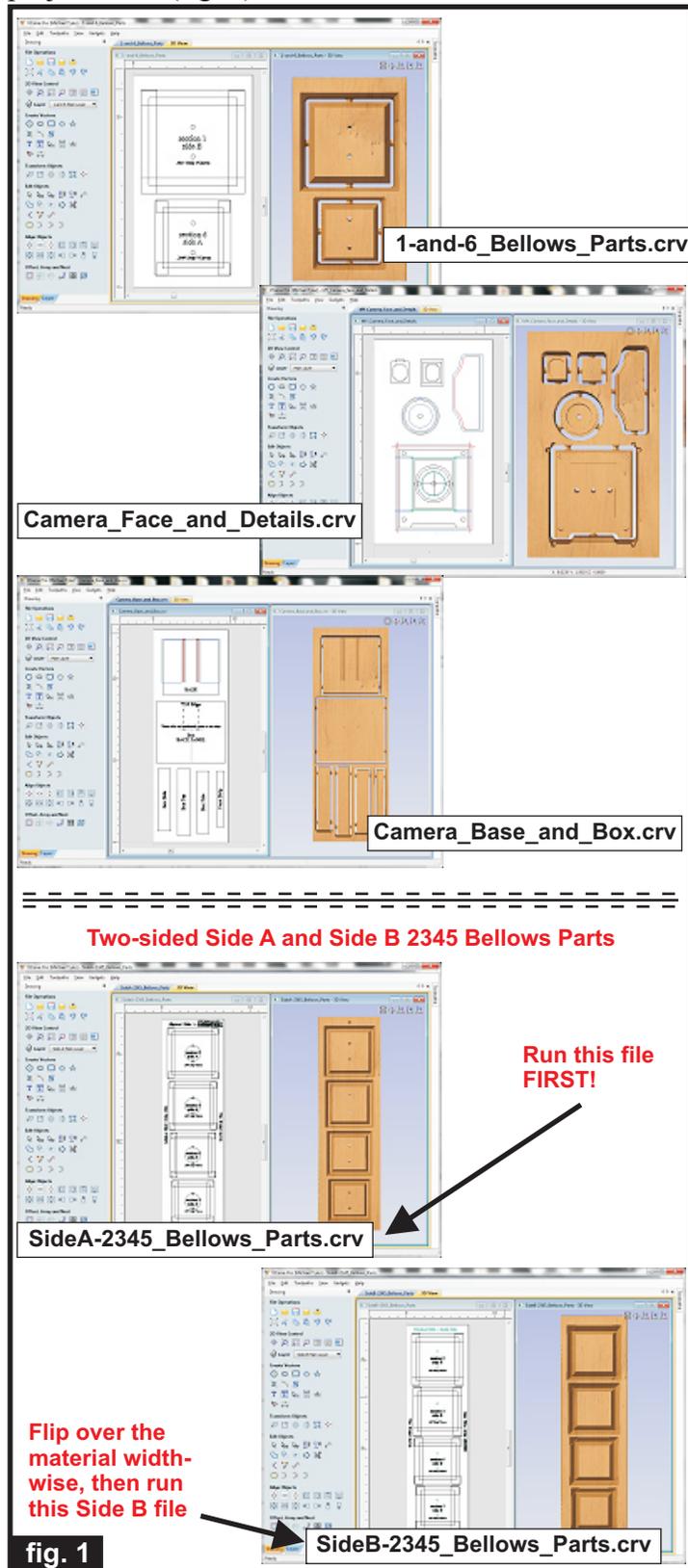
- 0.25" Ball Nose (BN)
- 0.25" Up-Cut End Mill (EM)
- 90° V-Bit

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(cont.)

STEP 1 - Open and Review the Project Files

Start your VCarve Pro or Aspire software and open the project files. (fig. 1)



Carefully review all the toolpaths and make any necessary changes to suit your particular bits and machine. The toolpaths are currently set with feeds, speeds and pass depths 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.** Preview all toolpaths again to visually verify the project outcome on-screen.

STEP 2 - Run the Project

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. Here are some pointers on running the 2-sided files...

(fig. 2a, 2b, 2c)

SIDE A 2345

Run the side A file first, then label all four 'A' parts before flipping

fig. 2a



After machining and labeling the **SIDE A** file, flip the board over across the (shortest) width. Insert two alignment dowel pins into the holes in the spoilboard and replace the board onto the pins with the plain side up. Re-apply a secure hold-down method.

Flip board over, position over the alignment holes and press the board onto the 2 alignment dowels placed in the spoilboard.

IMPORTANT: Secure the bellows parts with two screws driven through the holes in each part and into your spoilboard.

fig. 2b



Then run the **SIDE B** panel file...



After flipping the material width-wise, run the SideB file and label the four 'B' parts after machining

fig. 2c

(cont.)

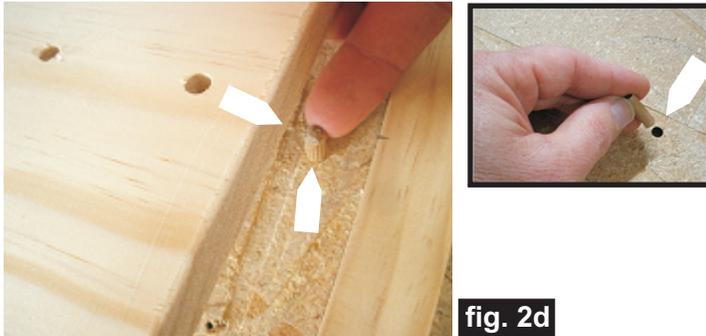
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(cont.)

STEP 2 - Run the Project (cont.)

Additional information for two-sided carving...

For the alignment holes of the prototype sample, I set the depth of the alignment drill holes to 1.1" when I ran the first file of the 2-sided board (i.e., the SideA-2345_Bellows_Parts.crv). This drilled all the way through the 0.75"-thick material and into the spoilboard, creating the two alignment holes in the spoilboard about 0.35" deep to insert the 0.25" dia. alignment dowels for placing the flipped board upon. (fig. 2d)



When I flipped the board over for SideB, I pressed the board onto the dowels and resecured the hold down (screws driven through the material and into the spoilboard). I maintained the same X,Y zero location on the machine bed throughout the complete project run. Inserting a couple dowels into the holes in the spoilboard and into the material holes, yields perfect alignment between the back and front of the material.

Alternatively, you can set up a drilling toolpath on the first side of the material that is ~0.55" deep. Then after completing the first side, rezero the bit to the machine bed and drill the same holes giving you a total depth of 1"+. Using 1"-long glue dowels, this works great.

Another consideration with this alternate technique is you don't have to maintain the same X,Y zero location. You can move the spindle to a different location, rezero X and Y and then continue with drilling the holes in the spoilboard, placing the material and machining the second side.

If you have a 'pristine' spoilboard and don't want to drill into it, this approach would help by not drilling through the material on the first side. Instead, secure a sacrifice sheet of mdf (or whatever) on top of your spoilboard and drill the holes into that for aligning the second side.

STEP 3 - Release Parts from Material

Separate the parts from the material, then sand off any tab remnants and undesirable toolmarks. (fig. 3a)



fig. 3a

NOTE: My material thickness was slightly more than the specified 0.75"-thickness, so an "onion skin" of material was automatically left around all the chamfered parts on the two-sided board. I still used the additional hold-down screws through the hole pairs in each part, since no tabs are present on this board (I liked the extra security). However, "onion skinning" is a commonly used technique in lieu of tabs, so I imagine the parts would have held just fine, regardless. I held the board up to a bright light to illustrate this onion skin of material that was left. I cut away the parts using a single-edge razor. (fig. 3b, 3c)



fig. 3b



fig. 3c

STEP 4 - Parts Assembly

Glue the bellows parts together using the two 5.625" long dowels to aid in alignment. **Don't glue the dowels in yet.** Clamp or weigh down and set the assembly aside to dry. (fig. 4a)



fig. 4a

(cont.)

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(cont.)

STEP 4 - Parts Assembly (cont.)

Glue the two 'Brightness Finder' rectangles together. Set aside to dry. (fig. 4b)

fig. 4b



Miter the box frame top corners using the saw of your choice. Miter right at the edge of each frame part, to keep the overall lengths of the parts intact. (fig. 4c)

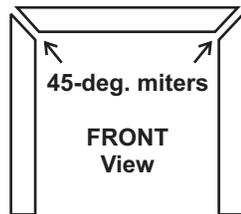
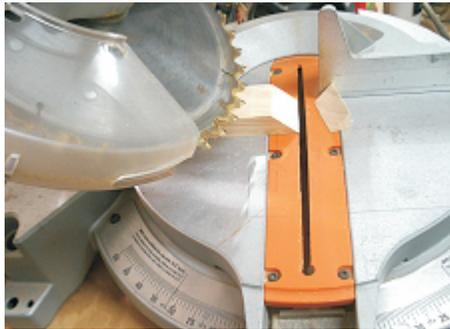


fig. 4c

Glue the frame to the back panel making certain that the holes are oriented correctly, with the holes being the shortest distance from the top edge of the panel. (fig. 4d)

fig. 4d



Glue the front strip to the base. (fig. 4e)



fig. 4e

STEP 5 - Make Detail Parts

Make hinge brackets from standard popsicle sticks. Glue four sticks together for each bracket as shown in the diagram on pg. 9. When dry, cut 45-deg. angles at each end to yield 4" long brackets. (fig. 5a, 5b)



fig. 5a

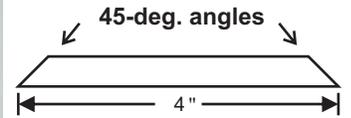


fig. 5b

Make a "pointer" for the Distance Gauge from a popsicle stick. I used a spindle sander to form the point, then cut the length to 1". (fig. 5c)

fig. 5c



Make a "lever handle" from popsicle sticks. Glue two sticks together, then cut off the rounded end to a 0.5" length. Glue this on top of a 1" long stick. (fig. 5d)

fig. 5d

Make a "lens" for the Brightness Finder by cutting a 0.1875" thick slice from a scrap 0.625" dia. dowel. Make a "knob" by cutting thin slices from scrap 0.375" dia. and 0.25" dia. dowels and gluing together. (fig. 5e, 5f)

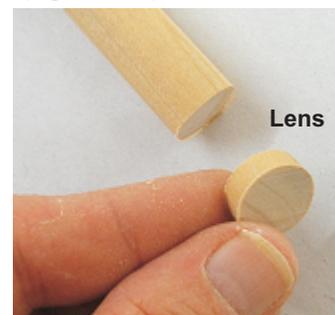


fig. 5e



fig. 5f

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(cont.)

STEP 5 - Make Detail Parts (cont.)

Cut out the Top Handle pattern from pg. 9 and tape it to a large popsicle stick (usually named “Craft Sticks” at craft/hobby supply stores.) Alternatively, any thin wood will do. (fig. 5g)



fig. 5g

Cut out the pattern using a band saw or scroll saw. Mark and drill the two 0.25 dia. holes. NOTE: If you wish, you may toolpath this for your CNC. The vectors for the handle are included on the Top View placement guide layer in the Camera_Base_and_Box.crv project file. (fig. 5h 5i)



fig. 5h



fig. 5i

Make the Distance Gauge panel. Use a thin piece of wood and apply the gauge markings. There are several options to apply the gauge markings. I’ll list just three ways to do it here:

- 1) Print and cut out the paper pattern from pg. 9, glue it on your thin wood rectangle, then apply clearcoat (this is the easiest method)
- 2) Laser print the reverse pattern from pg. 9, then iron the markings on the wood using the highest (no steam) setting
- 3) Laser print the reverse pattern from pg. 9, then use the solvent transfer method (this is what I used - I’ve never done that before and it took me three attempts to get an acceptable result)

I’ll outline the procedure for the solvent transfer method if you would like to try that too...

Solvent Transfer Method

Print the reverse markings with a laser printer (inkjet won’t work). You may want to print several of them, in case it takes a few tries to get the ‘feel’ for this.

Cut out one of the reverse marking printouts. Pour a small amount of laquer thinner into a solvent-resistant cup, and get an artist’s brush, your thin wood rectangle and a burnisher ready (or you can use the back of a spoon for ‘rubbing’ the markings). (fig. 5j)



fig. 5j

Align the printout face down over the wood and hold in position. Dip your brush into the solvent and dab off the excess. Now, **LIGHTY** apply the solvent to the backside of the printout. This softens the laser toner. Apply too much and it will ‘bleed’ like crazy. Lightly rub the paper, then carefully remove it to reveal the transfer. (fig. 5k, 5l, 5m)



fig. 5l



fig. 5k



fig. 5m

Completed Transfer

(cont.)

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(cont.)

STEP 6 - Finish Application

Apply your choice of finish before final assembly. Here's what I used on my Retro Camera Timepiece made from Select Pine (fig. 6a, 6b, 6c, 6d, 6e, 6f):

SealCoat and/or Spray Clear Shellac (same formula)

- main camera lens and small disc lens
- dowel buttons
- hinge brackets
- slider dowels
- knob, lever and pointer

Rust-Oleum Ultimate Stain - Ebony

- Outer surfaces of box and top handle

Rust-Oleum Ultimate Stain - Cabernet

- bellows assembly

MinWax Golden Pecan #245 and Gun Stock #231

- main base assembly
- faceplate and faceplate base
- interior of box
- brightness finder

Lastly, I applied several light coats of Krylon Clear acrylic spray over all parts.



fig. 6a



fig. 6b



fig. 6c



fig. 6d



fig. 6e



fig. 6f

STEP 7 - Final Assembly

Scuff the glue area of the back panel with some 220-grit sandpaper. Insert the long dowels into the bellows assembly. Glue the bellows to the back panel, pushing in the dowels until they seat fully into the holes in the panel. (fig. 7a, 7b)



fig. 7a



fig. 7b

Glue the faceplate onto the bellows. (fig. 7c)



fig. 7c

Glue a 0.25" dia. x1" long dowel into the center hole of the faceplate, then glue on the main lens. (fig. 7d, 7e)



fig. 7d



fig. 7e

Glue four dowel buttons in the faceplate holes. Weigh down until dry. (fig. 7f, 7g)



fig. 7f



fig. 7g

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(cont.)

STEP 7 - Final Assembly (cont.)

Epoxy the dowel slice from the 0.625" dia. dowel to the Brightness Finder. (fig. 7h)



fig. 7h



Epoxy two 0.25" x 1.5" long dowels into the slider grooves of the main base. Position them 1.1875" from the seam of the front strip. (fig. 7i)

fig. 7i

Epoxy the main base into the box frame and back panel (fig. 7j)



fig. 7j

Epoxy the pointer to the underside of the faceplate base (photo does not show this - I forgot until later). Now, epoxy the faceplate base onto the slider dowels and feet of faceplate. Position the faceplate base about 0.125" beyond the front edge of the slider dowels (fig. 7k)



fig. 7k

Glue the Brightness Finder to the main base. (fig. 7l)

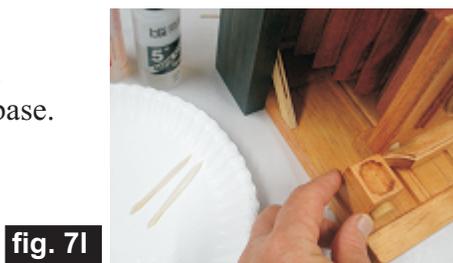
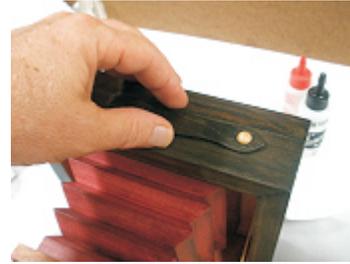


fig. 7l

Epoxy two dowel buttons in the handle holes. (fig. 7m)



fig. 7m



Epoxy the handle to the top of the box. (fig. 7n)

fig. 7n

Epoxy the lever handle to the faceplate base, then epoxy the Distance Gauge rectangle to the main base with the pointer tip located on the 100 mark. (fig. 7o)



fig. 7o

Epoxy the Knob to the side of the faceplate. (fig. 7p)



fig. 7p

Press in the clock insert and apply self-stick cork sheeting or felt dots to the underside of the base to complete the project. (fig. 7q)



fig. 7q

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(cont.)

IN CONCLUSION

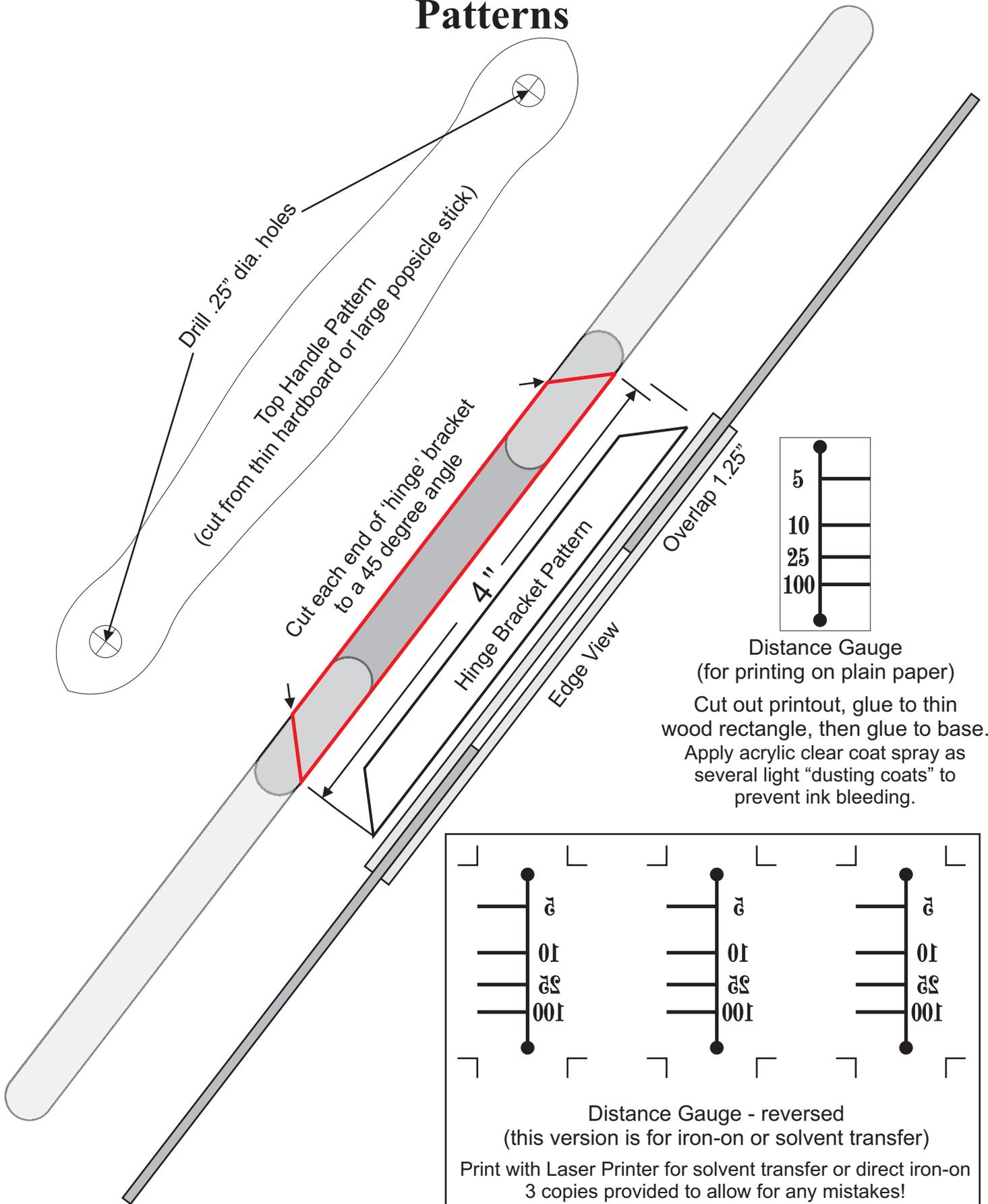
I hope you enjoyed making your Retro Camera Timepiece! You may want to try running the parts on different colored wood species rather than staining the parts different colors by hand. This might involve rearranging some of the project file components to place them on the appropriate colored material (be sure to recalculate toolpaths after any changes!). Not only would this simplify the project build process somewhat, but it could make a very nice 'upscale' version of this timepiece!

Happy Carving!

Michael



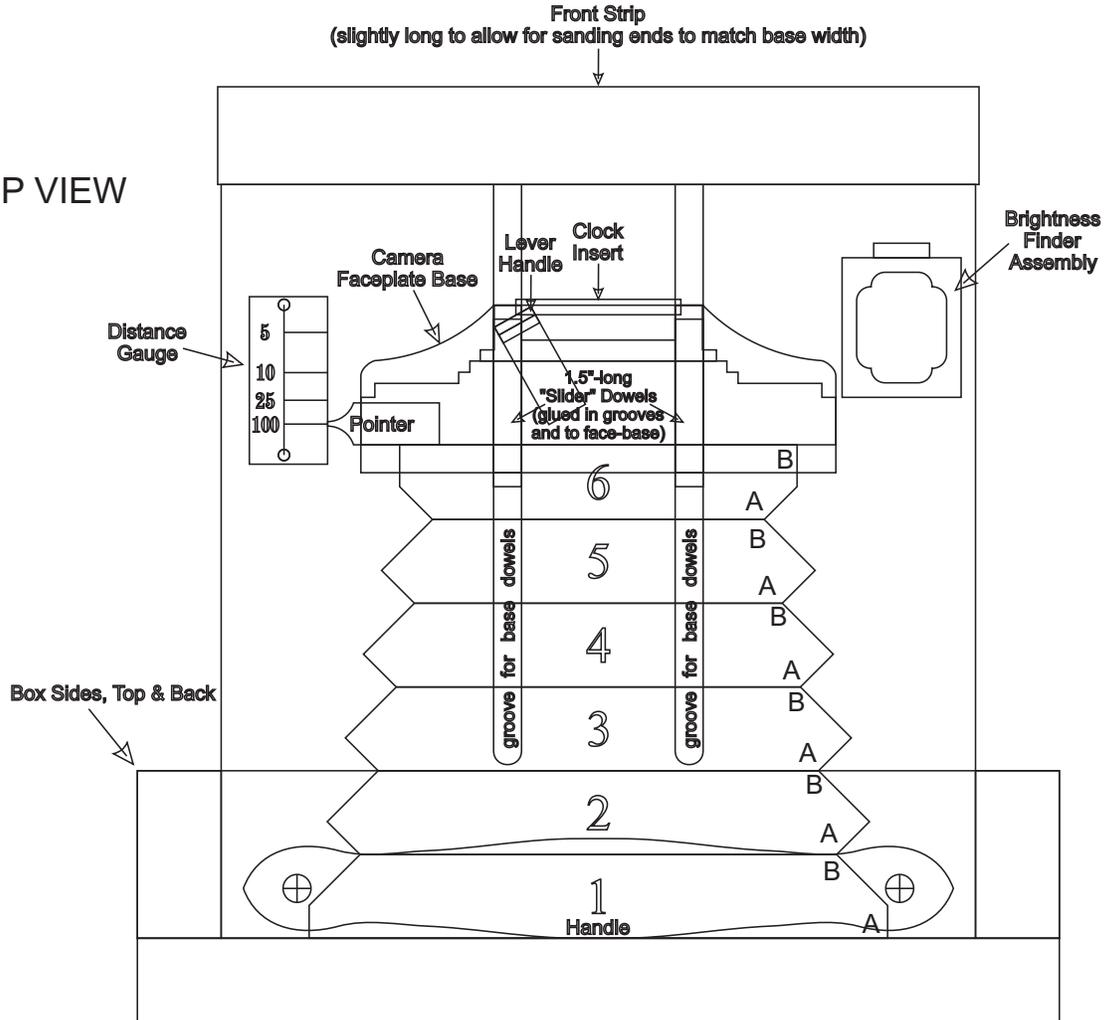
Patterns



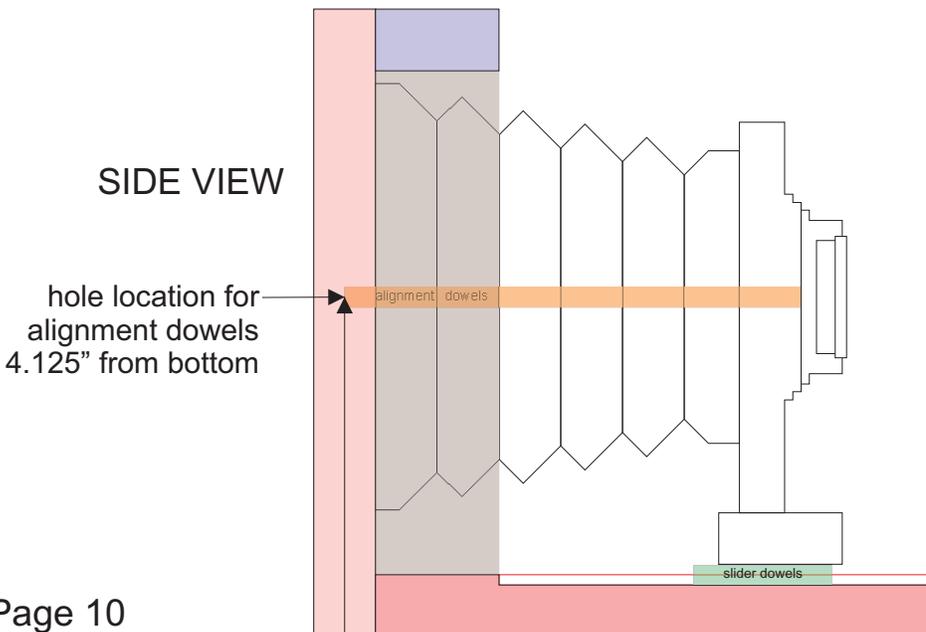
Layout and Placement Guide

(Not to scale - a true scale layout is shown in the Camera_Base_and_Box.crv project file)

TOP VIEW



SIDE VIEW



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 Home Depot™ or Lowes™

- Zinsser Bullseye SealCoat (100% wax-free brush-on shellac)
- Denatured Alcohol
- Zinsser Bullseye Spray Shellac (100% wax-free spray shellac)
- Wooden dowels, dowel glue pins, dowel buttons
- Rust-Oleum and MinWax stains
- Self-stick Cork Sheeting (located in the shelving section)
- Sandpaper
- Disposable Brushes and Paint Rags



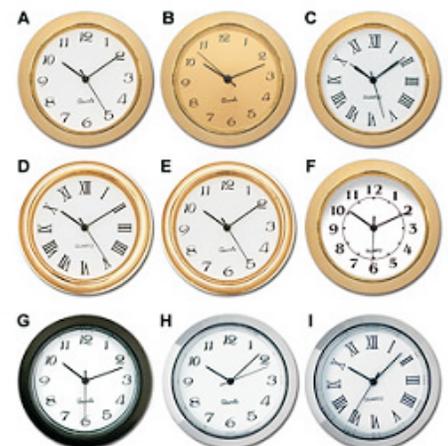
Items Purchased at Michael's Arts & Crafts™

- Popsicle sticks and large Craft Sticks
- Thin assorted craft wood



1-7/16-inch Mini Clock Insert Purchased Online from www.Klockit.com

- I used model #15389 (the black style G pictured), but there are several other 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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