

# "FREE" Do-It-Yourself (DIY) Replica Capacitors for Vintage Guitars

Methodology, artwork rendering and electronic document created by and property of Robert H. Sickler

Copyright © 1982-2008 Robert H. Sickler

**DISCLAIMER:** This free use 4-page instructional document can be used by the downloader for personal use only. These instructions and artwork are not to be sold, used for personal gain, or profit. The author is not affiliated with or endorsed by the Cornell Dubilier (C-D) corporation. Use of the likeness of a former Cornell Dubilier product is done for historical record, restoration or recreation purposes only and subject to C-D's will or restriction. The user of this document upon reading this disclaimer knowingly agrees to absolve the author from all responsibility for any damage to property, personal injury or legal problem while using this methodology. The author does not offer technical support for the methodology. You do not have permission to post this document or any portion of it to another web site or server. You may distribute the link to others needing the document for personal private use. This methodology is meant to be only a simulation of original procedure.

**Please read all instructions first, become familiar with the process and then gather the necessary tools and materials. This methodology is only to simulate the original procedure by the Original Equipment Manufacturer.**

## STEP 1:

At your local arts and craft store, find a thin grade of brown craft paper much like the color and thickness of an ordinary small thin lunch bag. If you know how to trim the lunch bags, press them flat and get them to print in your printer, all the better. Print the artwork (found on page 4 of this document) on a computer printer at the best print quality setting using the craft paper cut to 8-1/2 x 11". Trim the artwork (strips) on the thin exterior line with a straight metal ruler edge and sharp hobby knife.

## STEP 2:

Find a suitable mandrel in which to wrap the printed paper strip around to form the tubular capacitor shell. I would suggest something metallic with a straight, smooth surface finish like a 3/8" diameter chrome plated barrel of a multi-tip screwdriver (without the tip inserted of course). After measuring the circumference of the 3/8" diameter (roughly 1-3/16"), mark that distance on the plain unprinted side of the paper strip in pencil measuring upward from the bottom (the no text end).

**NOTE:** For flat tubular capacitors, you will have to make a wooden or metal mandrel whose cross-section is 3/16" thick x 1/2" wide. Round off the edges to look like this:



## STEP 3:

Lay the strip down on a washable work space with the unprinted side facing down. Starting 1/4" upward from the pencil mark, smear a thin coating of a good grade of waterproof wood glue. Too thick and the glue will ooze out while wrapping and make it tough to remove from the mandrel. Start the "dry end" around the free end of your mandrel and carefully wrap the printed strip tightly around until it stops where the text is. Make sure while wrapping that the edges of the paper layers are lined up. Add a tiny bit of glue under the end of the wrap edge to

insure the strip does not peel up afterward. Doing this too slowly will allow the glue to dry while wrapping. It may take some practice to get the tubular shell tight and aligned. After a few minutes set time, carefully slide the formed shell off the mandrel and let it dry several hours. I usually make several shells to have extras in case of problems later.

**NOTE:** Wrapping flat tubular caps requires a dry run to determine a starting point on the mandrel that allows the printed text to be located on the flat side of the capacitor.

## STEP 4:

I'm not going to suggest a capacitor brand, or capacitance value other than what is marked on the shell exterior, but choose something of a decent quality, yet one that has axial leads and will physically fit with margins inside the paper shell you have made. I have used all brands and types of modern capacitors over many years and the difference is not worth all the fuss everyone would have you believe.

## STEP 5:

Refer to the drawing on page 3 of this document and build yourself a filling fixture. The idea here is to provide a stable upright station to fill the paper shell with wax, having a modern capacitor positioned properly inside. The tape on the holding plate is to ensure a tight fit around the capacitor lead while the wax is being poured into the shell, otherwise it will leak out. Use a straight pin to start a tiny hole in the tape first and push the straightened capacitor lead through. You may have to hold the shell down on the tape with something other than your fingers and pour the wax in small stages to make sure the capacitor is seated and aligned properly. Pouring a full shell of melted wax may make the tape leak. Doing it in stages will help. But first...

## STEP 6:

There all kinds of waxes and exotic compounds used in original wax/paper capacitors. Let's be practical and use ordinary white candle wax with kid's brown crayons melted in. Dark brown crayons, tans crayons, whatever you want that looks similar to the originals. Experiment with the melted mixture to make sure it isn't too opaque.

# "FREE" Do-It-Yourself (DIY) Replica Capacitors for Vintage Guitars

Methodology, artwork rendering and electronic document created by and property of Robert H. Sickler

Copyright © 1982-2008 Robert H. Sickler

You want a mixture that will allow you to see the printed graphics of the shell after coated with wax.

The source of heat to melt this wax is up to you. I would recommend you do it outdoors away from combustibles. A little electric hot plate at "LOW" heat with a small metal pot works fine or an alcohol or oil lamp. The trick is to be able to have enough melted wax mixed to the color you desire and deep enough with wax to lower a small dipper inside. The dipper is again your own ingenuity. I have used old spoons with the handle bent at right angles to the bowl of the spoon. I also reworked the tip of the spoon bowl to form a small pouring spout.

## STEP 7:

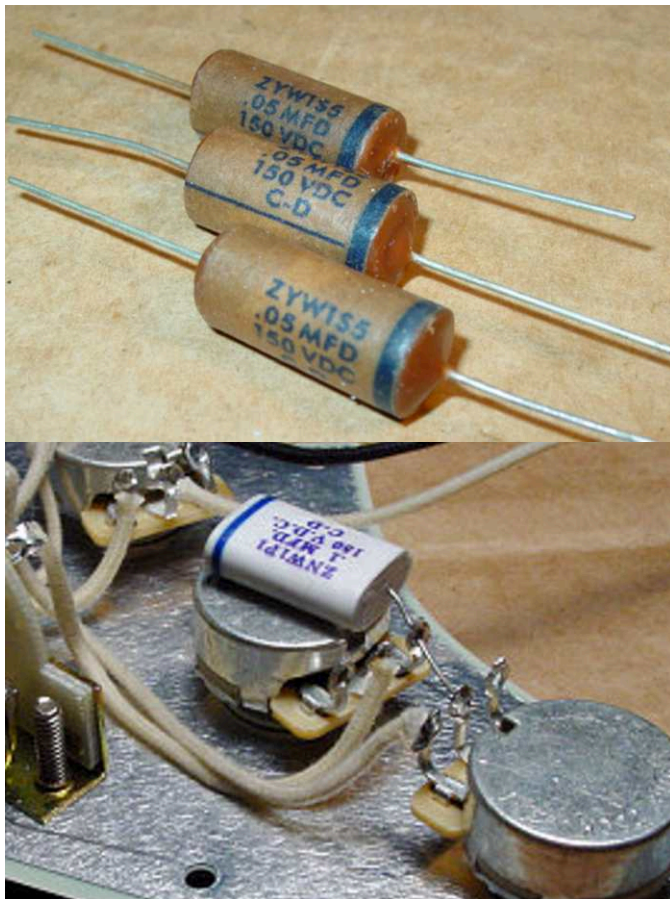
Use an unfolded paper clip to make a simple "L" shaped tool to dip your paper shell in the wax quickly a few times. Do not let it sit there in the hot wax because it could melt the glue holding the paper shell together. Place the coated shell on the holding plate of your fixture. With capacitor fitted and aligned (centered) inside the shell, fill the tube with your wax mixture in small increments. Each pour should adhere itself to the last. When filled to the top of the shell, let the wax crest. If it runs down the sides that's OK. Let the assembly

harden and completely cool before removing from the fixture. After some time, you can trim any spillage near the bottom or the sides of the cap with your fingernail. Smooth the outside wax coating with a piece of cotton cloth like an old bed sheet. Then you can polish the outside with your fingers. Also smooth out the hump of wax around the capacitor leads. A warm spoon edge works fine followed by your fingers. When you get done, your caps should look something like the ones I've made below. You can also add some wax to the other end that was flat to the holding plate if desired.

**NOTE:** When soldering these caps in place on the guitar, be careful not to use too much heat when soldering. This is especially a problem when a cap lead is soldered to a potentiometer can. Using an alligator clip close to the wax will help heat sink the lead to keep the wax from melting again.

There you have it! Such a pity things like this cannot be seen from the outside of the guitar. But us vintage detail appreciators know it's there and that's all that counts. I'm sure many of you can think of other ways and tools, but at least you have the basics and can have the fun and pride of "doing-it-yourself"! Enjoy!

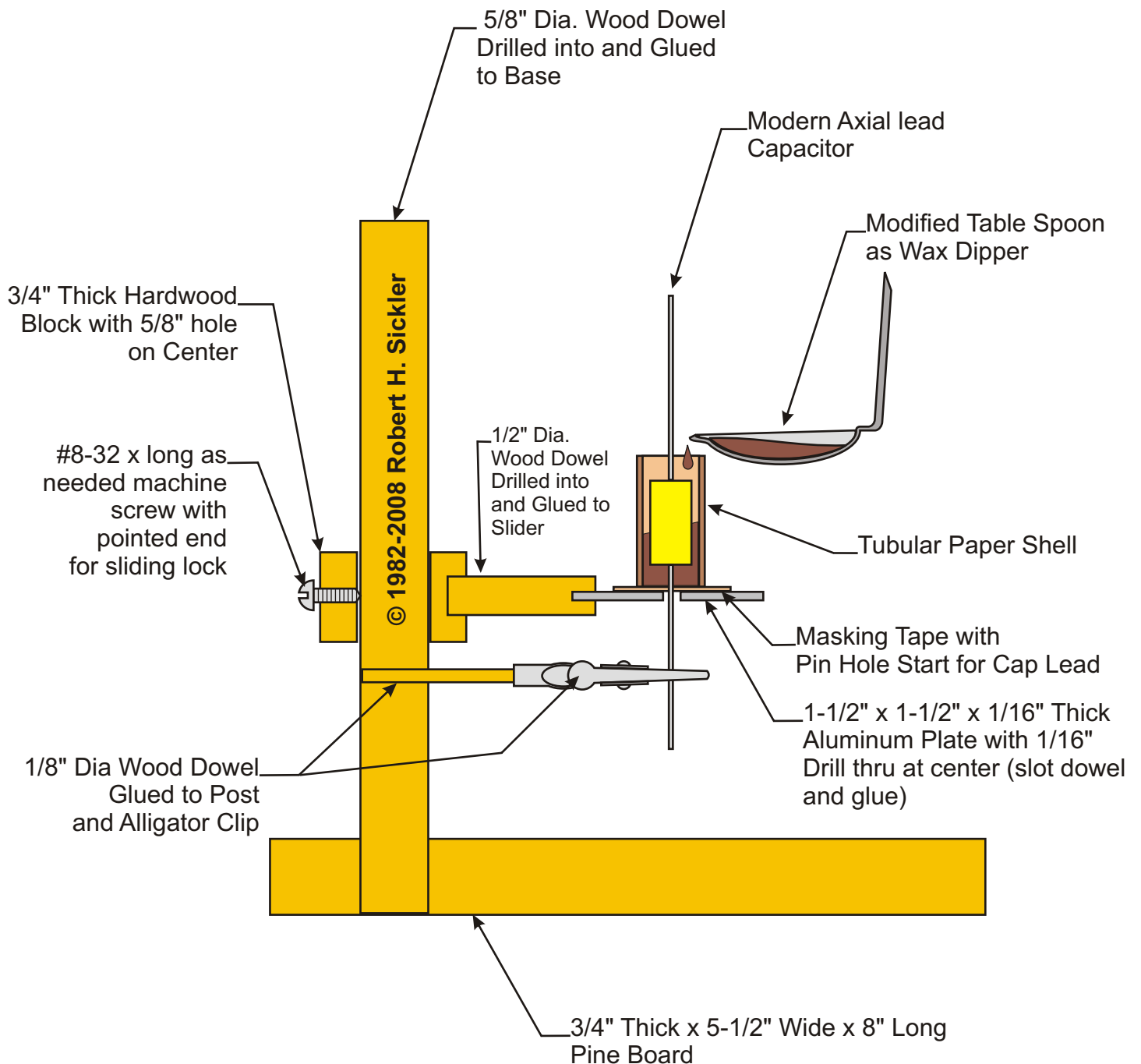
— Bob Sickler



(See pages 3 & 4 for filling fixture and capacitor artwork)

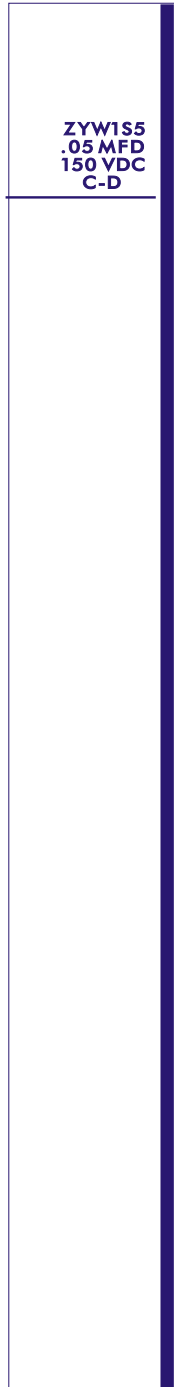
# "FREE" Do-It-Yourself (DIY) Replica Capacitors for Vintage Guitars — Wax Filling Fixture —

Fixture Concept and Rendering © 1982-2008 Robert H. Sickler

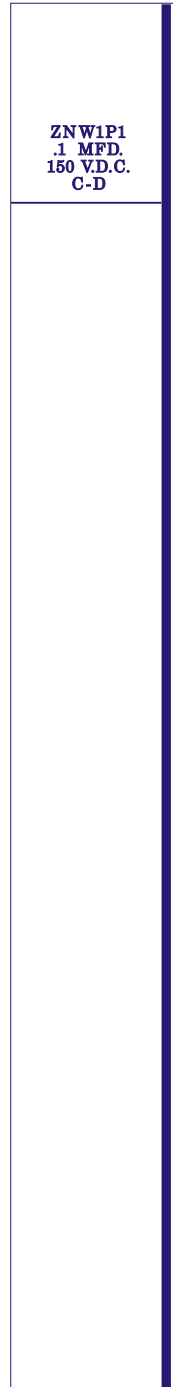


# "FREE" Do-It-Yourself (DIY) Replica Capacitors for Vintage Guitars — 1950's Era Paper Capacitor Shell Patterns —

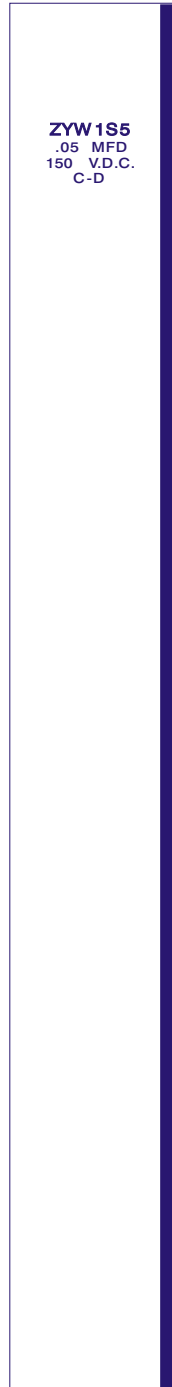
Renderings © 1982-2008 Robert H. Sickler



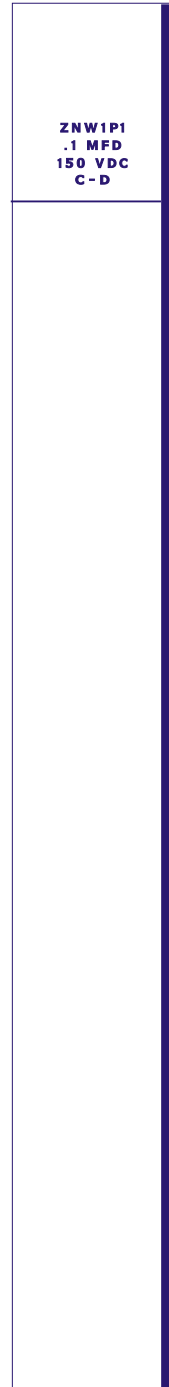
(1950 tubular .05 MFD  
3/8" dia. mandrel)



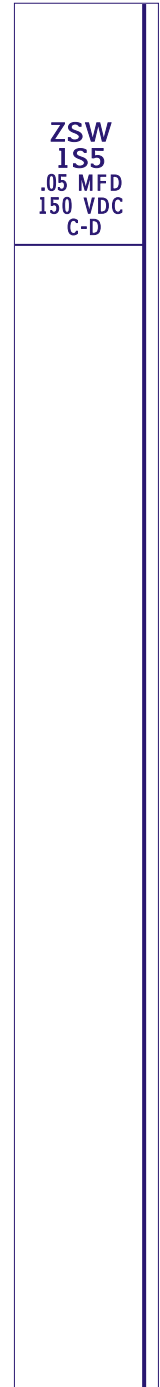
(1959 flat tubular .1 MFD  
white paper,  
see instruction  
text)



(1953 tubular .05 MFD  
3/8" dia. mandrel)



(1953 flat tubular .1 MFD  
see instruction  
text)



(1953 large stubby  
tubular .05 MFD  
7/16" dia. mandrel)