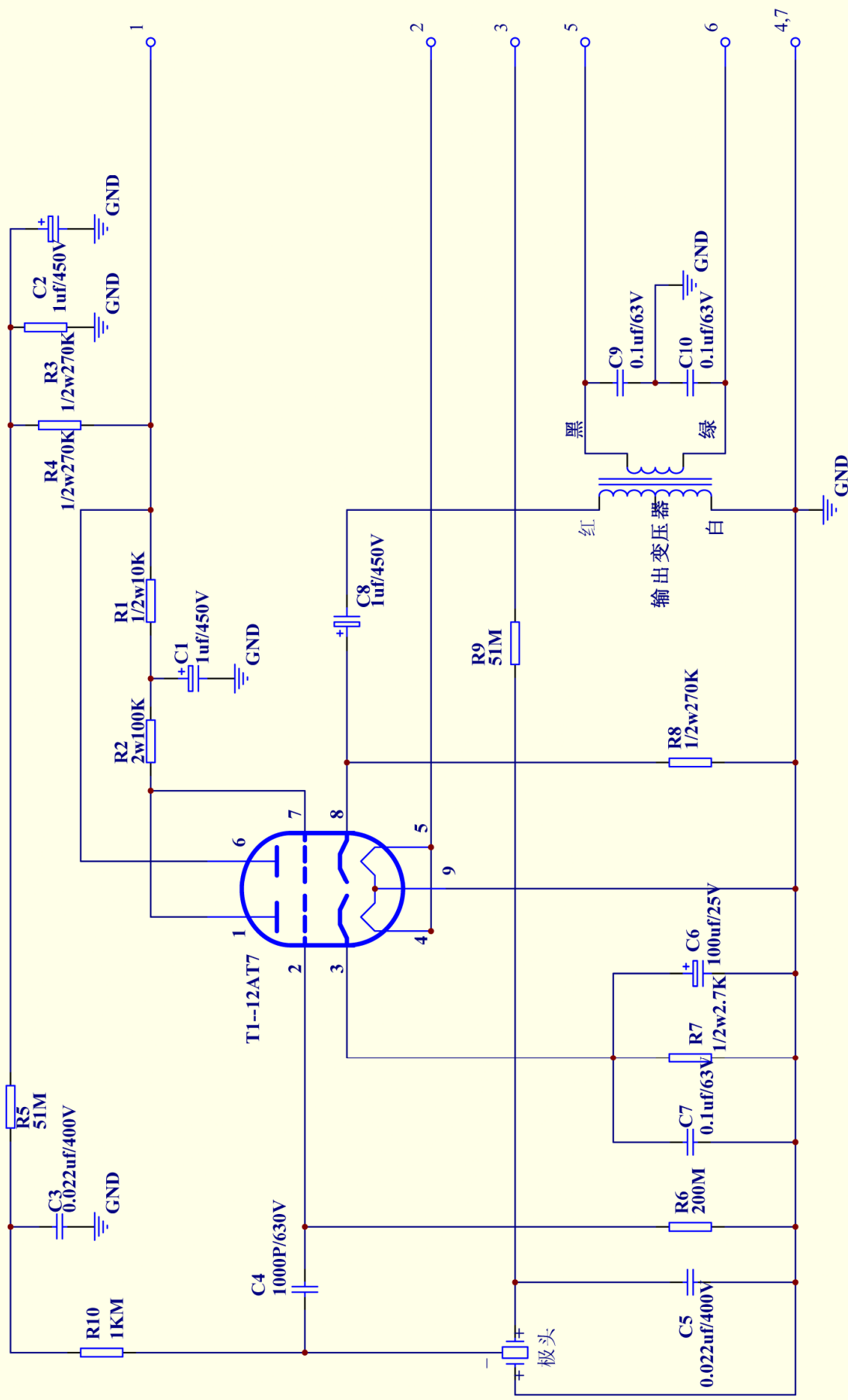


# **APEX 460 MODS**

A.K.A. Nady TCM-1150, Carvin CM100, Alctron HST-11A

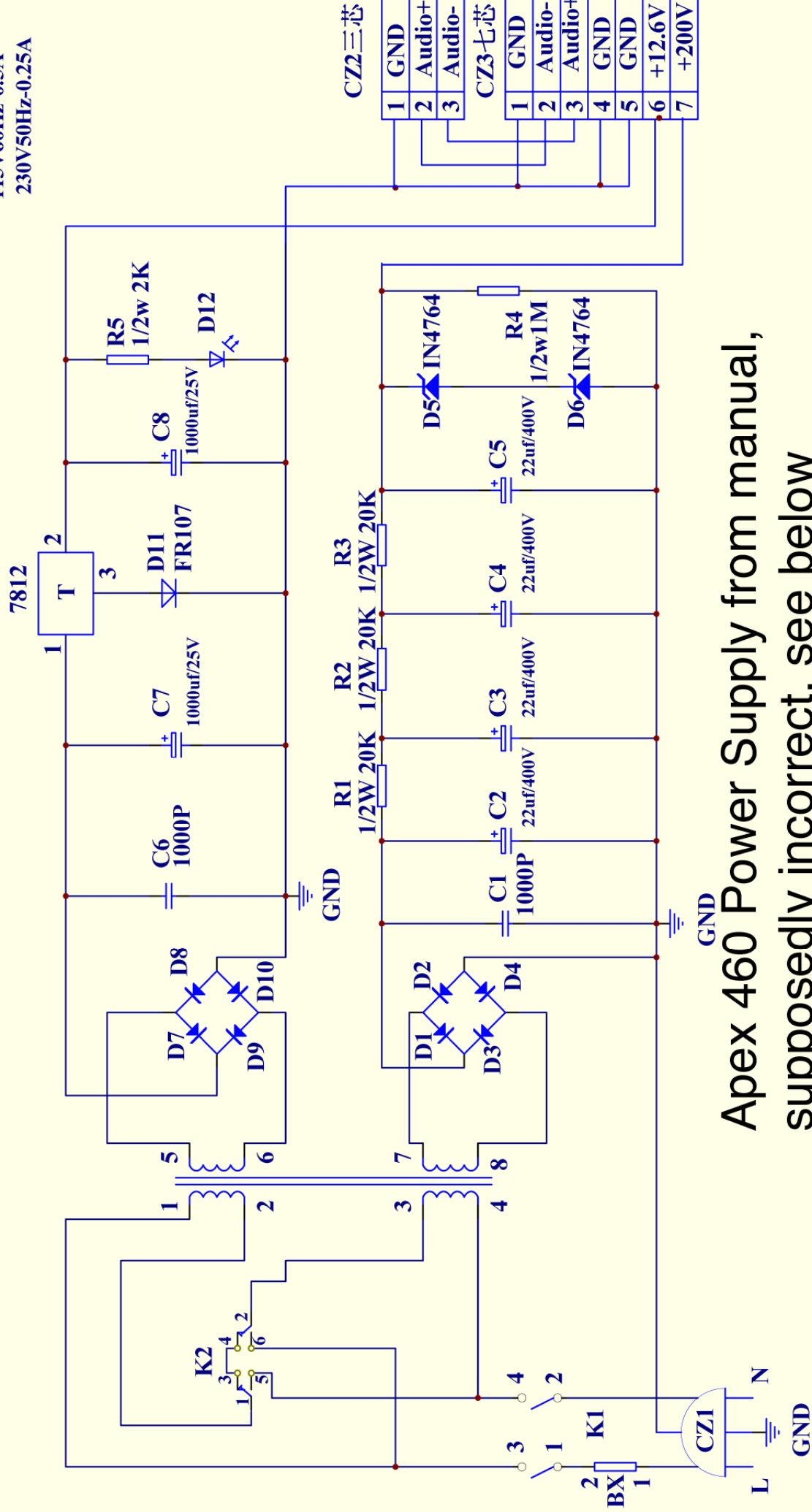
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# Schematics



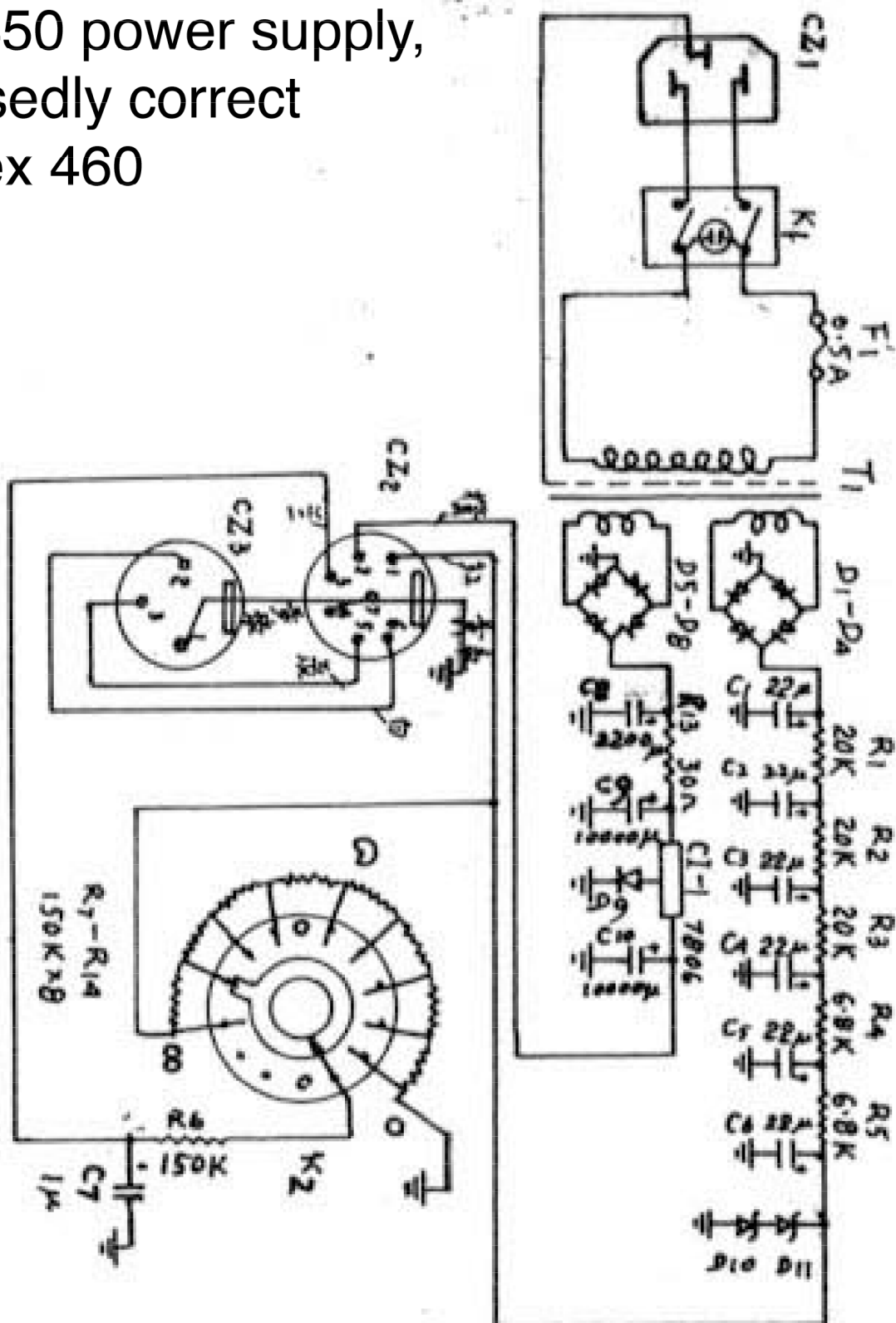
Microphone  
Apex 460 传声器原理图

115V60Hz-0.5A  
230V50Hz-0.25A



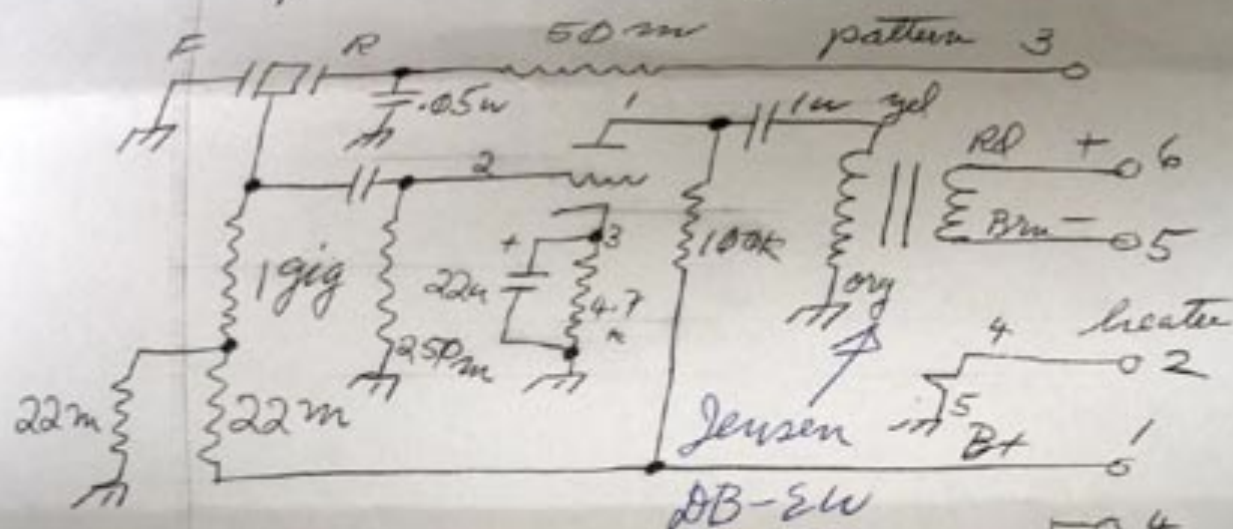
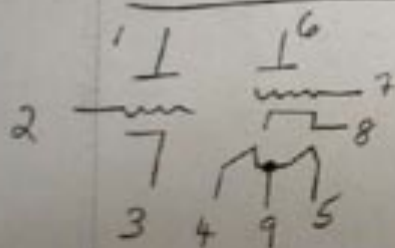
Apex 460 Power Supply from manual,  
supposedly incorrect, see below

# Apex 450 power supply, supposedly correct for Apex 460



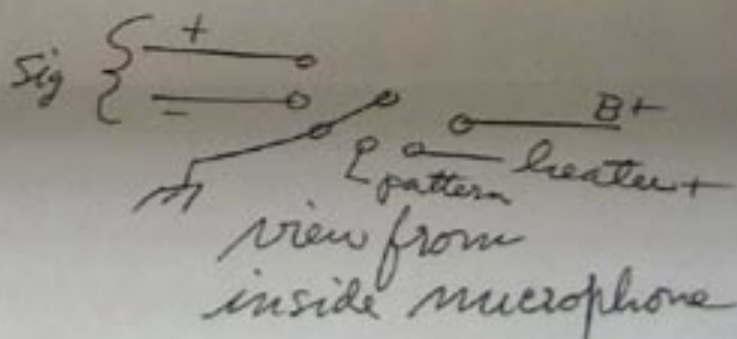
**SKEE017**

modified APEX  
capacitor microphone


$$\text{tube} = 12A \times 7$$


tie off pins  
5, 6, 7, 8 and 9  
to ground

## Connector



# Transformer and Tube Mod

by [MorphProductions.com](http://MorphProductions.com)

This mod is for replacing the stock 460's transformer with a Cinemag 2460 and the tube with your choice, I like the GE 6072A.

The first thing to do is unscrew the bottom off the Apex 460's casing and slide the long tube off.



The Apex 460 without it's protective casing.



2007 Ashton Price/Morph Production



At the bottom of the mic on either side are 4 tiny screws. Remove them.



2007 Ashton Price/Morph Productions



After the screws are removed separate the bottom casing to reveal the transformer.



You'll find the transformer in the top half of the casing. You won't really be able to access it properly until a few more steps.



Remove the tube from it's socket. Try to avoid touching it with your hands. Upon reassembly, replace with NOS GE 6072A.



There's some metal slats that hold in the wires from the circuit board to the transformer and mic output. These slats have to be removed so you can get the slack you need to slide the top of the transformer casing to get at the wires.





The inside slats will pop off with a screwdriver. Remove both on either side.



With the slats removed you will have the slack with the wires required to slide the top casing up to give you room to get at the transformer.



2007 Ashton Price/Morph Productions

Slide the top of the transformer casing up the wires. Now we have the room needed to get at the transformers wiring.





Exposed transformer!



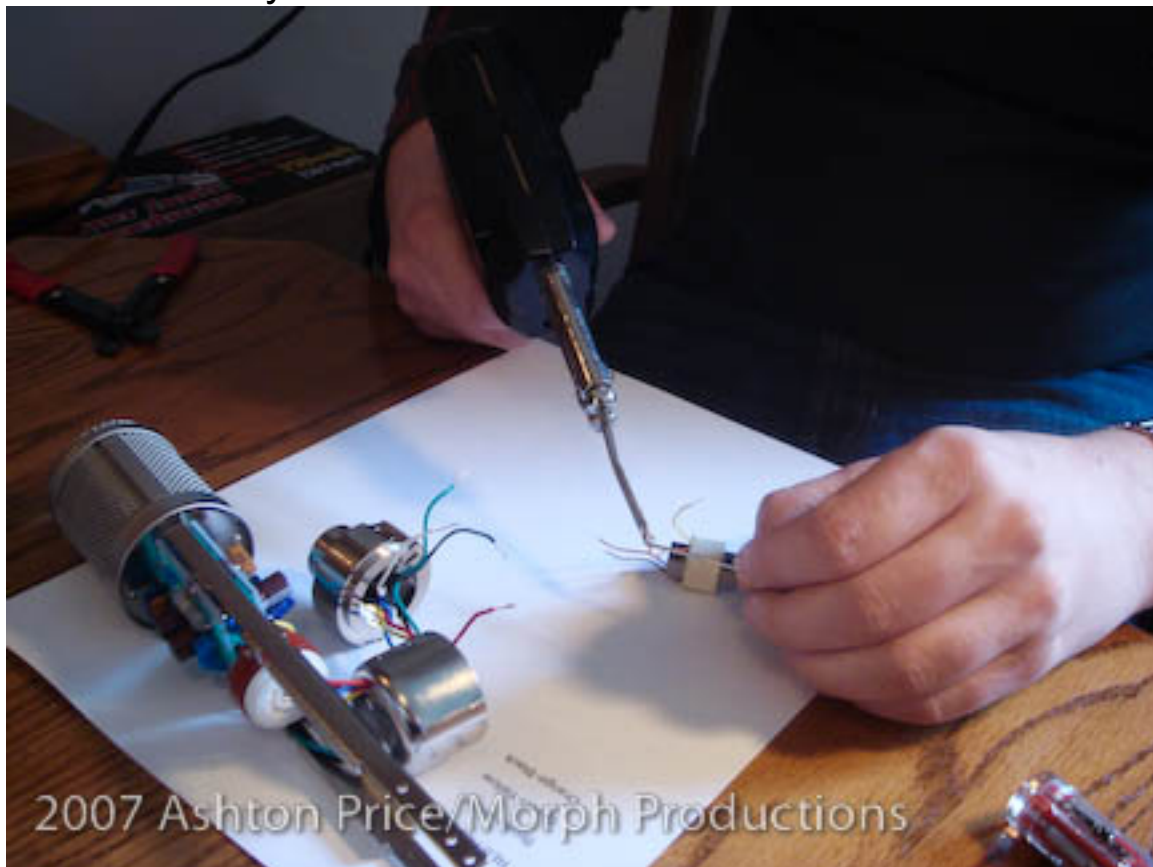
Cut the wires from the transformer at the base of the transformer to give you as much wire as possible to play with. This would be the point of no return so again I will remind you that you're doing this at your own risk!!!



Strip the wires on the mic and the Cinemag transformer to prepare for soldering. You can also cut off some of the excess wire from the Cinemag transformer as you won't require them to be so long.



Tin all the wires you're about to solder.

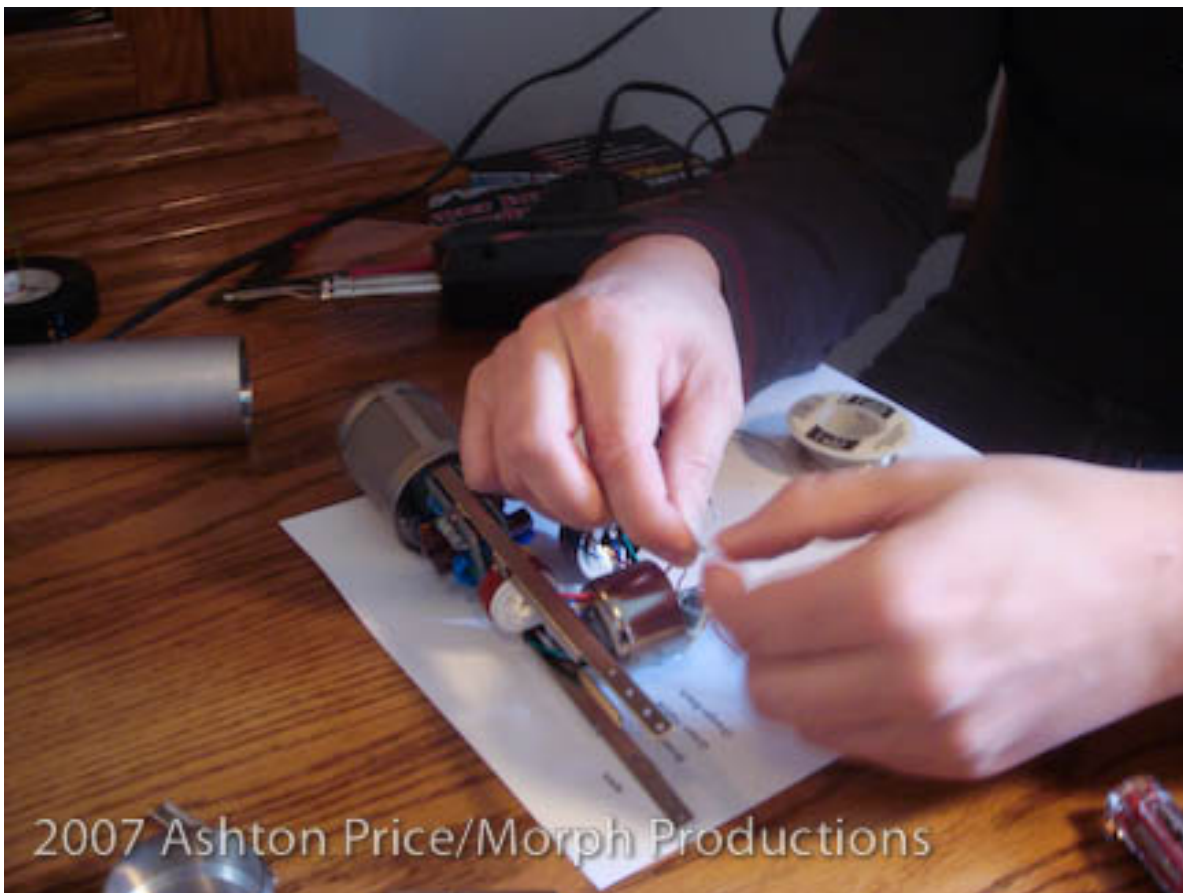




The colour coding for the connections is as follows (this worked for my mic, if for some reason it doesn't for yours I'm not responsible!):

Apex 460	Cinemag CM-2480	Peluso
----------	-----------------	--------

Red	Red
White	Brown
Green	Yellow
Black	Orange





Tape up the connections and put the mic back together.



# Capsule Mod

by [MorphProductions.com](http://MorphProductions.com)

Welcome, this page was created as a visual guide to assist those of you who want to mod your Apex 460 tube microphone with some of the great aftermarket parts available. This tutorial in-particular will be dedicated to changing the stock capsule to a Peluso CEK-12. Please note that I am not a professional in the electronics industry but merely a music producer who wanted to help out others with these mods. Do this mod at your own risk and only if you have experience in basic electronics and soldering!

Below is the Peluso CEK-12 as it was delivered. When I spoke to the [Canadian distributor](#) of [Peluso](#) products he said that this is the one that most people get. It is a re-creation of a capsule from the AKG CK-12 Microphone. There are also other options as well such as the CEK-89 which is a re-creation of a Neuman style capsule.

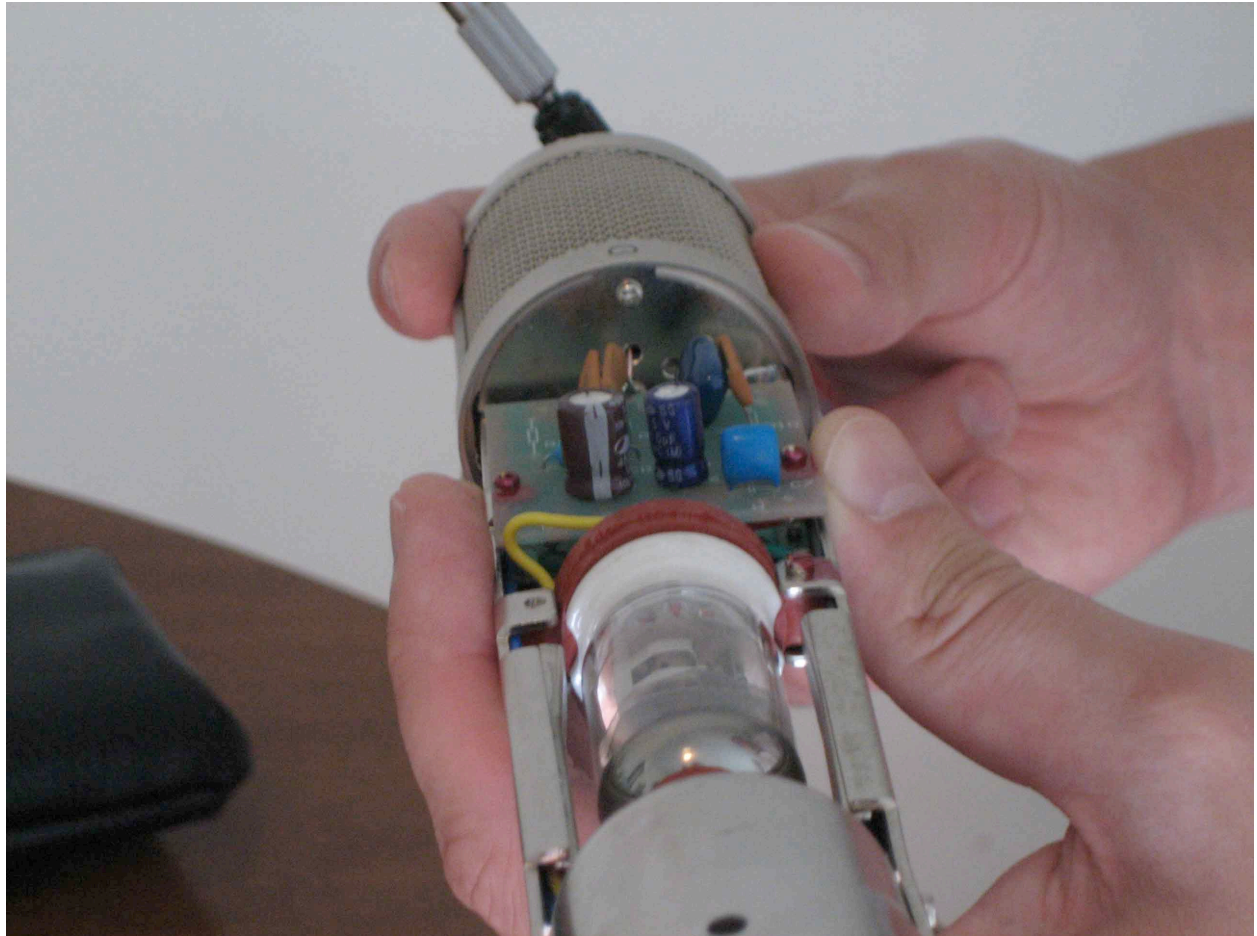




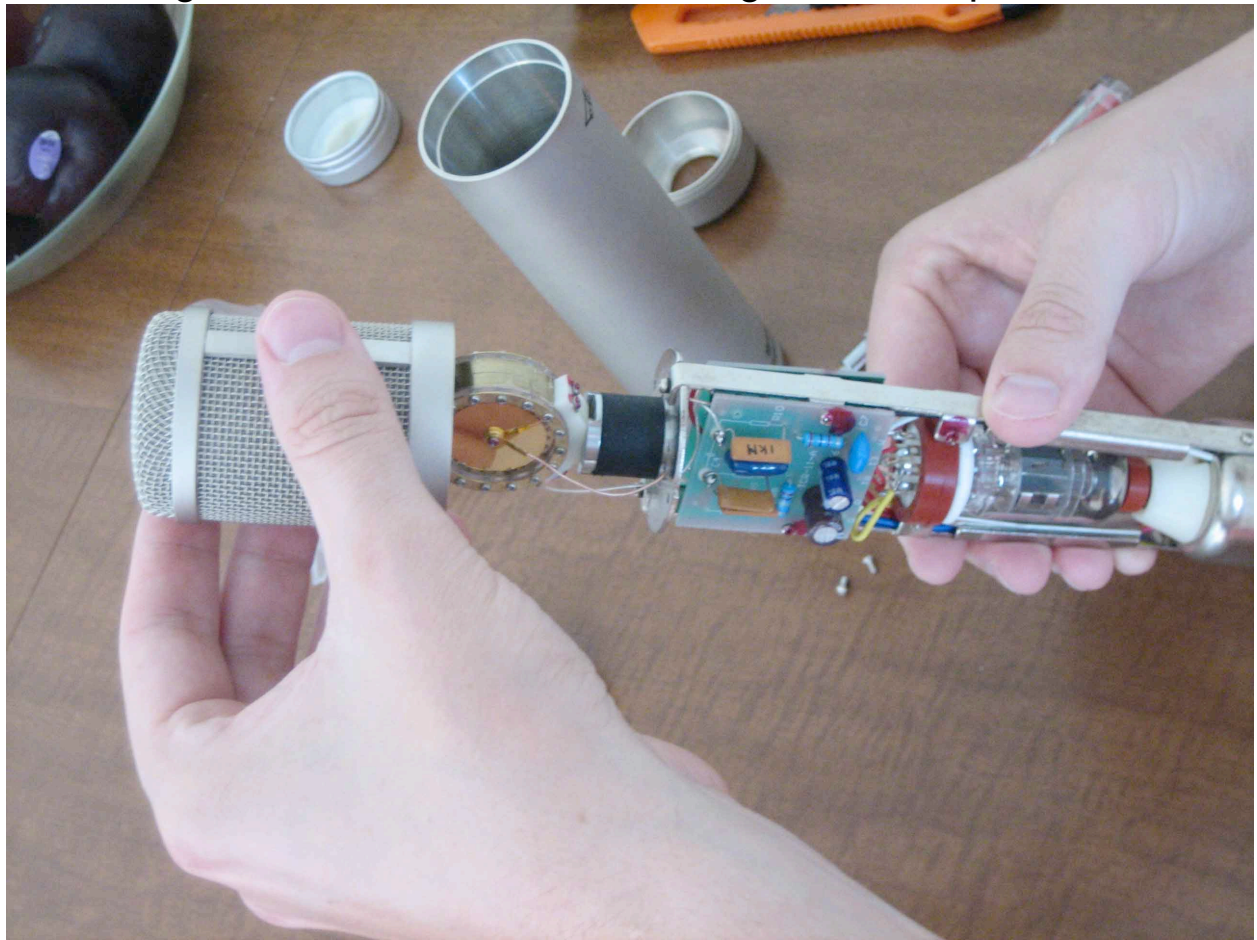
The first thing to do is unscrew the bottom off the Apex 460's casing and slide the long tube off.



Next you have to take off the protective screen. To do this remove the screw at the bottom of the screen.

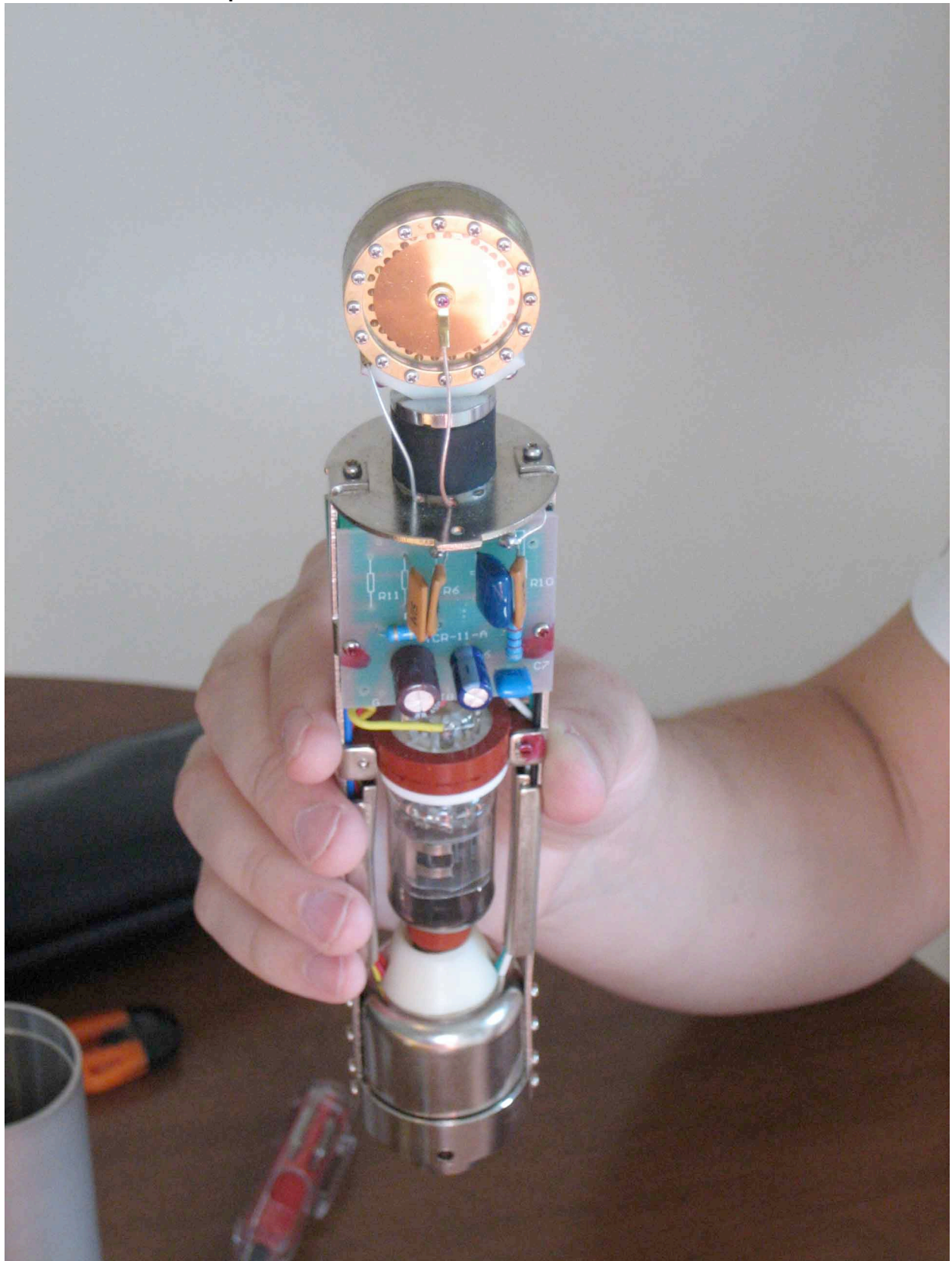


Removing the screen will reveal the original 460 capsule.





A rather nude Apex 460!

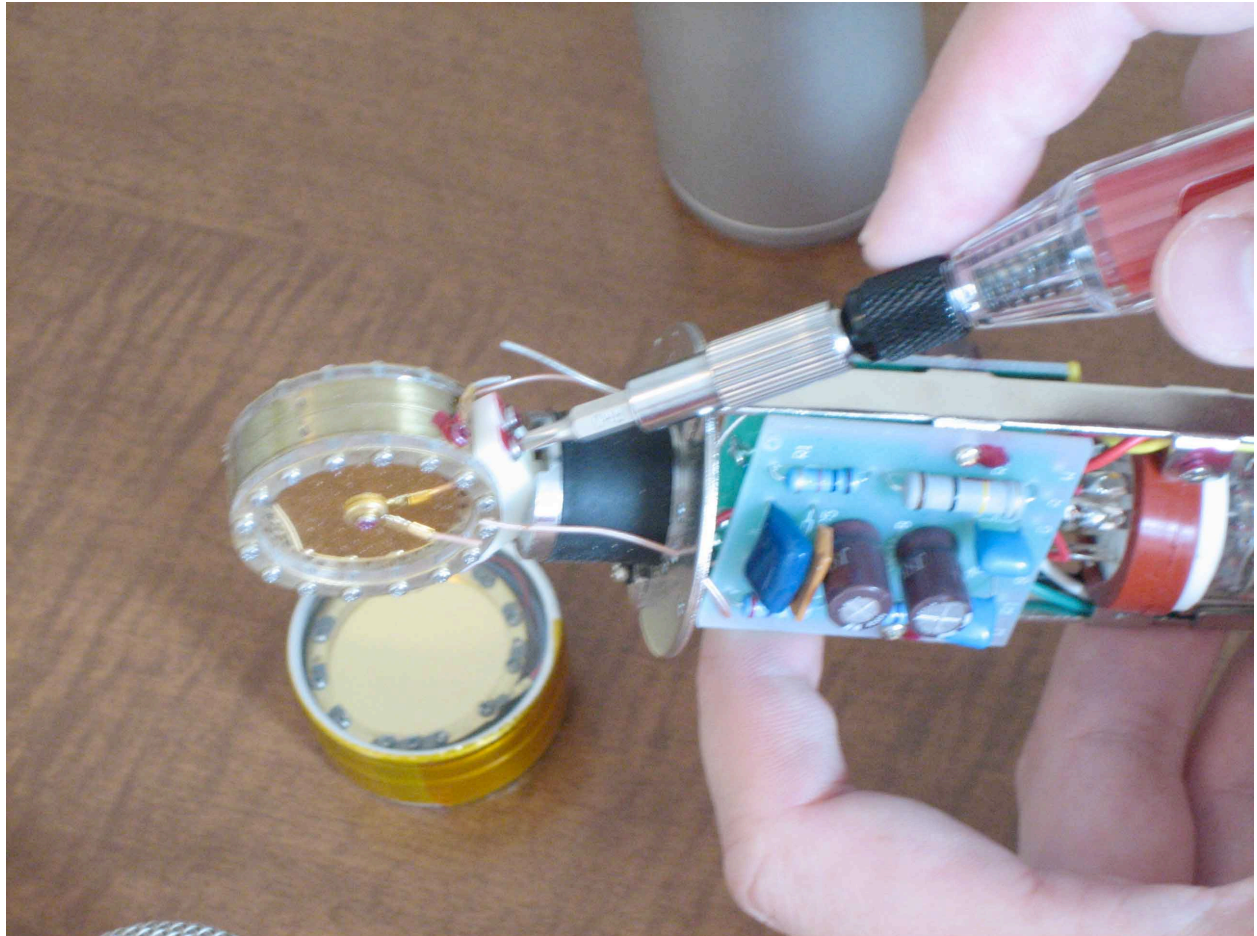


Cut off the wires, preferably as close to the mic as possible to give you as much wire to work with as possible. This step is more or less the point of no return so again I'd like to say you're doing this at your own risk!

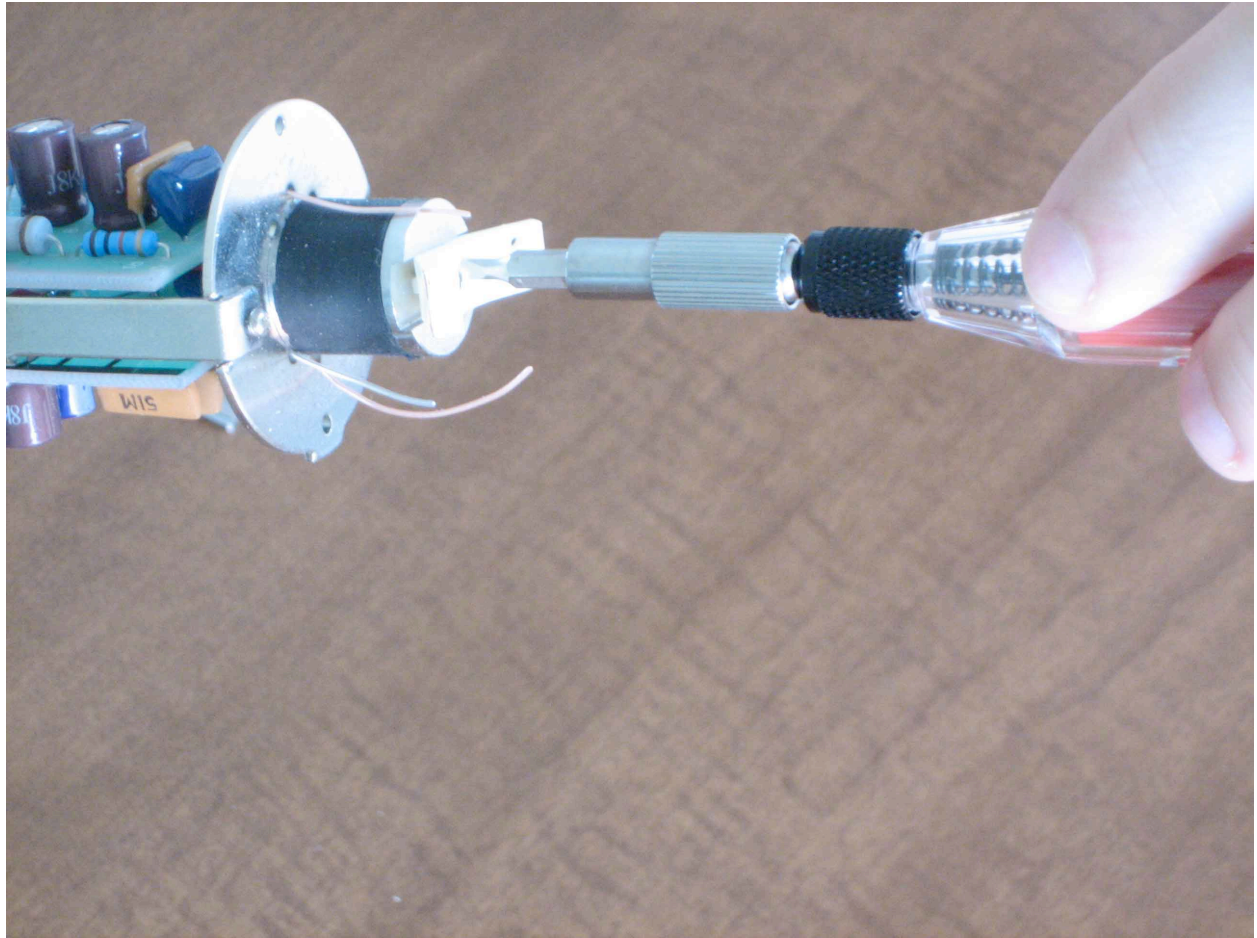




Next comes the physical removal of the capsule from it's mount.  
There are two screws on either side of the capsule

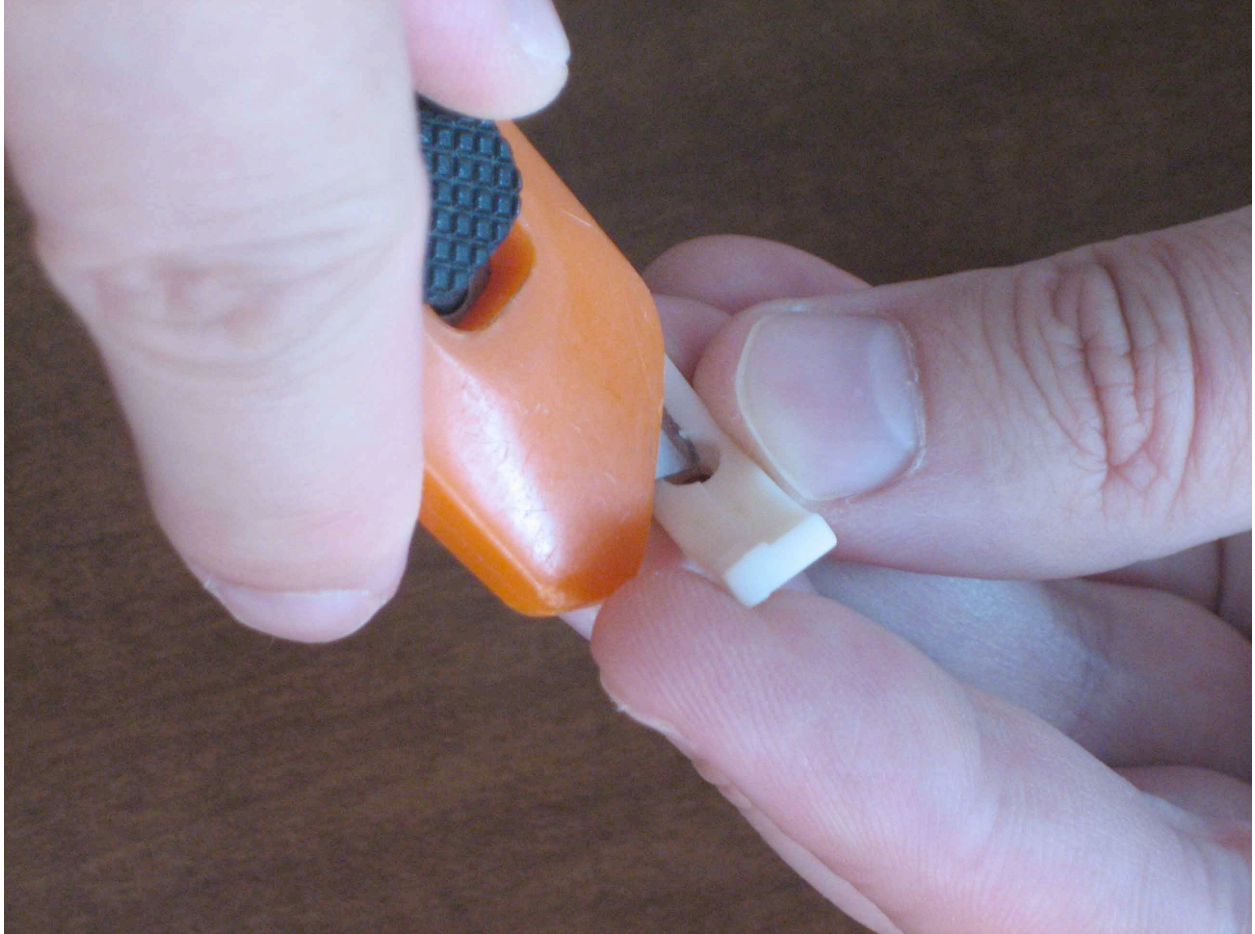


Next comes the removal of the old capsule mount itself

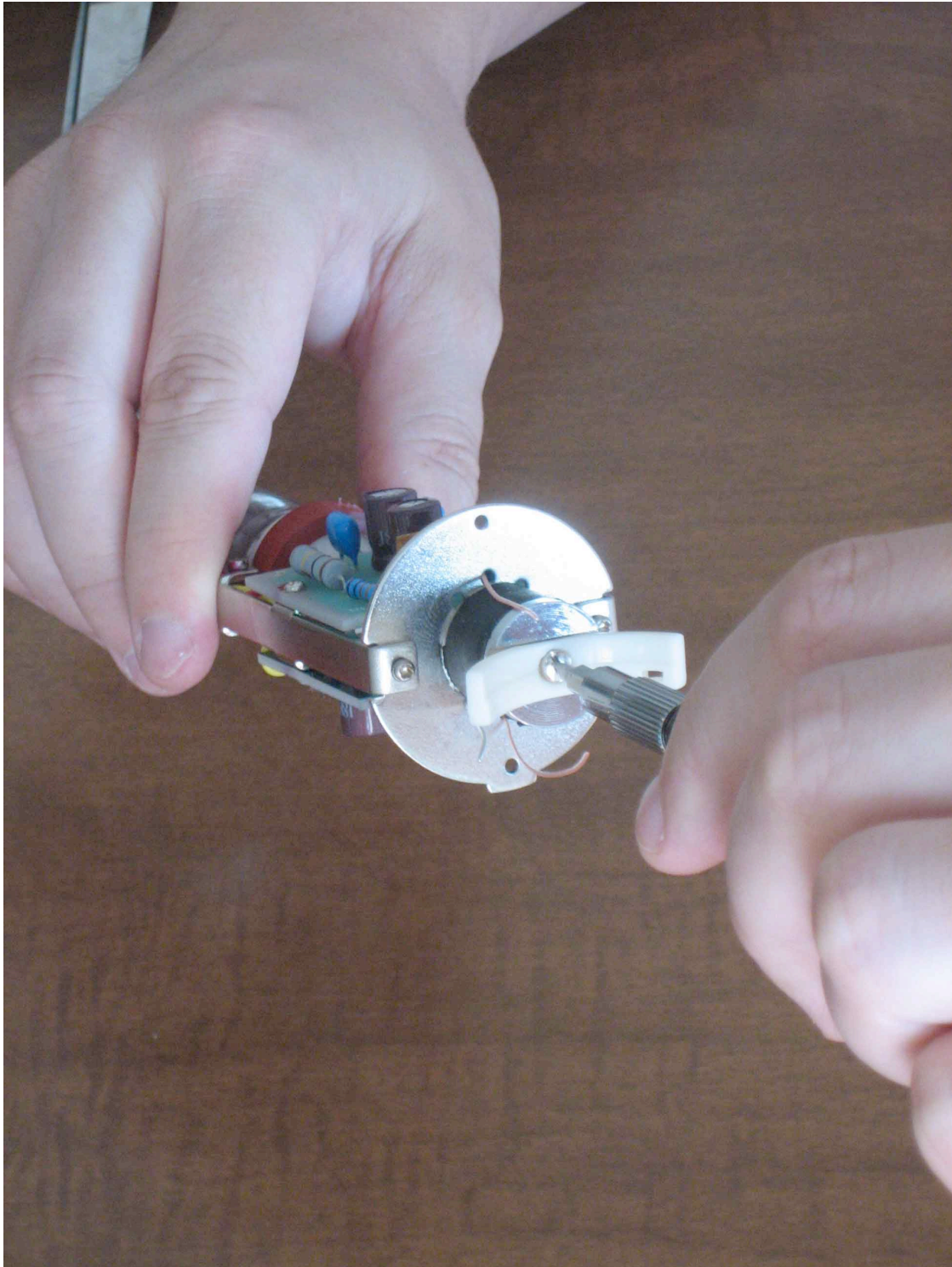




I found that the mount for the new Peluso capsule didn't have a big enough hole to allow the Apex screw to go in flush so I carved out a bigger hole. Doesn't that pic look like an accident waiting to happen!



Nice and flush!

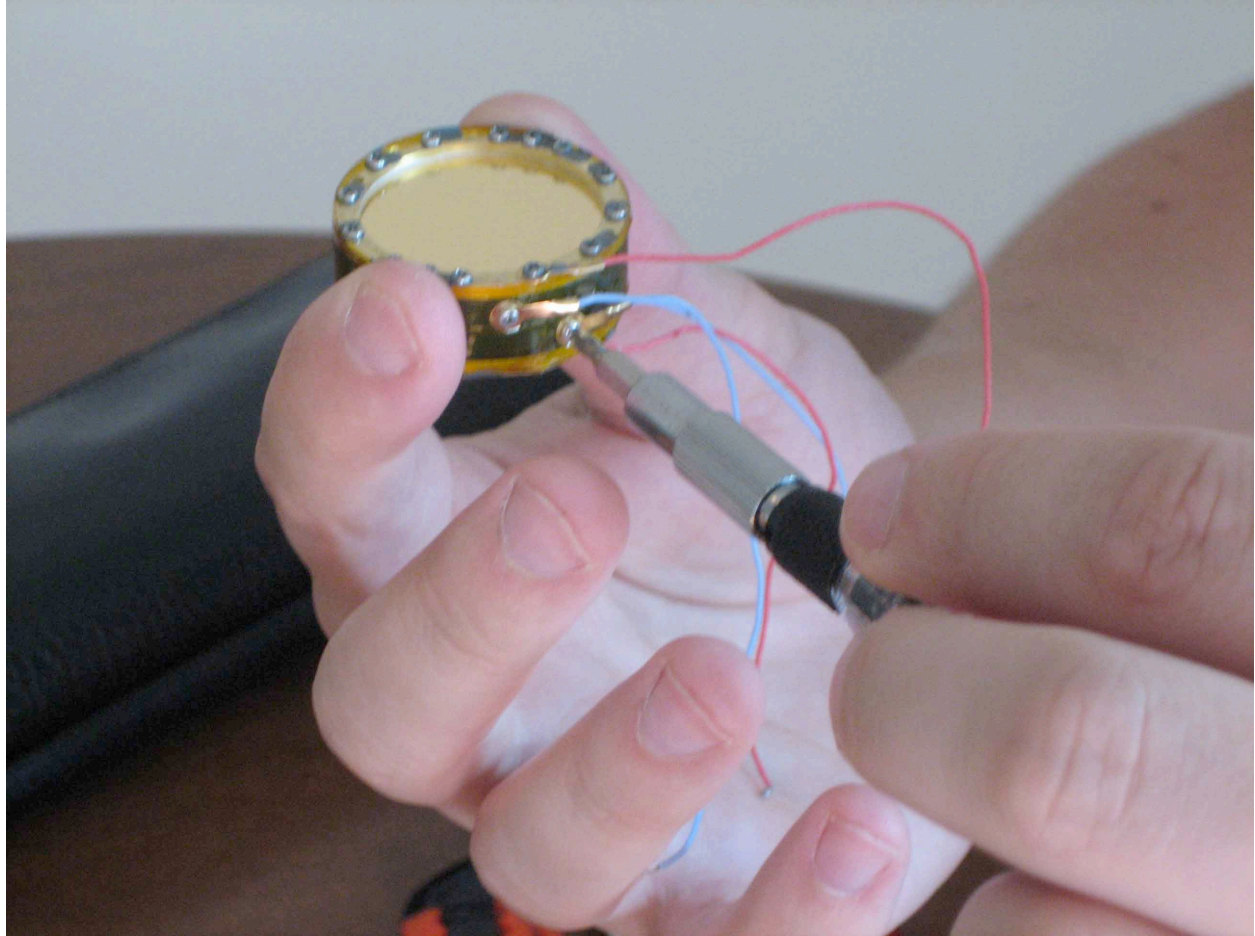




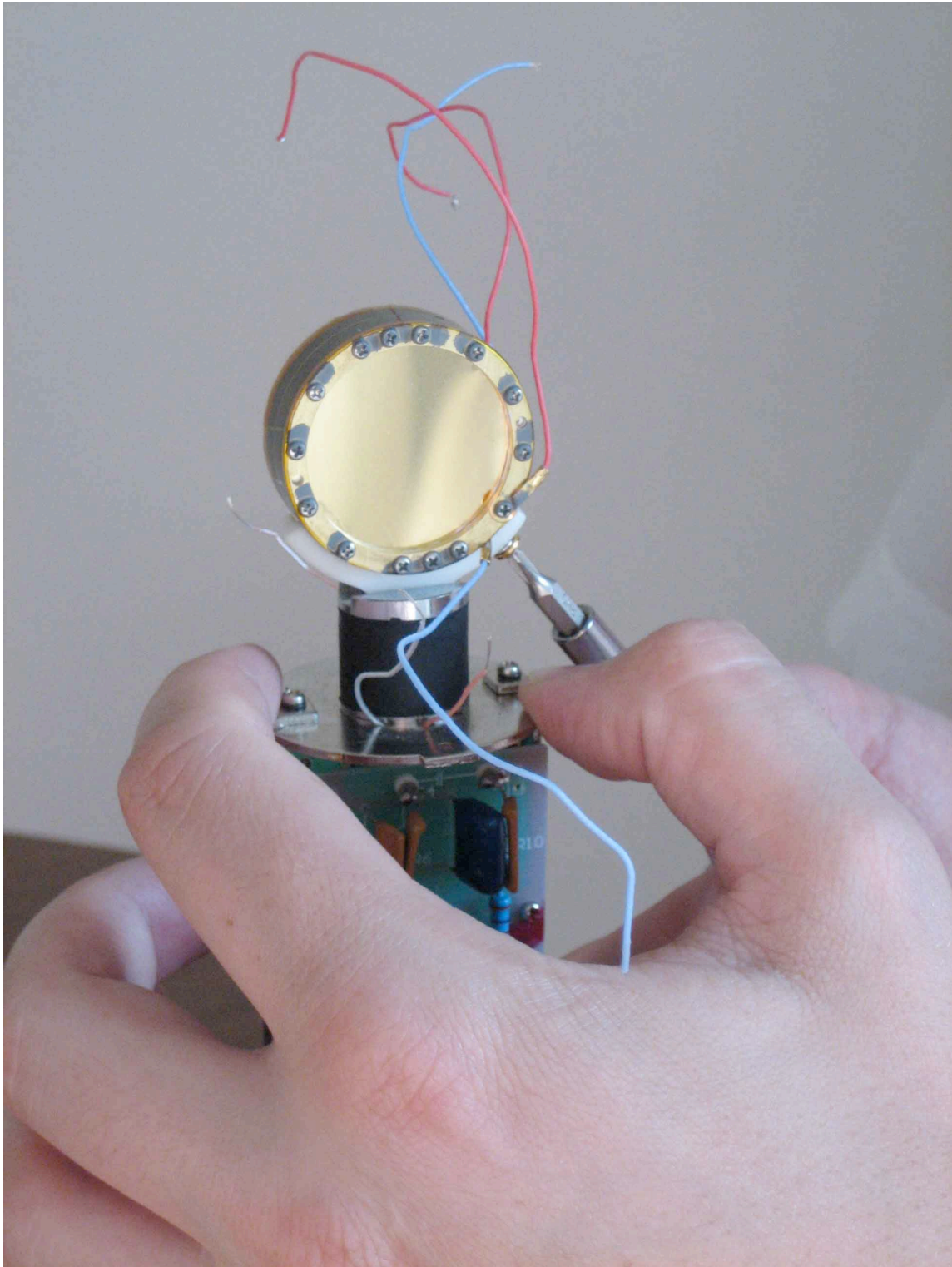
Peluso capsule on the left, stock Apex capsule on the right. Note the slightly bigger size of the Peluso capsule.



The holes that you use to mount the capsule to the mount are also the holes that attach some wires (I'm assuming the ground wires) to the mic. Unscrew these (DO NOT UNSCREW THE RED WIRES!) so you can put the screw through the mount first.

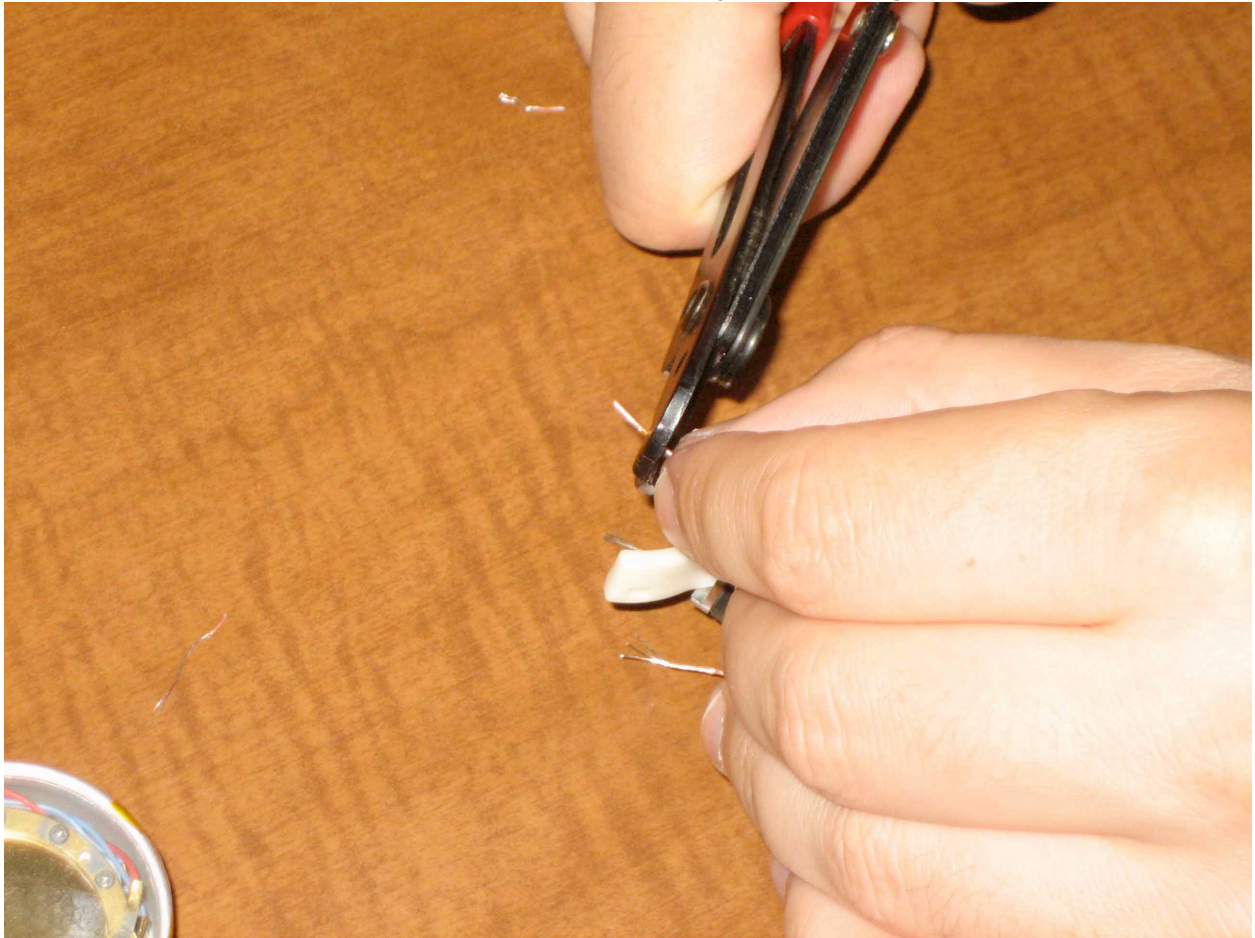


Attach the capsule to the mount by running the screw through the mount, then the ground wire into the capsule itself.

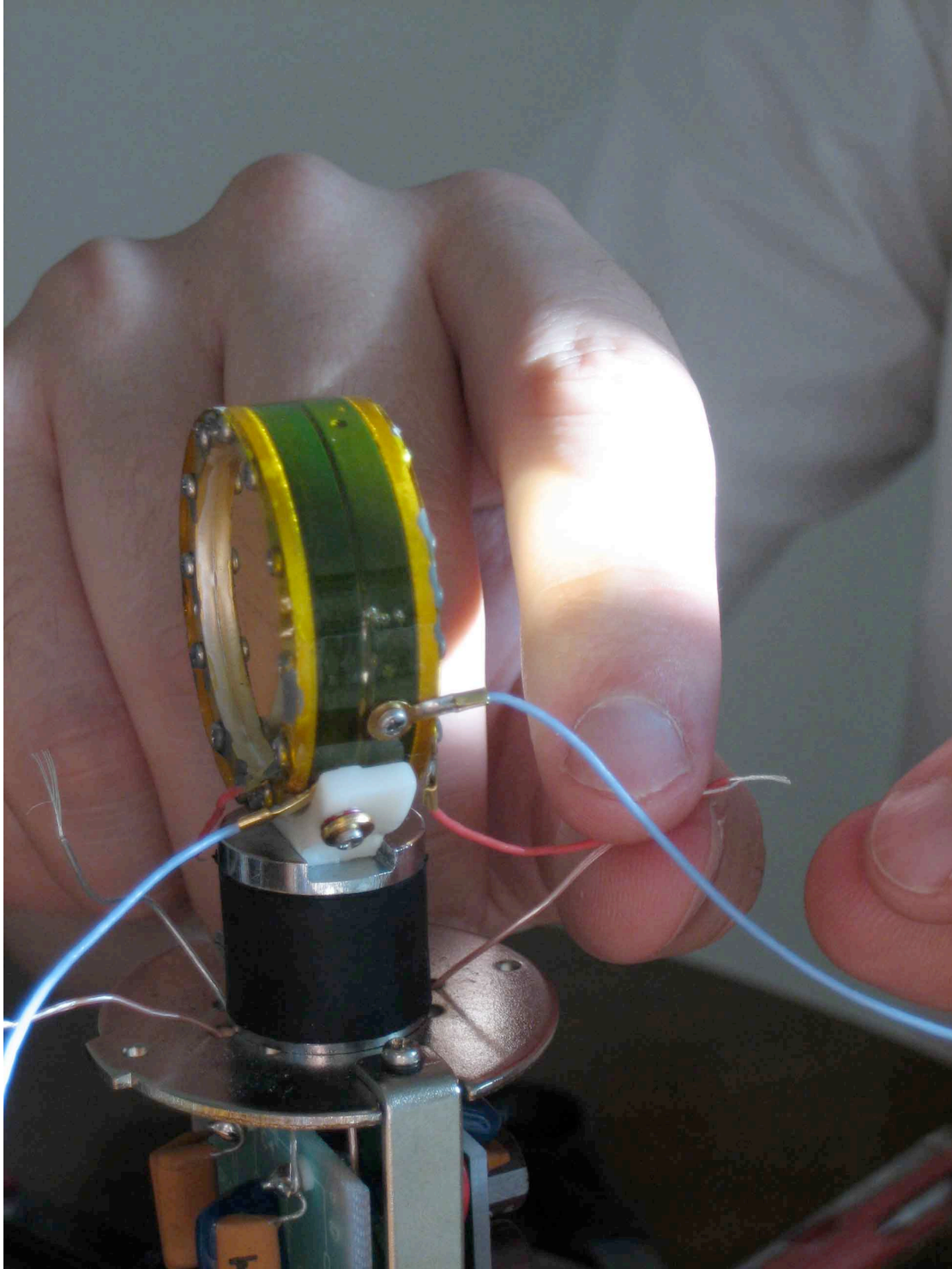




Next comes the electrical part. Start by stripping all the wires.



The colour coding for attaching the wires is relatively self explanatory. Red on Copper and Grey on Silver. There are two ground wires on the Peluso capsule but only one on the original so both have to be soldiered to the same ground.

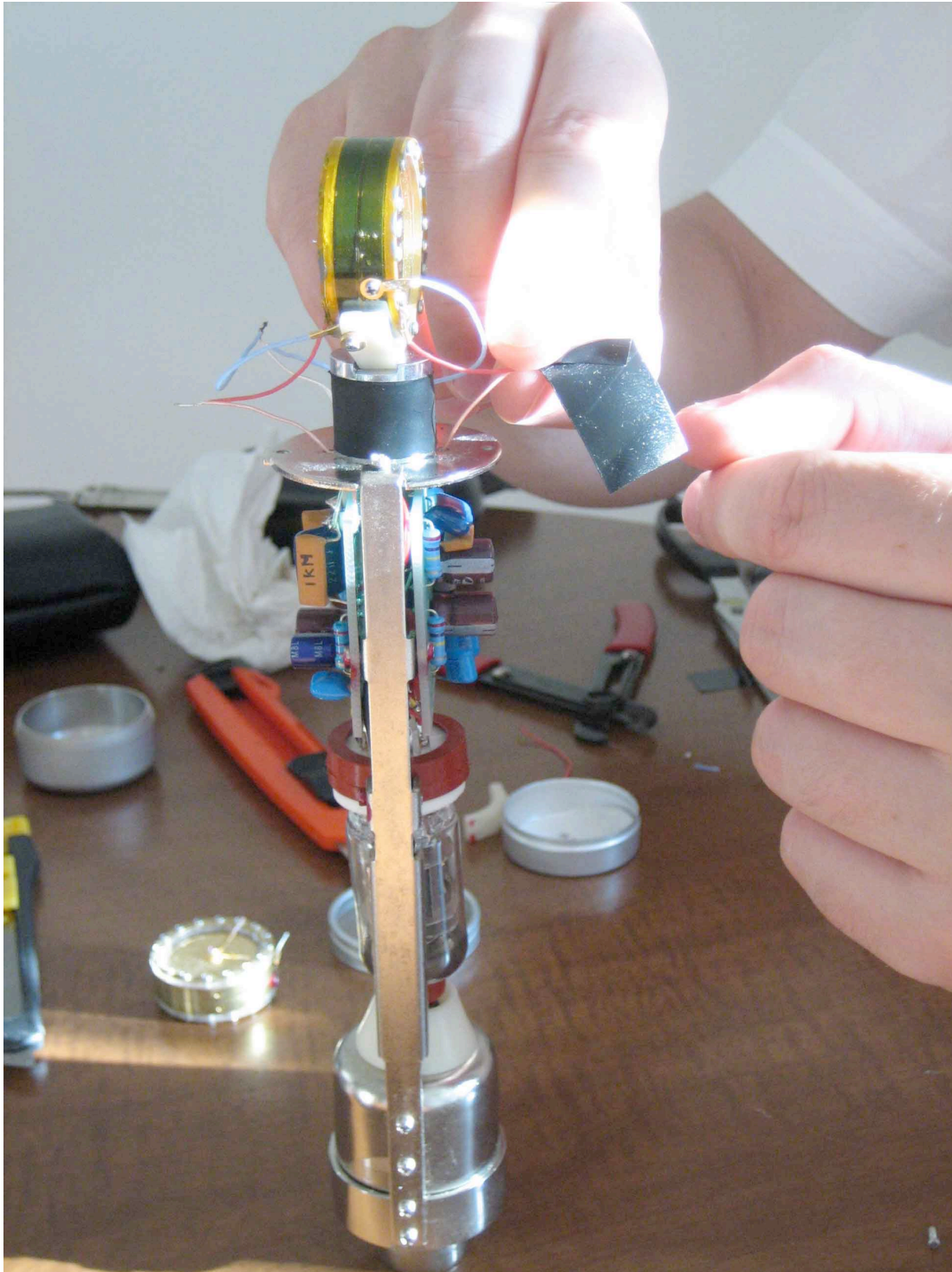




After you've attached the wires you have to solder them. Due to the nature of solder and the way it can spit I made sure to have someone hold a bag in front of the capsule to protect it from solder.



Next cover up the exposed wire with electrical tape.



Now that you're done you can close the mic back up and start recording. Goodluck!

# Reversing Stock Capsule Mod and Wire Mesh Removal

By "dkelley" and "rmaier" on [Gearslutz.com](http://www.gearslutz.com)

<http://www.gearslutz.com/board/low-end-theory/119130-apex-460-mod-free-try-trick-if-you-can.html>

## FROM "DKELLEY"

So I bought the one with the darkest rear cap (all the front caps were too bright for my taste anyway), took it home and took it apart. I desoldered the two cap's positive wired from the mainboard, unscrewed the capsule mount and reversed it physically (so the mic's cardoid indicator on the body would point to my newly chosen main capsule), and soldered the cap's main wires to the opposite connectors from before. So now the apex-chosen rear cap is my new main cap, and the previous main cap (very bright) became the rear cap. therefore the cardoid mode cap would be the darker one.

This could also be a good time, if you want, to remove one or more of the layers of the wire mesh grill...

## FROM "RMAIER"

I ended up removing the top mesh by pulling it out from the middle with a pair of needle-nose pliers. Nerve wracking, I admit, and I also ended up pulling down the outermost layer a bit, too, and had to clean it up later. Some people have experimented with laying a thin layer of foam on the floor of the head basket, with mixed results (made the mic smooth, but a bit lifeless).

# Circuit Redesign

by "marik" on [HomeRecording.com](http://homerecording.com)  
<http://homerecording.com/bbs/showthread.php?t=196274>

FROM "DKELLEY" ON [GEARSLUTZ.COM](http://www.gearsllutz.com): Just make sure not to remove the cathode follower until you swap the transformer; the cathode follower is vital to making the mic work properly with the stock transformer which can't handle the transients and output of the circuit you're describing.

FROM "MARIK" (mostly):

Remove R8, cut traces from tube pins 6,7,8 and short them together, connect C8 to junction of pin 1 and R2

Replace C8 with Ansar cap, anywhere from 1uF to 3.3uF, 400V. (200V?) "LD2T" said: Dave Thomas initially used a 2.2uf 400v. Later used 1.5uf. I've even read about someone using a 10uf with a .001uf in parallel, which added 7db at 100Hz! Could try Illinois caps, instead of Ansar in C8, but might attenuate the top end some. Or try Mundorf or Vcaps instead, or a [Clarity Cap](#)...its 1 mike @ 250 volts and it fits!

Ceramic C4 replace with polystyrene or Mylar cap of the same value with at least 150V rating. *C6 cap, replace it with a [100uf 25v Black Gate](#)!* You could also get rid of C9-C10 (which are RF attenuators and not necessary, especially with new transformer). You can remove C7 to soften the highs while leaving in C6, too. C6 alternative: [Nichicon Muse](#).

## **Removing Cathode Follower**

The dotted lines [on the schematic] are the grids of the tube, and there are two of them (you'll notice a small space between the two). Anything in the 12A\*7 family is a DUAL triode tube, meaning there are two amplifiers in each tube. Look at it as a left half, and a right half. That's why when you remove the cathode follower part of the circuit you bridge pins 6,7, and 8 to ground. That way you neutralize that part of the tube. You also remove the lead to pin 5, which turns off the filament to the right side of the tube.

4 and 5 are the heaters (9 going to ground). 3 and 8 are the cathodes. 1 and 6 are the anodes. 2 and 7 are the grids.



# Power Supply Mod

by "mbrebes" and "Phil Townsend" on [HomeRecording.com](http://homerecording.com/bbs/showthread.php?t=196274&page=6)  
<http://homerecording.com/bbs/showthread.php?t=196274&page=6>

Replaced the stock 1N4761 zener diodes with 1N4758 56V zener diodes. This dropped the voltage down on the capsule from about 196V to about 112V.

Comment by "PhilGood:"

This makes a difference. I have 2 mics. I changed out the zener diodes in one PS and tested them side by side. The harshness is improved. The mic sounds much smoother and open. The detail is better and there is less fuzz. Another added benefit is the tube seems to warm up slower, so it means longer tube life.

By "Phil Townsend:"

Starting at the bridge diodes all the way back to the output. All that stuff is part of the signal path. What I cant understand is the use of zeners. A choke / cap supply will sound MUCH better than the cap / resistor supply. (Better= more dynamics, extension and less noise.) I havent run the "PSU DESIGNER II" on it yet but I will in the next few days. That will tell a better story. Single ended amps are Ruled by their power supplies.

## Things to replace in the Power Supply

- Diodes.. replace with low noise schottky types
- Heater regulator replace with LT low dropout types
- all the caps (Black gates in the front and a high quality film cap (Mundorfs or better) in the last position.
- Replace resistors with Mills resistors.
- Loose the PC board and go point to point with silver wire.
- Snubbers
- Mu metal shielding to keep the mike output well away from the PS.
- Lose the zeners.

Rebuilding the PS is not really a big deal but it would push the mike into the ultra fi realm.

More specifics from "Phil Townsend" PS mod below:



C6 replace with 22ufd @ 350v Black Gate  
C7 replace with 1 ufd @200v Western Electric paper in oil  
C8, C9, C10 replace with 2200ufd@16v Black Gates  
R15 replace with Mills 20 ohm at 5 watts  
After C6 install Solen 3.3 ufd @ 400v\*\*\*

\*\*\*one side of the 3.3uF is grounded and the other side connects to the circuit between the positive side of C6 and D11

Insulate all PC chassis mounting screws. One ground connection only.  
Tightly twist both secondaries.

Let it run in for at least 48 hours. (with load)

Black Gates take a week of working to come up to snuff.  
Dont try to judge the sound until its broken in.

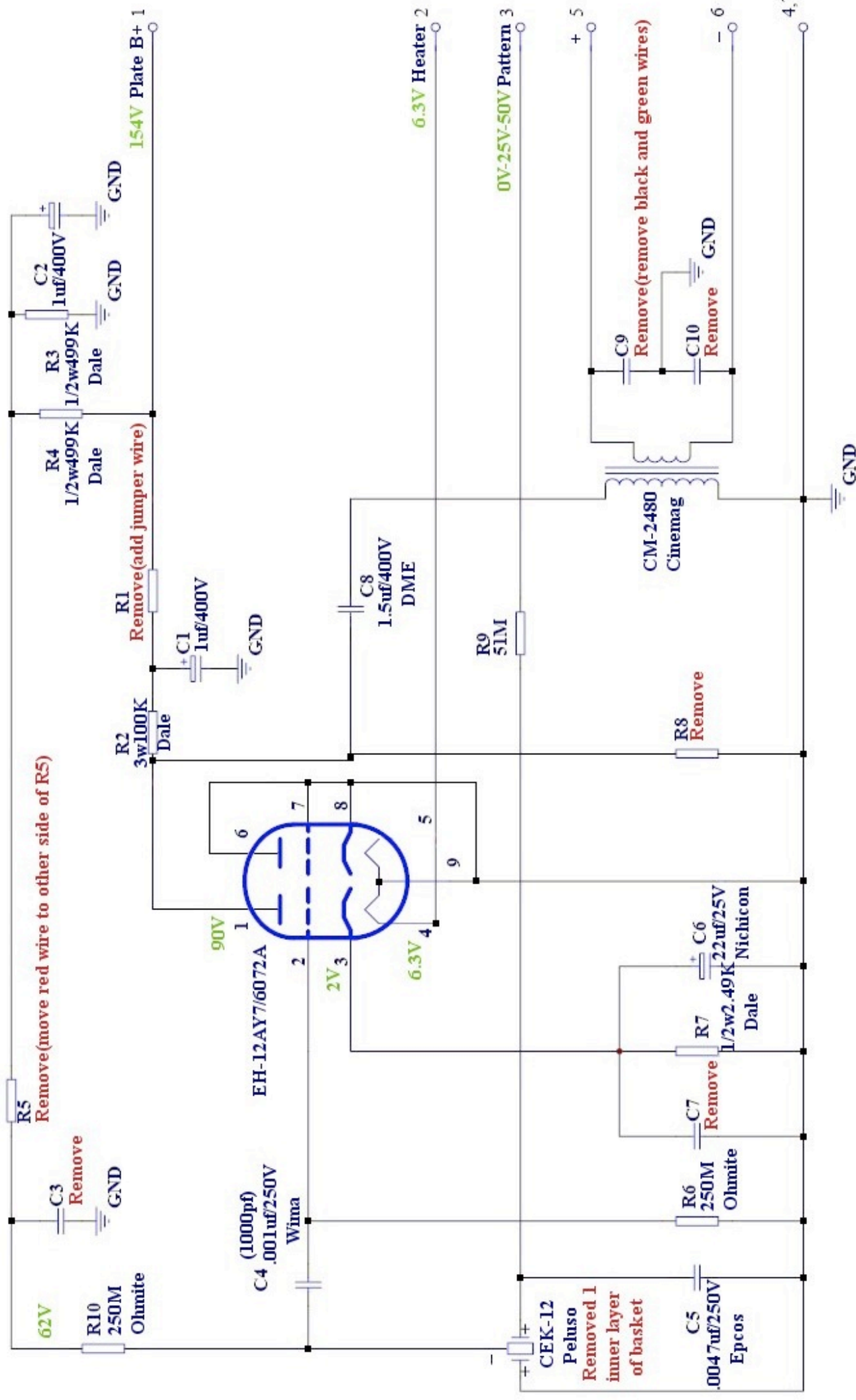


# **“LT2D” Complete Mod with Altered Schematics**

<http://homerecording.com/bbs/showthread.php?t=196274&page=14>

O.K. I've been trying alot of different parts out on both mics and have come to some conclusions. Here are some schematics that I've made up that show the mods that I've done to each mic. I have 2 for the 1050, one with the cathode follower and one without (which is how I have it at this time). The schematics also show voltages at different points for reference. The voltages change quite a bit depending on which resistors you use at different points. I'll update them as I finalize my mics, but I'm pretty much done at this point and plan to use them like this for awhile and see how they work.

PAGE DOWN



## Modified Apex 460

This is as close to the C24 schematic as I could get, but with R6 and R10 with the C12 values and I left C1 and C2 in as they just filter AC from the circuit and are present in the C12VR. Removing R1 and changing R3&R4 to 499k's opened up the highs. Removing R5 made it a bit thin but removing C3 filled things back out. Think of C3 as a bypass to add highs back. So is C7, which I also removed because it's not present in the AKG's. Dropping R7 to 2.49k adds bottom extension and C6 controls how much you want to actually hear. The stock 100uf adds alot of bottom and also gain. The 2.49k adds the gain and fills out the mic without too much bottom, like the originals. C5 also acts like a bypass and by dropping to .0047uf it opened up the "air" and clarity nicely. I'm really liking this mic as the open, clear yet full mic in my collection. I have the original zeners in the PSU, two 1N4761(75v).

I ultimately wound up removing the cathode follower because I have other mics that sounded about the same so I decided to try it without the CF and now it has a different character than my other mics. I must say that I'm not sure if this will be it's final configuration until I try it with some other voices to see if it fills a void in my collection. I actually tried a 3M and 2M at R3 and R4 respectively, which is the size used in the U47, but it dropped the voltage to around 45v at the capsule (before R10), so I stuck with the 499k's. I added R5 back as it thickened up the mic where before it was too close in sound to the Apex for me. I'm thinking about trying a 23ohm resistor at R7, which is what the U47 uses, just to see. The PSU originally had one 1N4764(100v) and one 1N4762(82v) zener, which was too high so I kept the 1N4764 and changed the other to a 1N4758(56v).





This actually sounded very good but, as I said above, I have other mics that sounded pretty much the same. I would probably put R5 back in if you're looking for a more U47ish response. You can also add a 1000pf cap where R2 connects to tube pin 1 and this softens the highs more if you want something even darker. Zeners are the same as the other 1050 schematic.

Overall observations are that;

R1&R2-control voltage to tube pin 1 and 3.

R3&R4-control voltage to the capsule.

R5,R10&R6-effect the sound of the capsule-smaller=darker, larger=add highs.

C4-effects the sound of the capsule also-larger=favor lows, smaller=add highs.

R7-effects the low freq extension-smaller=more bottom.

C6-effects low end depending on size-larger=more bottom. Also adds gain.

C7&C3-bypass to add highs.

C5-effects high end depending on size-larger=more bottom.

C8-effects low freq extension-Larger values=more bottom.

R8-smaller value adds bottom but loses gain.

R9-only part I haven't changed.

Hope this proves useful.

A hand-drawn circuit diagram of a battery. It consists of three rectangular cells connected in series, each represented by two parallel vertical lines of unequal length. The entire battery is enclosed in a circle. Below the circle, the word "Trout" is written vertically.

