

How To Build a Homemade Battery Charger Branding Iron & Branding/Pyrography Pen

By: **Pete Wade** (email: pete@thebarkingtree.com)

Disclaimer!! This can be a very dangerous tool. High levels of electricity are involved, and serious injury can occur. I am not a professional electrician. If you get electrocuted, not only could it kill you, but it will hurt the entire time! I assume no liability if you choose to proceed. Good luck, but don't come crying to me!

Note: There are several manufacturers of car battery chargers, but all should be very similar. At least until the technology changes. You will be removing most of the "guts" so that you can wire directly into the transformer. I used Harbor Freight's Cen-Tech 2/10/50 amp 12v Manual Automotive Battery Charger for this project. You do not want one of the newer digital/automatic type chargers, they will not work for this project.

Total investment will be around \$125 unless you have a Harbor Freight coupon and/or some of the pieces-parts already.

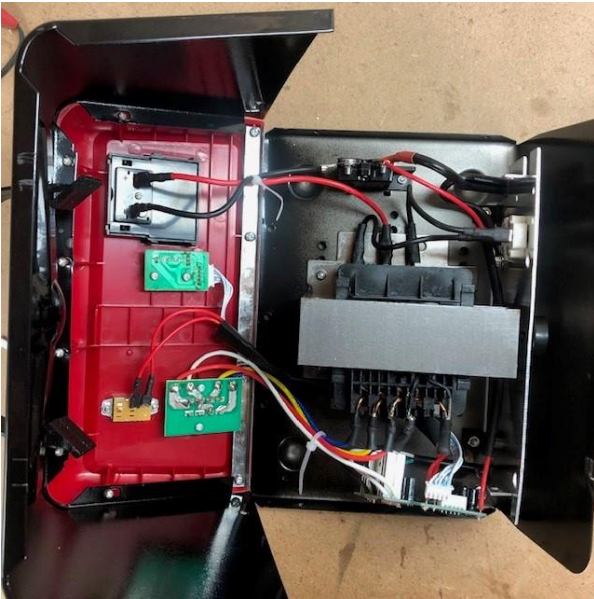
Items Needed:

1. 2/10/50 Amp 12v Manual Auto Battery Charger (Harbor Freight \$55)
2. 600w, Single Pole, 3-Way Rotary Dimmer Switch (Home Depot \$12)
3. Screw Type Quick Connect Terminal Strip (Amazon \$12)
4. 12 ga. Solid Grounding Pigtails or straight 12 ga. Solid wire (Home Depot \$6)
5. ½" x 6" PVC Pipe (Home Depot pre-cuts \$2.32)
6. ¼" Stereo Mono Plug (Amazon \$10 or a music store)
7. ¼" Female Mono Plug (Amazon \$4 or a music store)
8. 12 ga. x 2' Stranded wire in White & Black (Home Depot \$2-3)
9. Heat Shrink Tubing (\$3-4)
10. 20 amp Inline Automotive Fuse Pigtail (Auto parts store ~\$8)
11. 3' of 12 ga. Stranded lamp/power cord wire (~\$4)
12. Various Ring/Fork/Spade terminals, 1 wire nut. (~\$2)
13. Nichrome Wire. (Amazon \$10-25) I use 20 ga.

Tools Needed:

1. Philips Screwdriver
2. Electrical Side Cutters
3. Wire Strippers
4. Soldering Iron/Gun
5. Solder & Flux
6. Heat Gun/Lighter

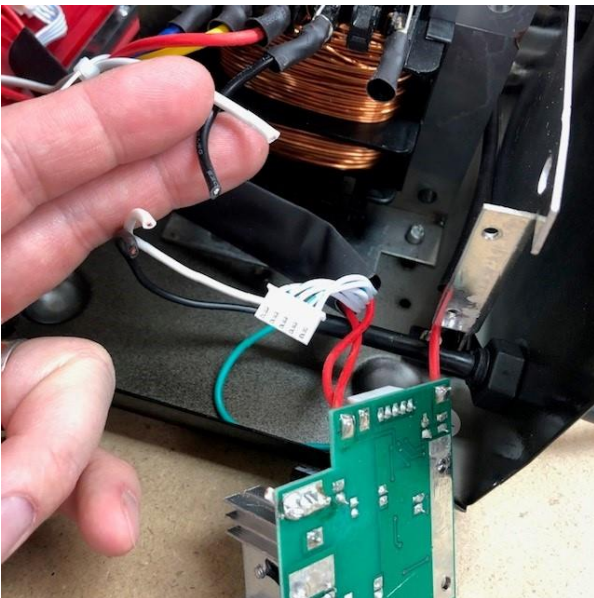
Step #1: Gutting the Unit

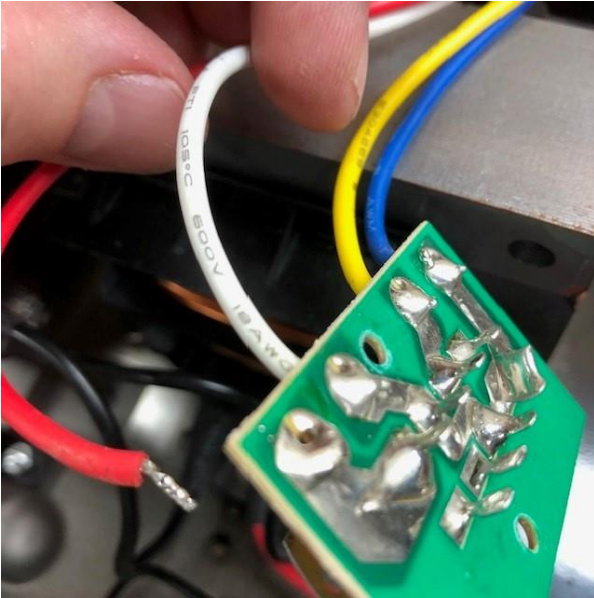


1. Remove battery charger cover. There should be several screws along the back and bottom holding the front panel/outer cover in place. You won't be able to completely remove the cover as some wiring connects to the front control panel. But opening it up will provide enough space to work.

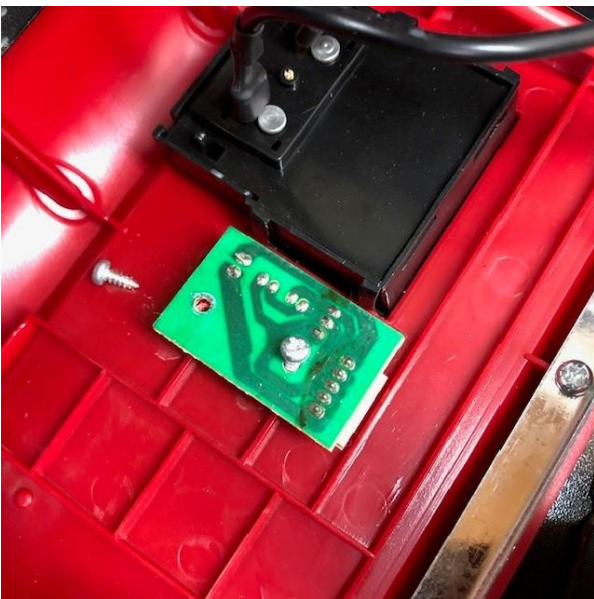
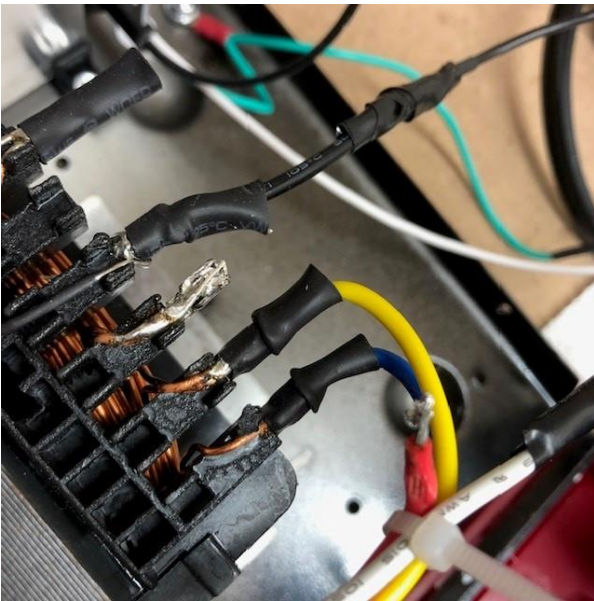


2. Remove the Incoming Power circuit board from its bracket and cut the Black & White wires free from that circuit board from both the incoming power cord, and coming off the board to the transformer (Black) and amperage selector switch (White) on the front panel. You will also need to disconnect the red wire connected to the Black Overload Safety Switch on the other side of the unit. Cut all the wires close to the circuit board. You will not need this circuit board.

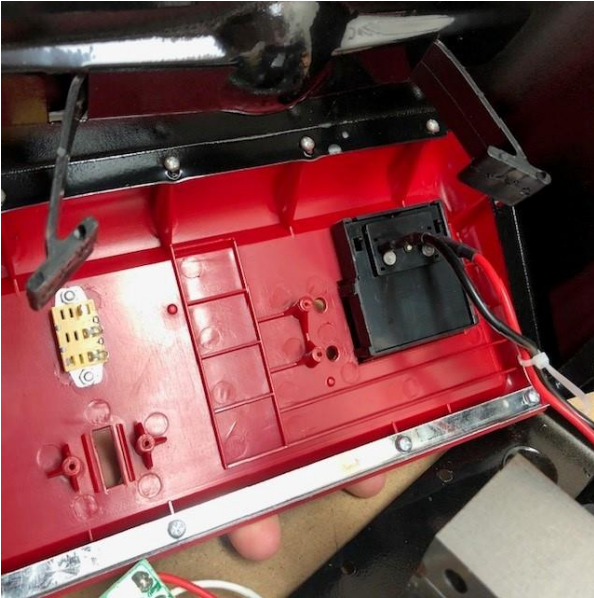




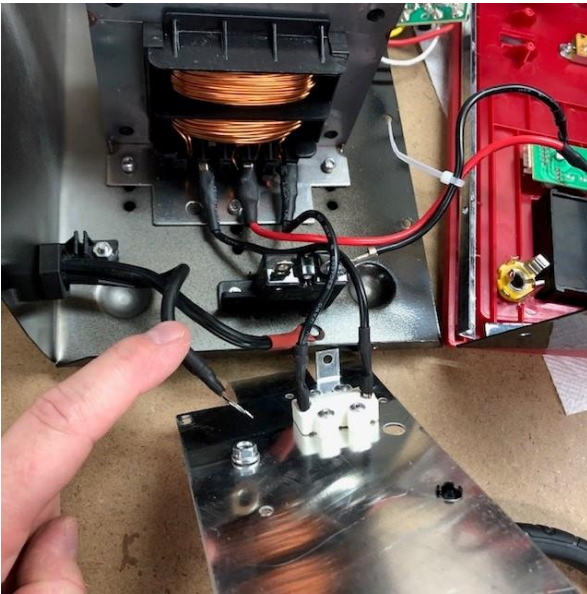
3. Un-solder the Red wire connected to the Power Side of the Transformer and the Amperage Selector Switch circuit board on the front cover. Remove this completely, you will not need it.



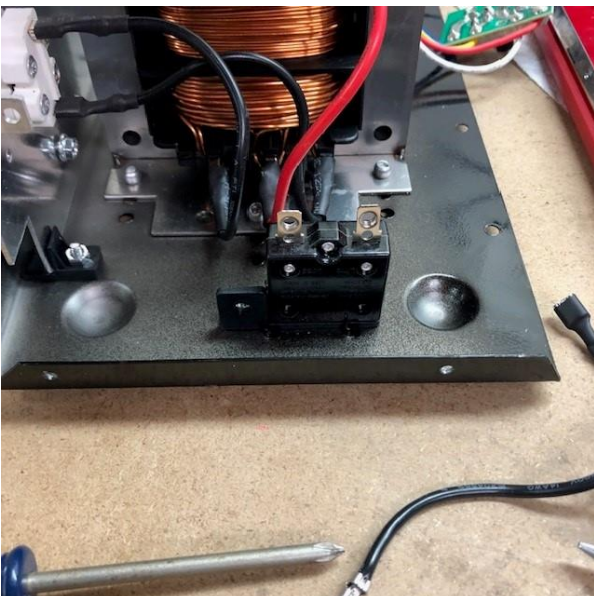
4. Disconnect the white multi-pin wiring harness connector from the center circuit board on the front cover and remove the circuit board. You will not need this circuit board.



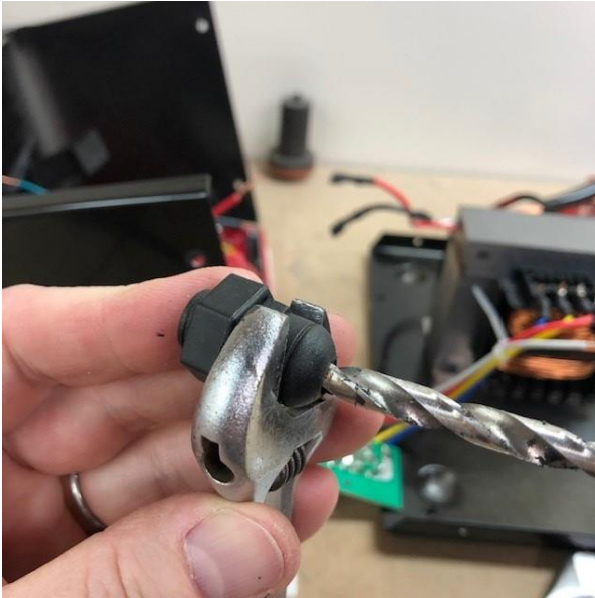
5. Disconnect the two red wires with spade connectors from the Amperage Selector Switch on the front cover. You can remove the selector switch if you want, or leave it in place, it will not be used anymore.



6. Remove the Jumper Cable wires that are connected with ring terminals from their points of connection. You will not need these anymore.



7. Remove the Black Overload Safety Switch and the short Black wire connected to it and to the Amperage Gauge on the front cover. You will not need these anymore.



8. Unscrew the ground (Green) wire.

9. Remove the power cord by unthreading the panel fitting and pull the power cord out. Strip the black outer cover off the power cord so that you can remove the panel fitting. This will take some work.

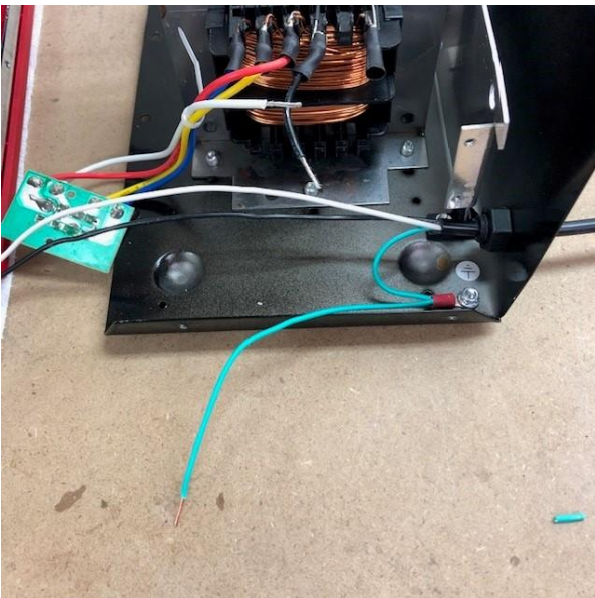
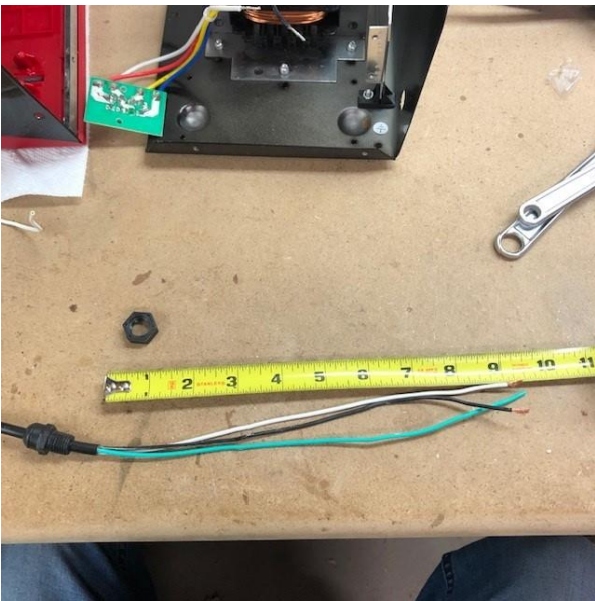
10. Using a drill bit the same diameter as the power cord, and while holding the panel fitting in a crescent wrench/pliers, drill out the remaining black wire covering. This will allow you to reuse the panel fitting.

The gutting of the unit is now complete.

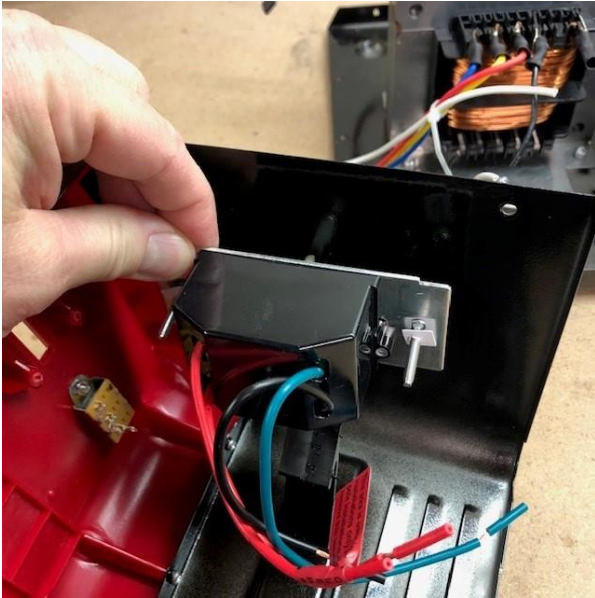


Step #2: Incoming Power Side

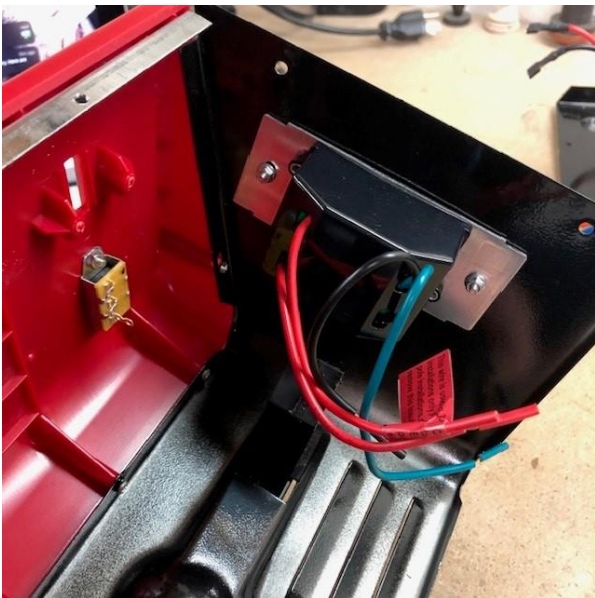
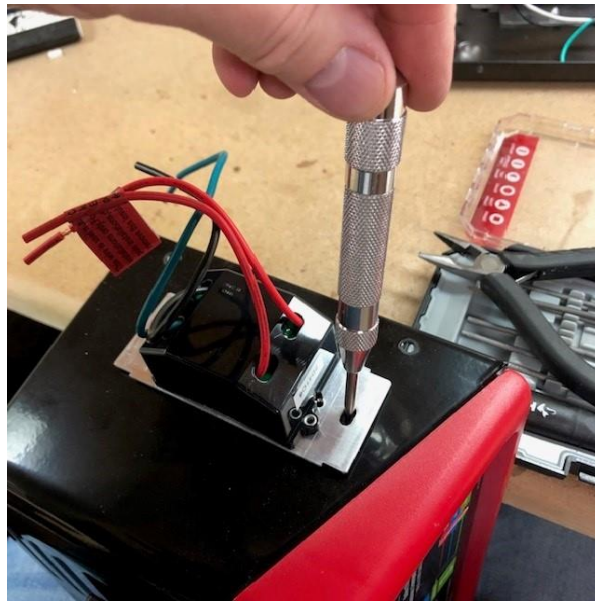
1. Strip more of the outer cover off the power cord so that you have 9-10" of White/Black/Green wires exposed. Strip 1/2" off the ends of the White/Black/Green wires.

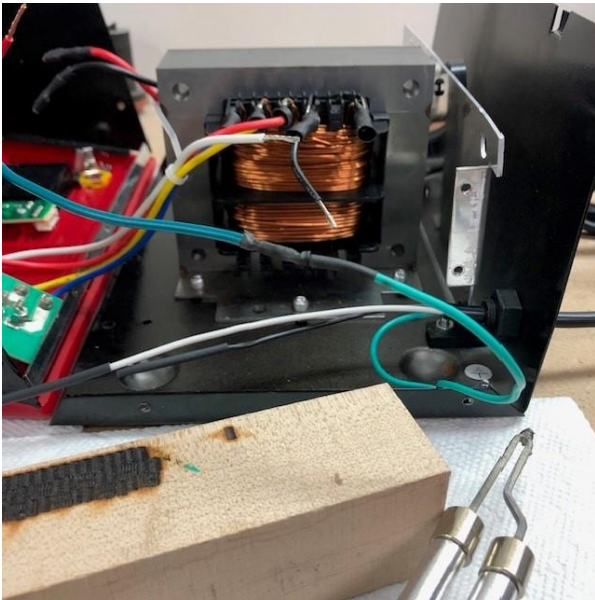


2. Slide the panel fitting back onto the power cord, and install them back into the charger as before. Tighten down the panel fitting.
3. Measure and cut the Green wire so it will reach the OEM ground screw from step #8 in the "Gutting" section.
4. Strip 1/2" off the incoming Green wire and the cutoff Green wire and join the two into a Ring or Fork Terminal. Secure the terminal to the ground screw.

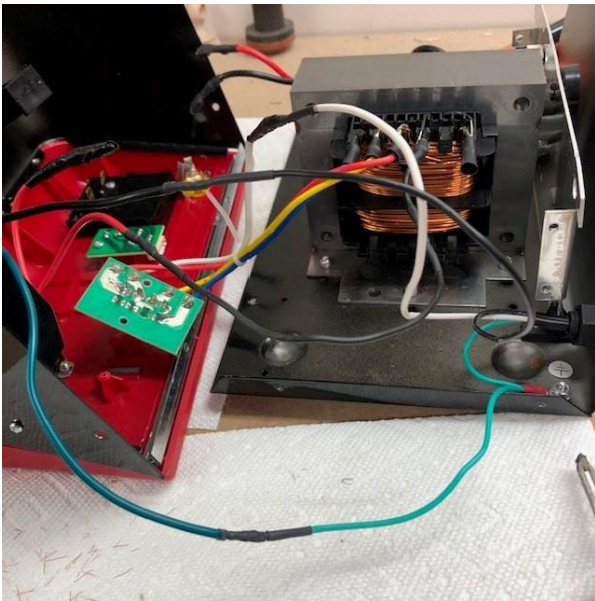


5. Locate a good spot for the dimmer switch on the side panel, close to where the power cord comes in. Make sure to leave enough room all around the switch box so it won't interfere with anything. Start by removing the plastic rotary knob and find the location where the rotary stem will protrude through the panel. Drill that hole first. Then place the rotary stem through that hole from the outside, doing this will allow you to locate and mark the two holes needed to screw/bolt the switch to the panel. Drill those mounting holes and mount the switch to the inside and secure it with appropriately sized nuts/bolts/washer.





6. Connect the Green ground wire from the Rotary Switch to the Green power cord ground pigtail from step #4. Solder & heat shrink tubing.



7. Connect the Black power cord wire to the Black switch wire. Solder & heat shrink tubing.

8. Connect the White power cord wire to the White amperage selector switch wire from the front panel. Solder & heat shrink tubing.

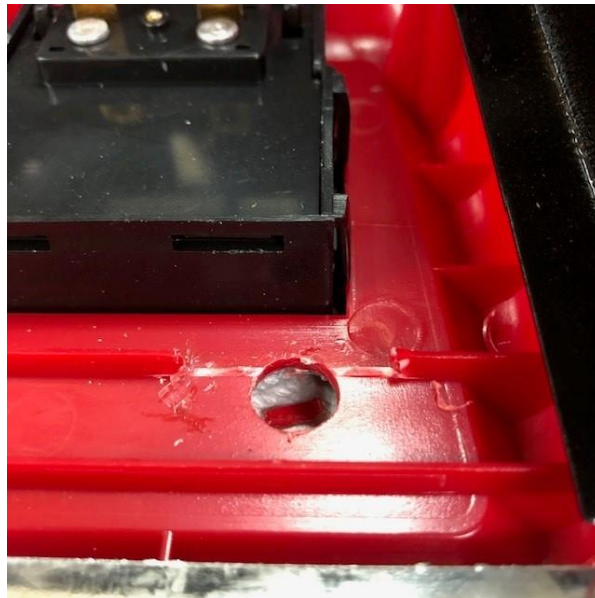
9. Connect the Black transformer wire with an ~5" length of black 14 ga. Stranded wire to the Red Rotary Switch wire that comes from the same side as the Black Rotary Switch wire. Solder & heat shrink tubing all connections.

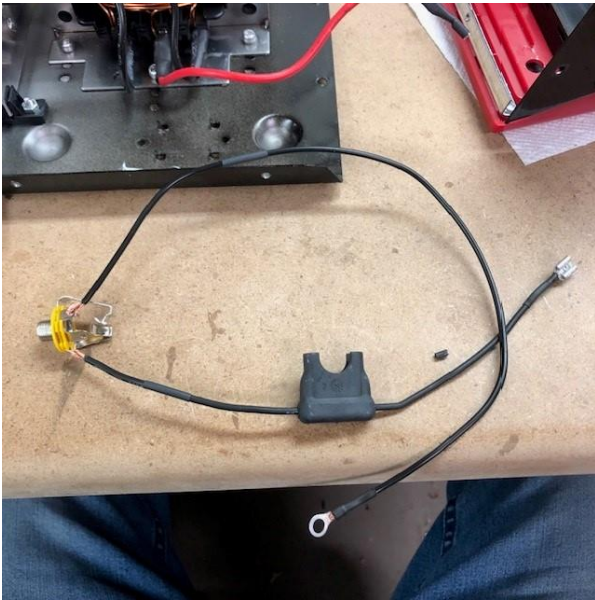
10. Cap off the secondary Red wire from the Rotary Switch. It will not be used.

Step #3: Branding Iron Side:

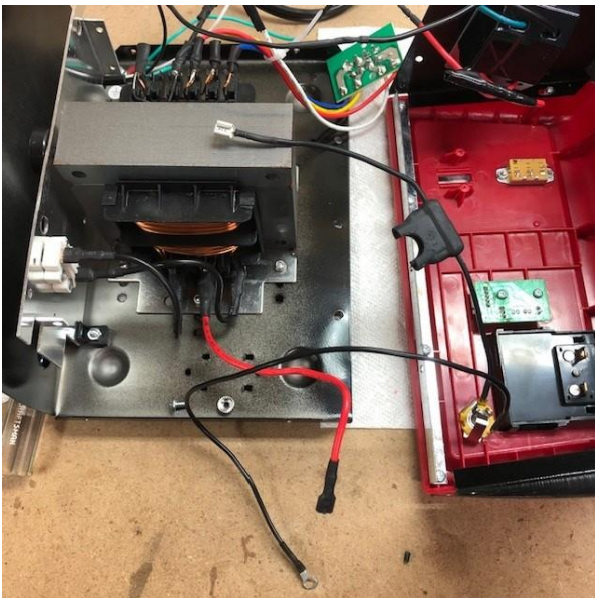
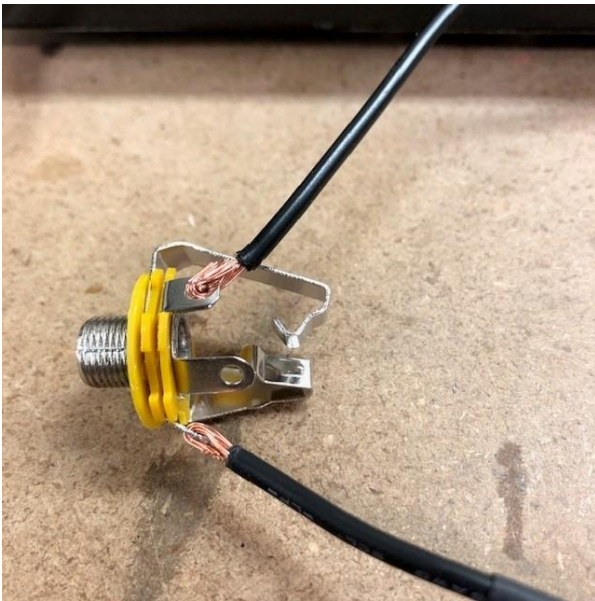


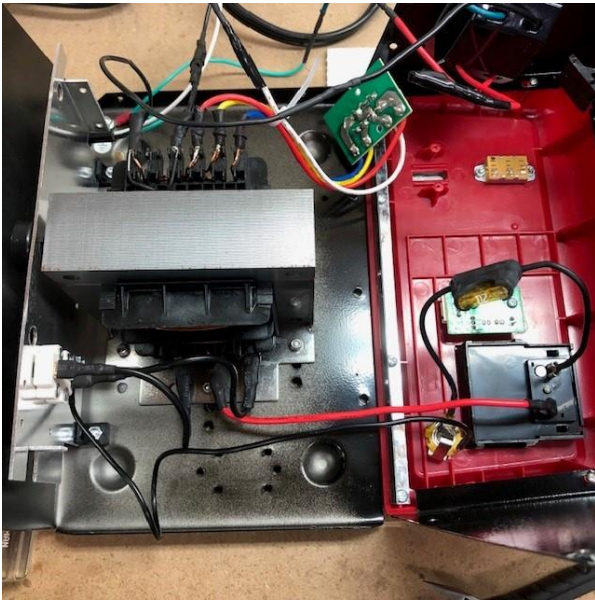
1. Locate the Female Mono Plug position on the front panel. Drill an appropriately sized hole for the plug's threaded stem to fit. It may be necessary to trim some of the plastic support ribs to allow the plug to fit flat.



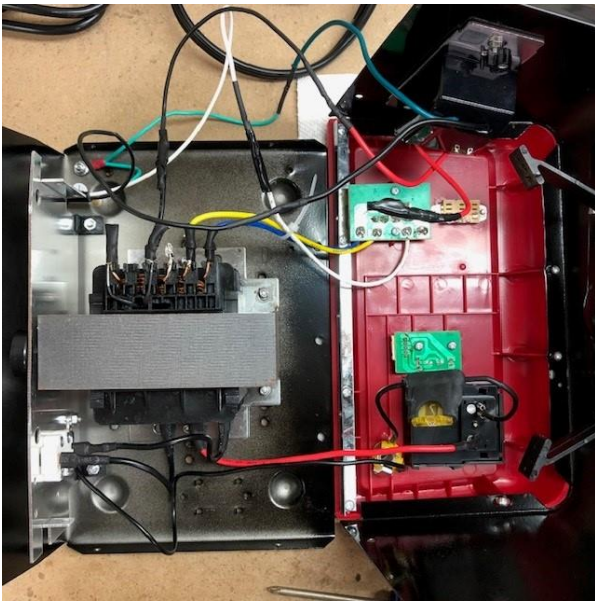


2. Strip both ends of the Pigtail Fuse Holder.
3. Install a female spade connector to one end of the Pigtail Fuse Holder that will mate with the male spade connection on the back of the front panel Voltage Meter and connect it.
4. Connect the other end of the Pigtail Fuse Holder to the ??? post of the Female Mono Plug. Solder in place.
5. Cut a ~10" length of 12-14 ga. stranded wire, strip both ends and install a ring terminal on one end and connect that ring terminal to the aluminum panel along the back of the unit.
6. Install the other end to the ??? side of the Female Mono Plug. Solder in place.
7. Install the finished Female Mono Plug through the front panel and secure with its nut.



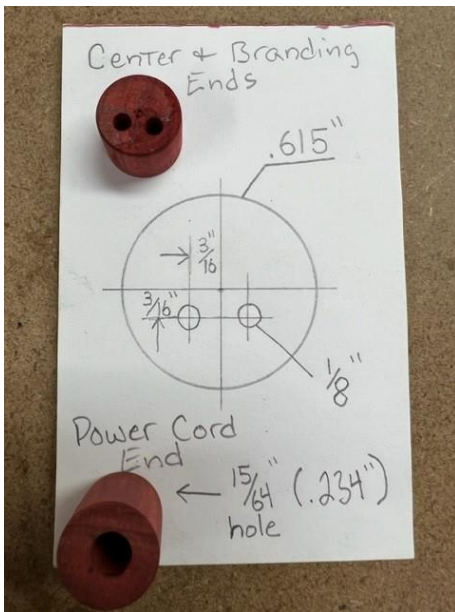


8. Reconnect the OEM Red wire from the Transformer to its male spade connection on the front panel Voltage Meter.
9. Install the 20 amp fuse into the Pigtail Fuse Holder.
10. Verify all connections are tight!
11. Bundle up the wiring as best possible and secure it.
12. Reinstall the covers and screws.
13. Install the rotary switch knob or use your skills and turn something nice!!



The Battery Charger Branding Iron/Pyrography machine is now complete and is ready to accept any Mono Plug style pyrography pens.

Step #4: Making The Branding/Pyrography Pen



1. Cut the $1/2''$ PVC pipe to 6" long and deburr the ends.
2. Turn a $\sim 6''$ length of wood, between centers, to slide into the PVC pipe with a little resistance ($\sim .615''$). This needs to be a good, slightly snug fit to the ID of the PVC pipe.
3. Cut the turned wood into three (3) pieces: 1", $3/4''$ and $1/2''$ long.
4. Find the center of the 1" long & $1/2''$ long pieces and mark with a "+" covering the entire face. Measure from the vertical centerline, over $3/16''$ on either side along the horizontal line. Then measure from the horizontal centerline, down $3/16''$ on either side of the vertical line. This will create two offset crosshair points. Center punch these marks to ensure precise drilling.
5. Drill both points in both pieces with a $1/8''$ drill bit, completely through.

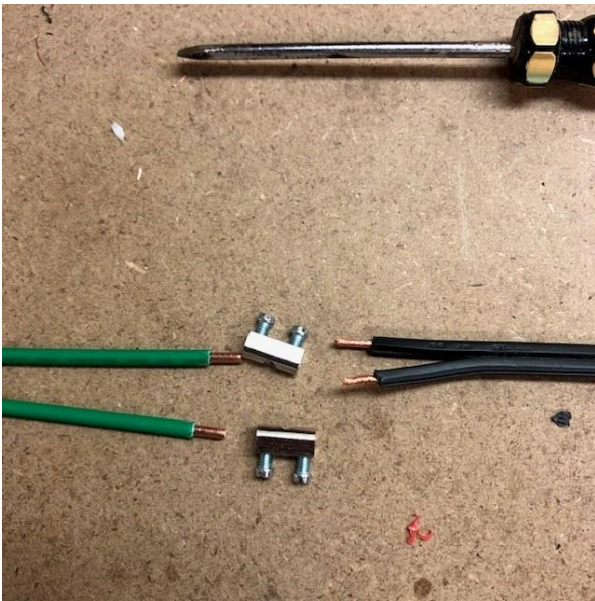


6. Find the center of the $3/4''$ long piece and centerpunch it.
7. Drill a hole through the piece to allow the Lamp Cord to pass through with a little resistance ($\sim 15/64''$ or $.234''$). Or, drill a clearance $1/4''$ hole, and seal the cord in place with epoxy once the whole pen is completed.
8. Cut apart the Terminal Strip to remove four (4) metal couplings. You will have to remove the screws, and use a combination of side cutters, pliers and utility knife to cut the plastic away. This is a pain!





9. Make two (2) Green Grounding wires 5 1/2" long by cutting off the screws & wire loops.
10. Strip 1" off one end of each, and 1/4" off the other end of each.



11. Using the 3' length of Lamp Wire, strip 3/8" off both ends of both wires, and twist the stranding.
12. I recommend you add solder to both wires on one end. This will stiffen the stranded wire to better accept the coupling screws. Make sure they will still slide into the couplings! Slide this end into the 3/4" turned wood piece with the center hole.
13. Install each soldered end of the lamp wire into half of the couplings. Tighten down the screws. Make sure the couplings remain straight and the screws pointing up, in the same direction.
14. Install the short, stripped end of each Green grounding wire into the other end of the couplings. Tighten down the screws.



15. Slide the turned cylinders down onto the Green grounding wires. The 1/2" long piece first, then the 1" long piece.

16. Install a coupling onto each 1" stripped end of the Green grounding wires. Make sure the Green grounding wires are slid into the turned cylinder so that they are on the lower half of the wood (see pictures), with the coupling screws pointing up to match the coupling screws from step #13. This makes it so the screws won't bind up inside the PVC tube.





17. Slide the whole assembly into the PVC tube until the 1" of stripped wire/couplings are sticking out of one end. Once seated correctly, the turned wood cylinders should be flush with the ends of the PVC tube.
18. At the other end of the Lamp Wire, disassembly the Male Mono Plug, and open the clamping fingers to allow the Lamp Wire to fit. Be sure to place the threaded cover & plastic sleeve onto the Lamp Wire before soldering!
19. Solder one Lamp Wire end to the long post with the clamping fingers.
20. Loop the other wire through the hole of the short post, and solder in place.
21. Bend the clamp fingers down to secure the Lamp Wire in place.
22. Slide the protective clear sleeve up to cover the solder connections, then slide the metal cover in place and thread closed.

Your handmade Branding/Pyrography Pen is now complete.



Purchase some Nichrome wire and start experimenting with different shapes. For making brands, I suggest some heavier gauge wire. I use 20 gauge, but will probably go bigger to 18-14 ga. soon. The act of branding is usually done using a red-hot brand, and pressing into the wood as though you were stamping. This causes a lot of wear to the wire, and it won't last forever, so plan on needing to remaking your brands occasionally.

To make the Basket Weave wire, watch pro-turner Molly Winton on YouTube (https://youtu.be/I-CLD_Bc8xE). This link is to a demo where she goes very in-depth into her style and eventually how she fabricates her basket weave wires.

Now that everything is complete, please keep in mind, this machine is **VERY** powerful. **ALWAYS** start up the machine with the rotary switch dialed all the way down! Just like you would turn down the speed of your lathe.

Be safe! Don't burn yourself and don't burn down your house!