VAMISOUND

THE SOUND
IS YOURS

LDC84

BUILDING
INSTRUCTIONS

WE SOUND BETTER

Dear DIY friend,

first of all thank you for your support and choice of the VAMISOUND product. We wish you a happy DIY and the joy of a new microphone in your arsenal!!

Jan and Milan

VAMISOUND LDC84 BUILDING INSTRUCTIONS

WE SOUND BETTER

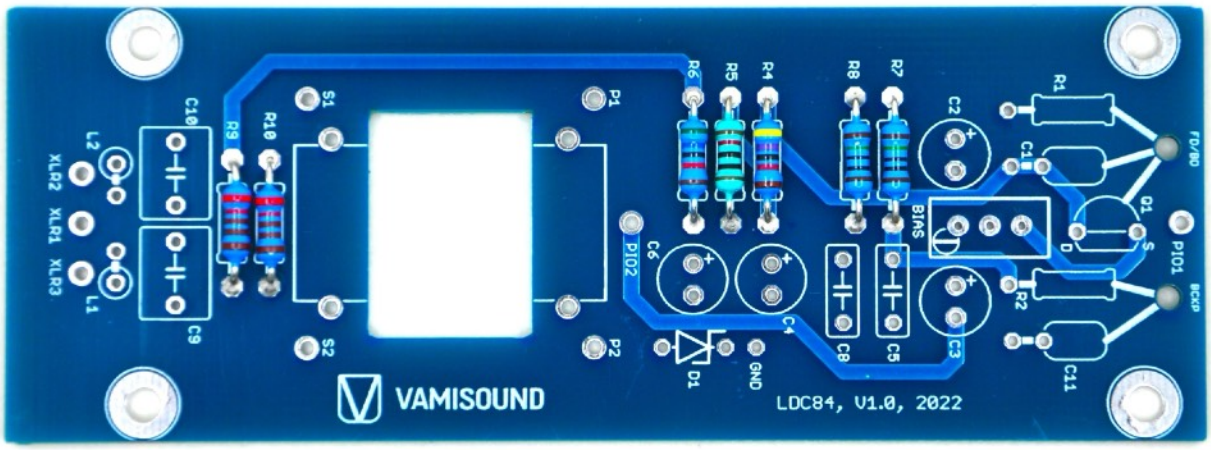
Before you start building your new microphone please carefully read this building instructions.

Attention: VAMISOUND LDC84 is a medium-heavy project. The circuit is made up of only a few components. However, it should be borne in mind that certain manual skills will be required or the successful completion of the mic construction. Good soldering experience and soldering stations with fine soldering tip are recommended. If you do not have this, please delegate the construction to a more experienced technician with proper equipment. We are not responsible for malfunctioning construction or injuries associated with improper assembly of our kits.

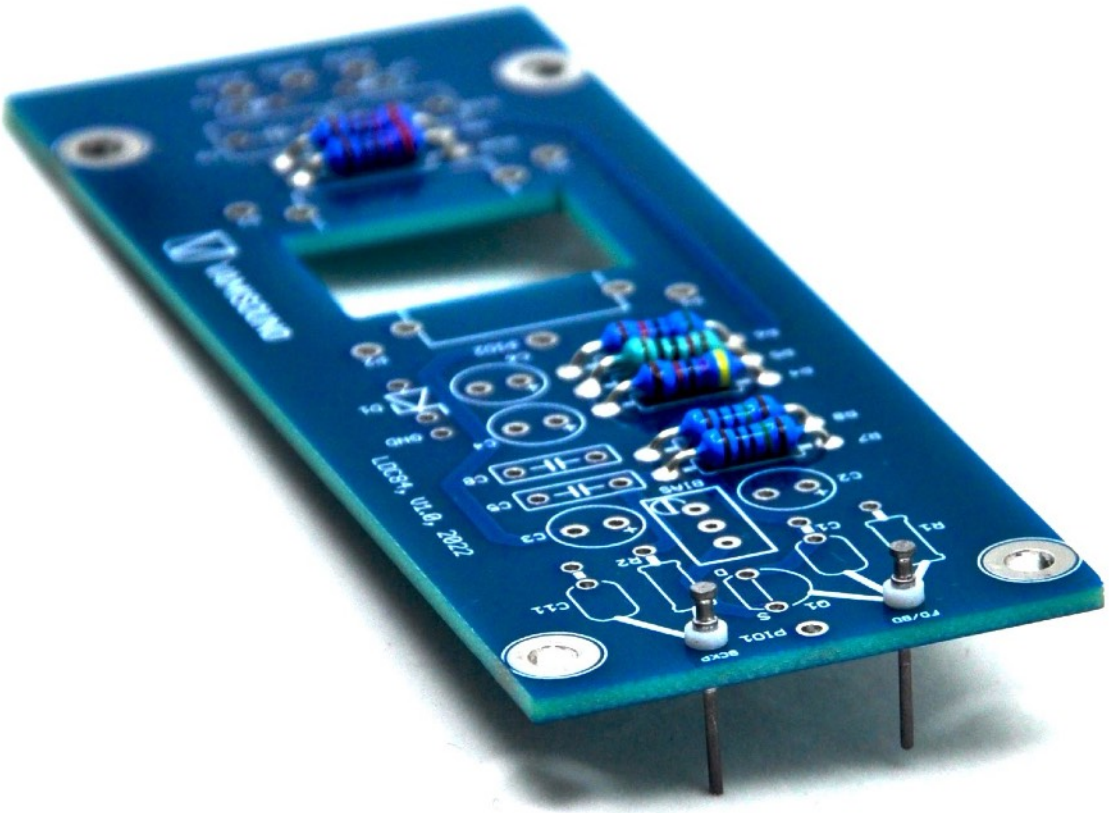
Document info	
Document name	LDC84 building instructions
Document revision	1.1
PCB revision	1.0
Date	November 2023
Project difficulty	★★★★★
Complexity of soldering	★★★★★
Risk of electrick shock	★★★★★
Changes and notes	1) R4 link updated, revision of doc changed to 1.1

The VAMISOUND LDC84 circuit board allows you to build a microphone that is based on the circuitry from the legendary KM84 small diaphragm microphone. However, thanks to a small modification of the input section of circuit, it can use a large diaphragm capsule. The circuit is frequency flat, with no internal equalizer, so capsules like the C12, M7 or K47 fit perfectly with it.

So let's start fitting the board with resistors.

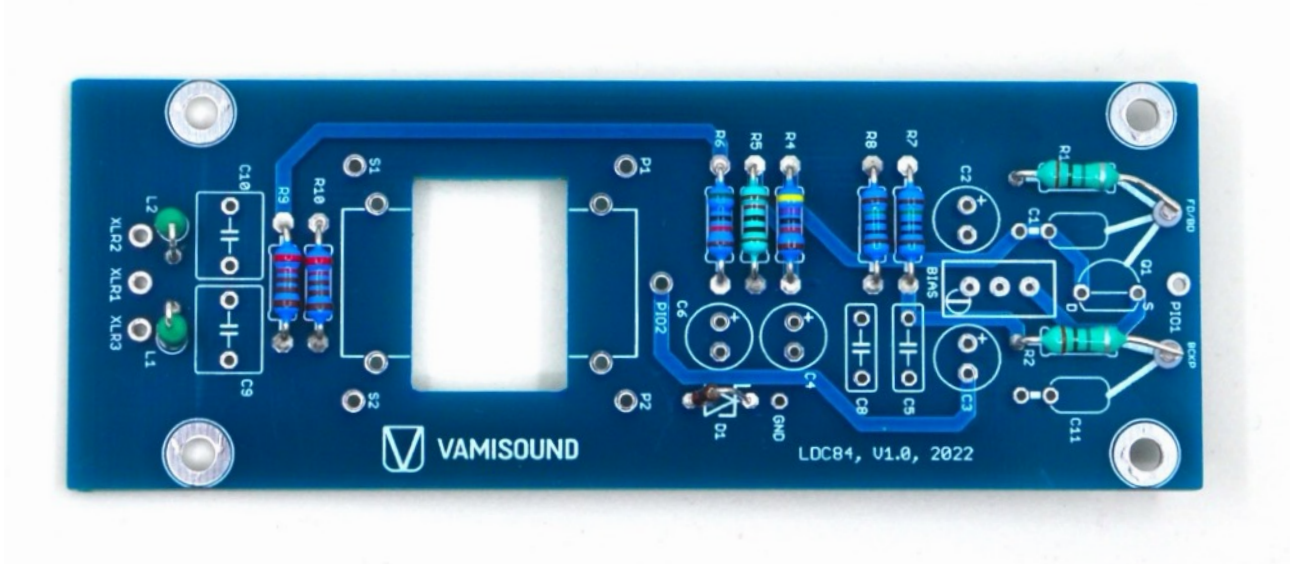


Proceed by installing the two teflon pins on the top of the board.

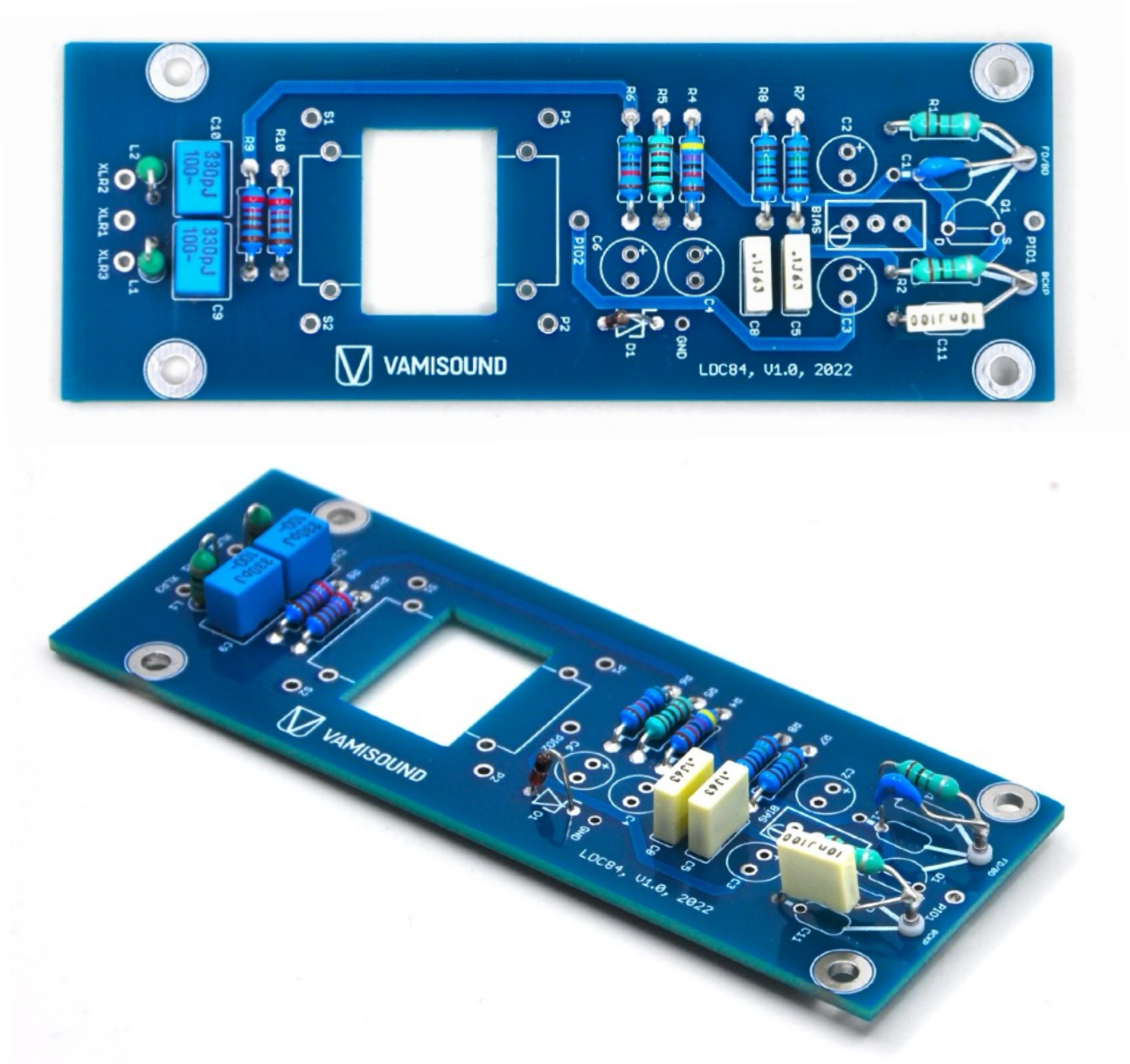


Now solder resistors R1 and R2 with value 1G. Note that one leg of the resistors is always resting on the teflon pin and is as if in the air.

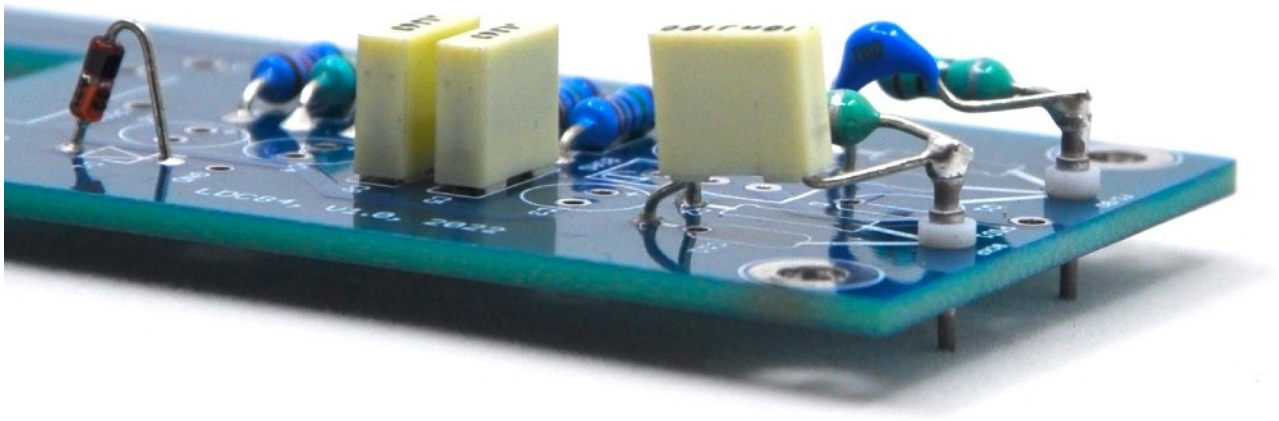
Continue by soldering two inductors L1 and L2 and a zener diode D1.



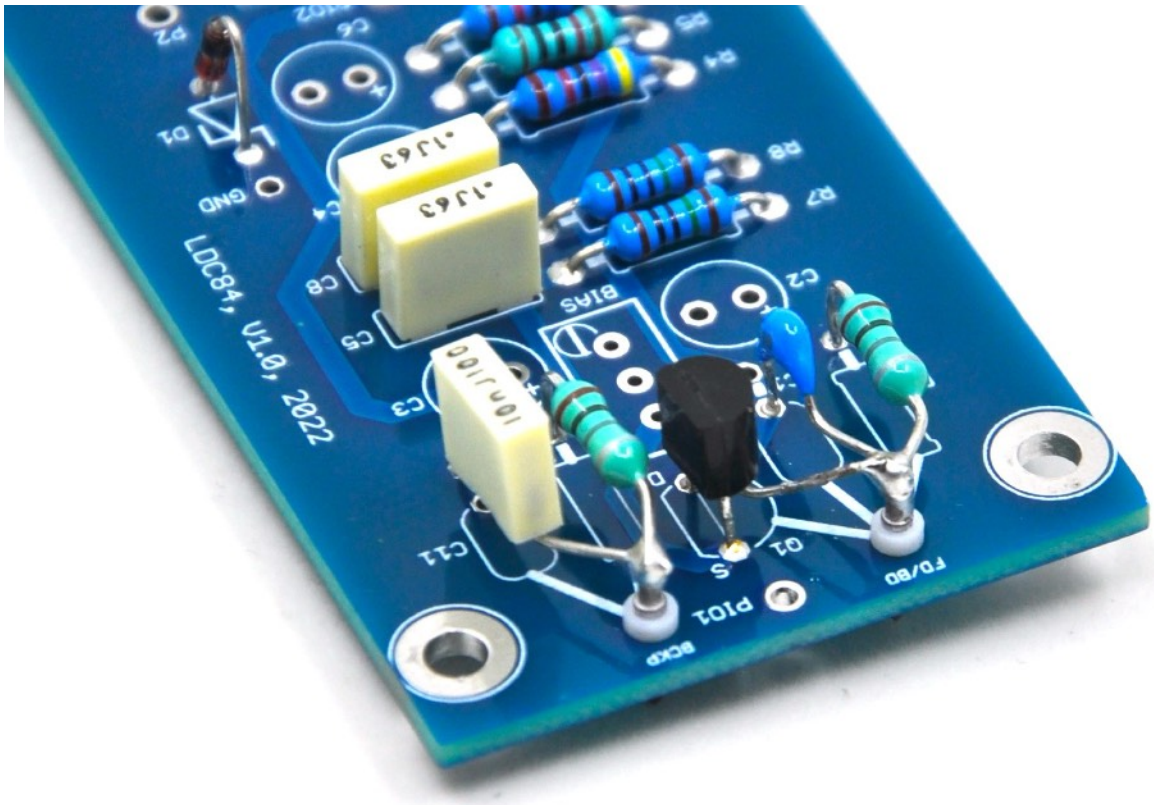
The capacitors are next. Start with ceramic C1 and film ones. One leg of the C11 capacitor is connected to a teflon pin in the air.

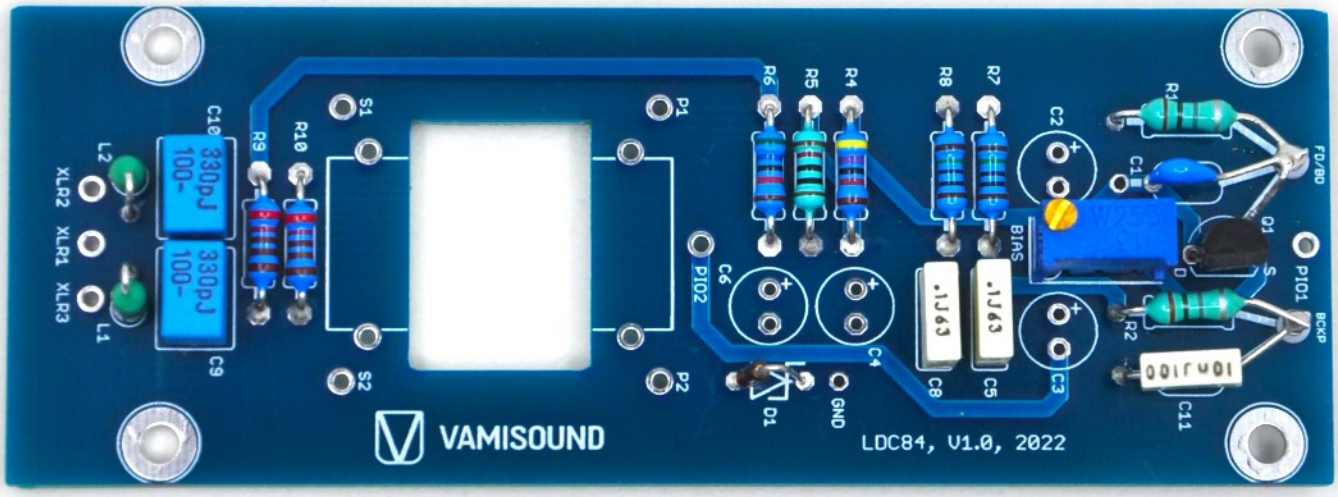


Note that the teflon pins have been shortened at the bottom.

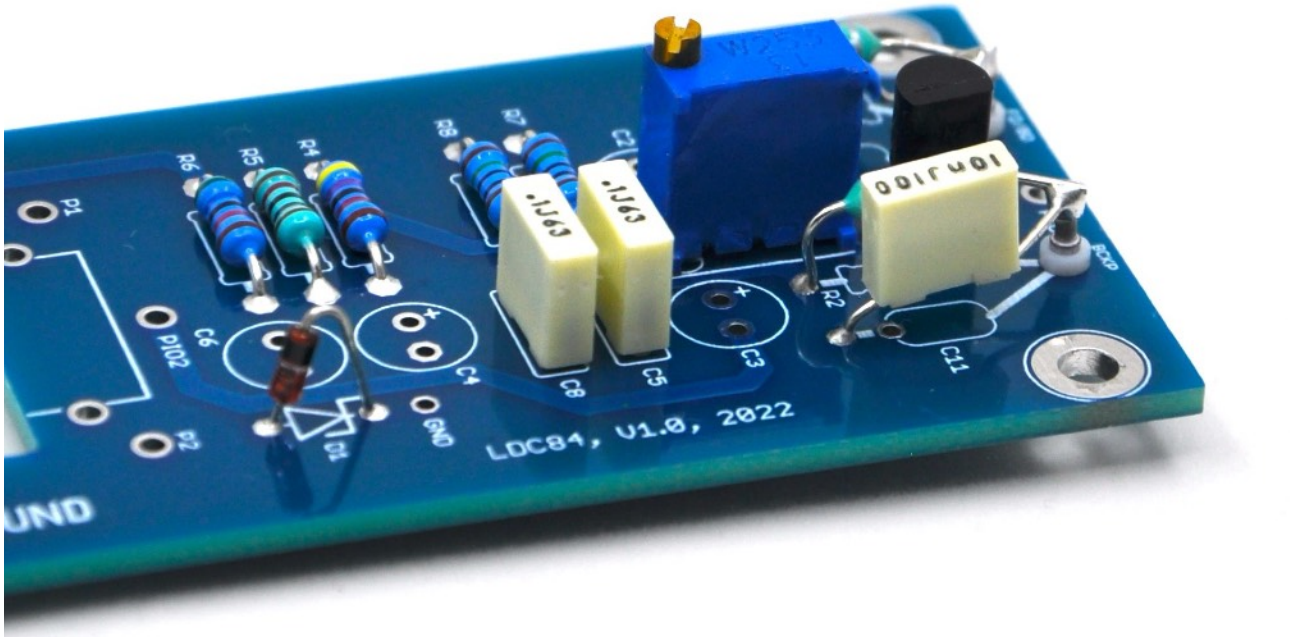


Connect the Q1 FET transistor (or rather its GATE let) to the teflon pin. On the 2N3819 transistor, the GATE leg is the middle one. Always check the pin out of the transistor you are using against the datasheet.

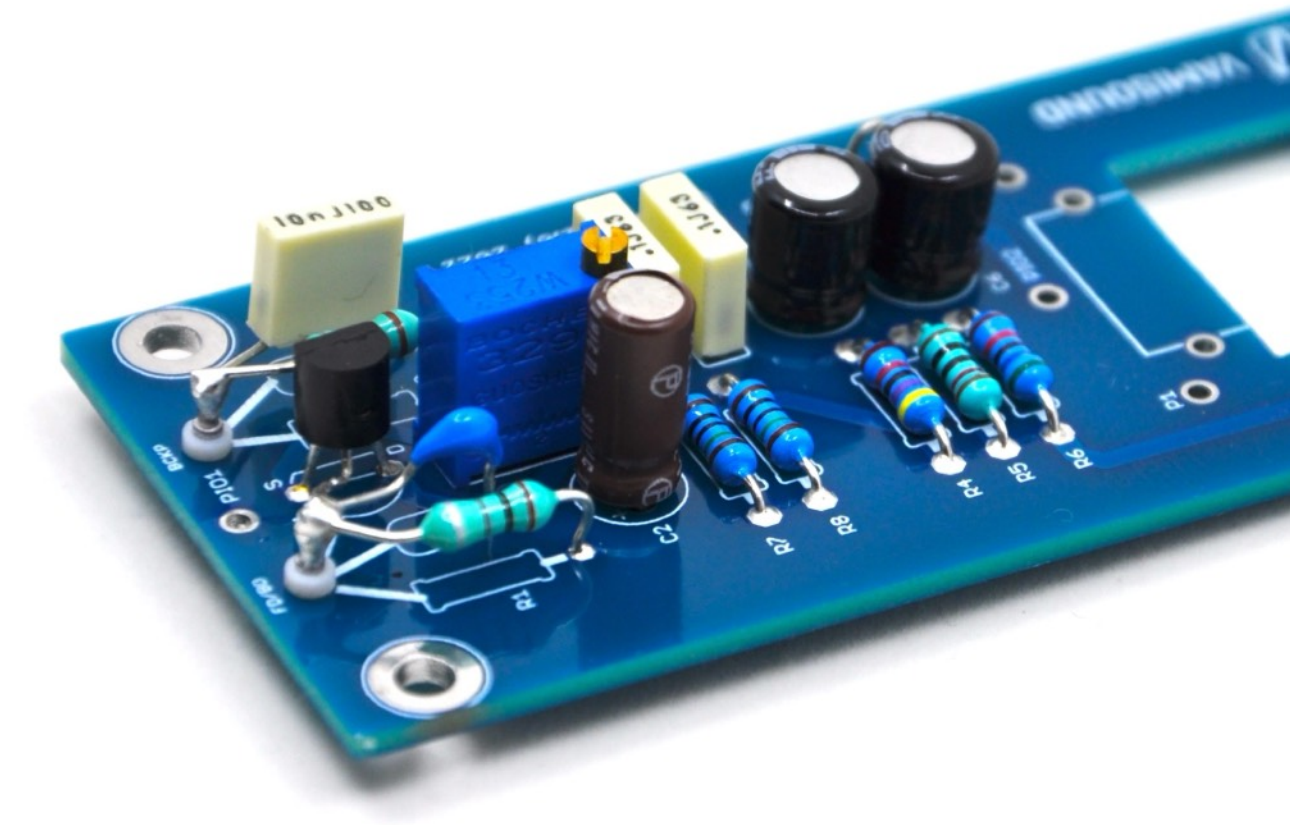




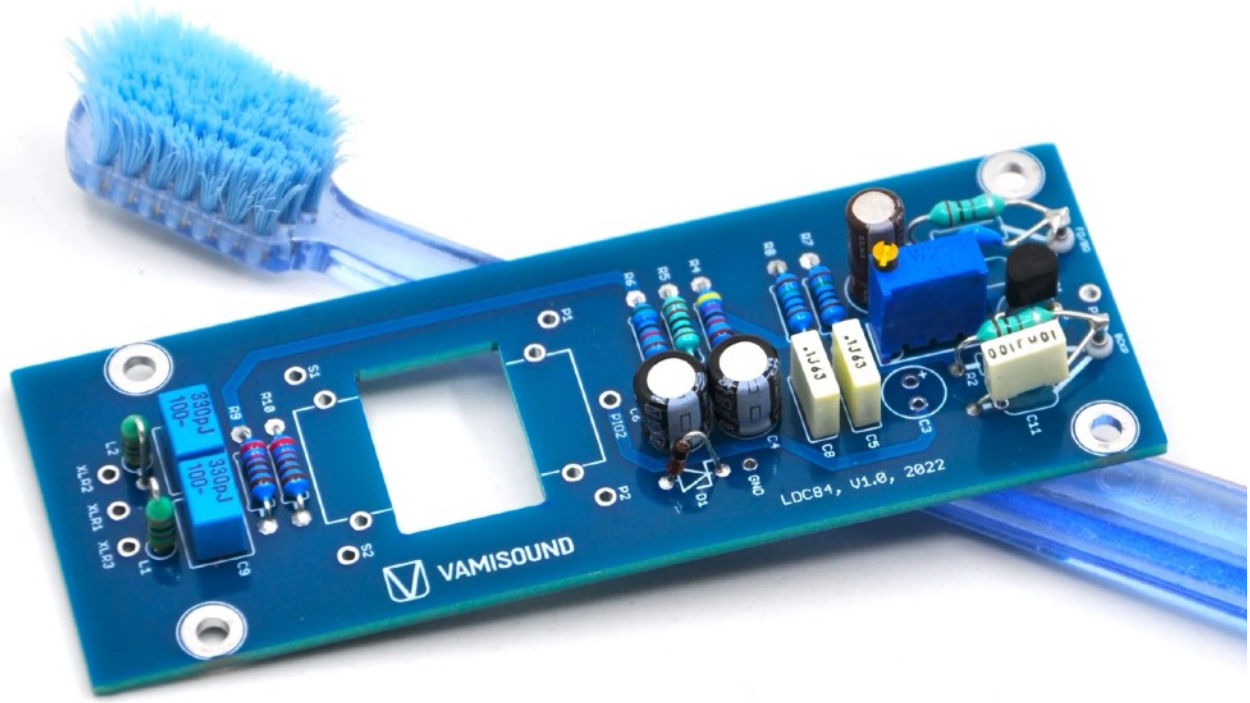
Continue by installing the trimmer resistor. This trimmer will serve you later for the bias procedure.



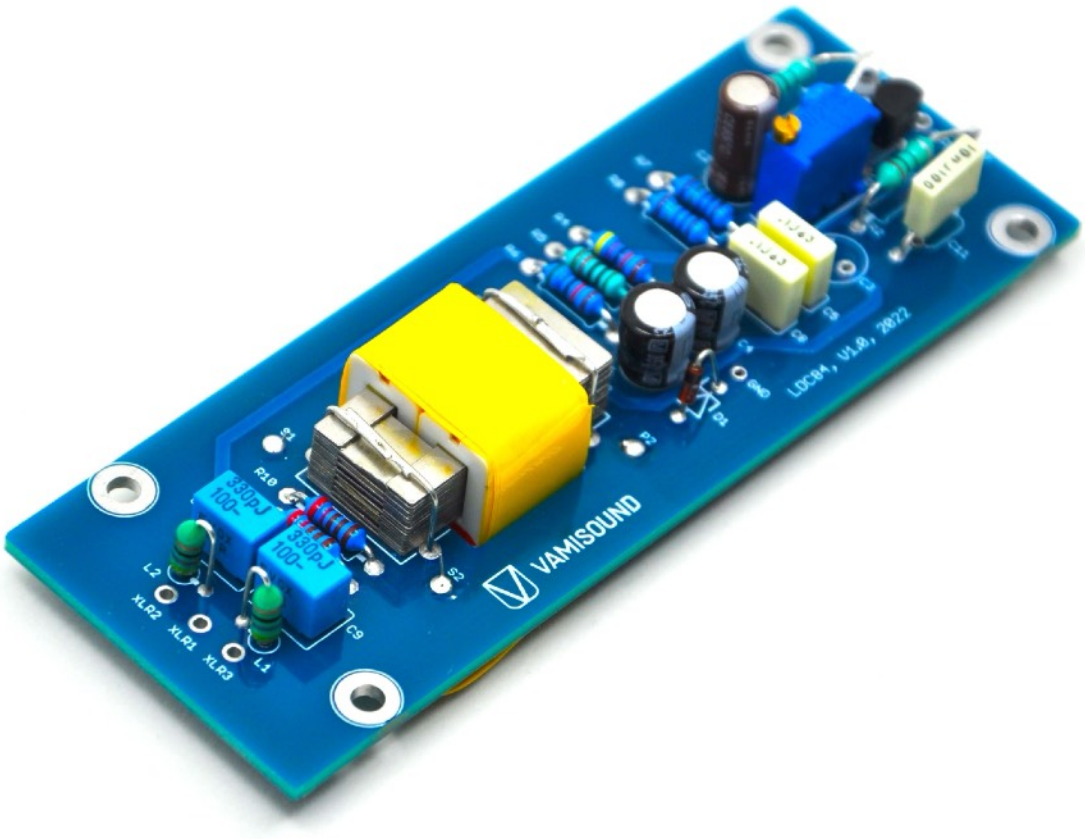
And now it's the turn of the three electrolytic capacitors. Do not install C3 if you will later use a PIO hi-end capacitor at the output capacitor position.



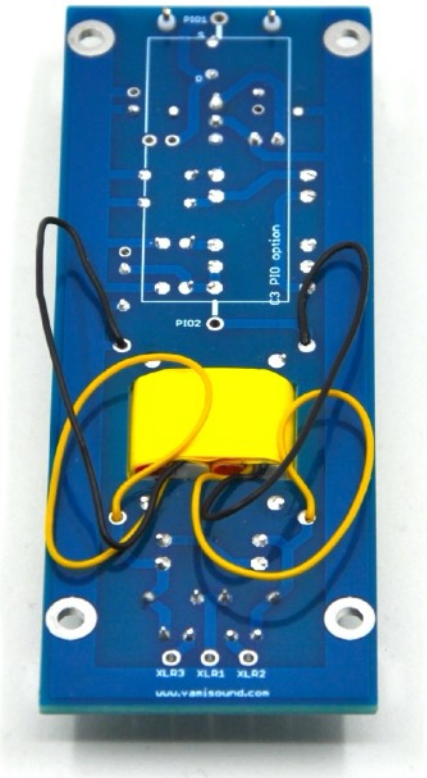
Clean the underside of the board thoroughly with iso propyl alcohol. Remove any residual flux and other contaminants. Also focus on cleaning the HiZ section around the two teflon pins.



Now comes the fun! Installing the transformer. Use the remaining resistor legs to attach the transformer to the pcb. Make sure the transformer is not glitching.

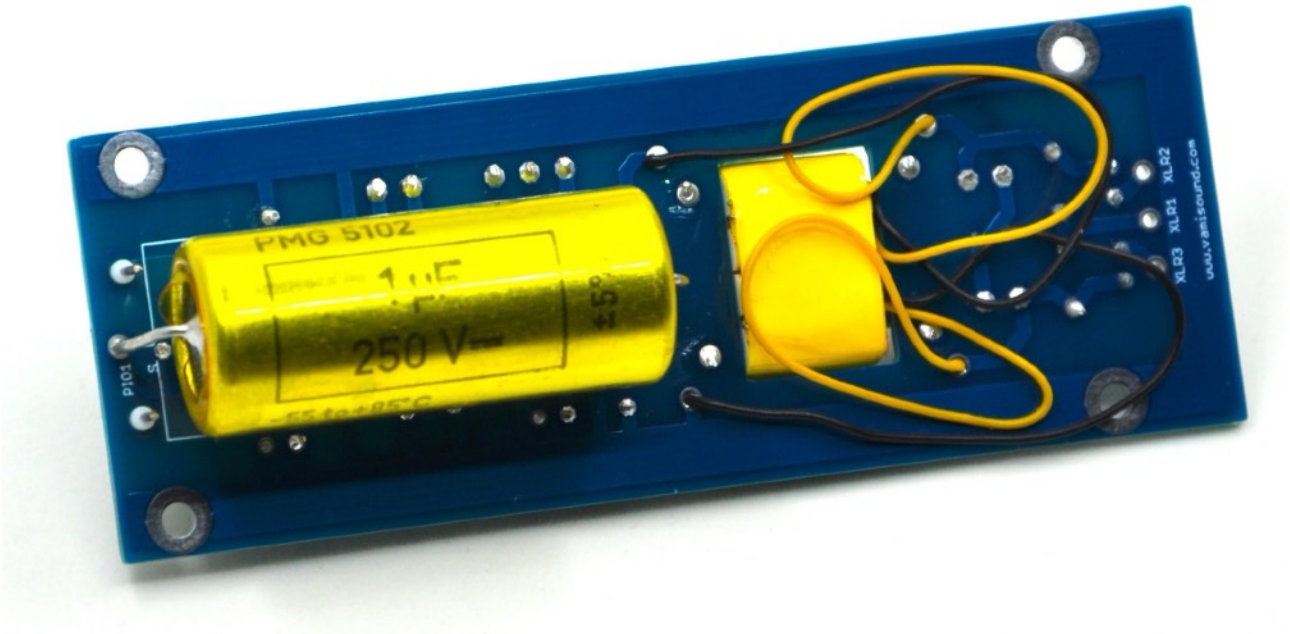


Connect the wires of the transformer primary to the pads on the board which are labeled P1 (primaries start) and P2 (primaries end). Transformer secondary wires to pad S1 (secondaries start) and S2 (secondaries end).

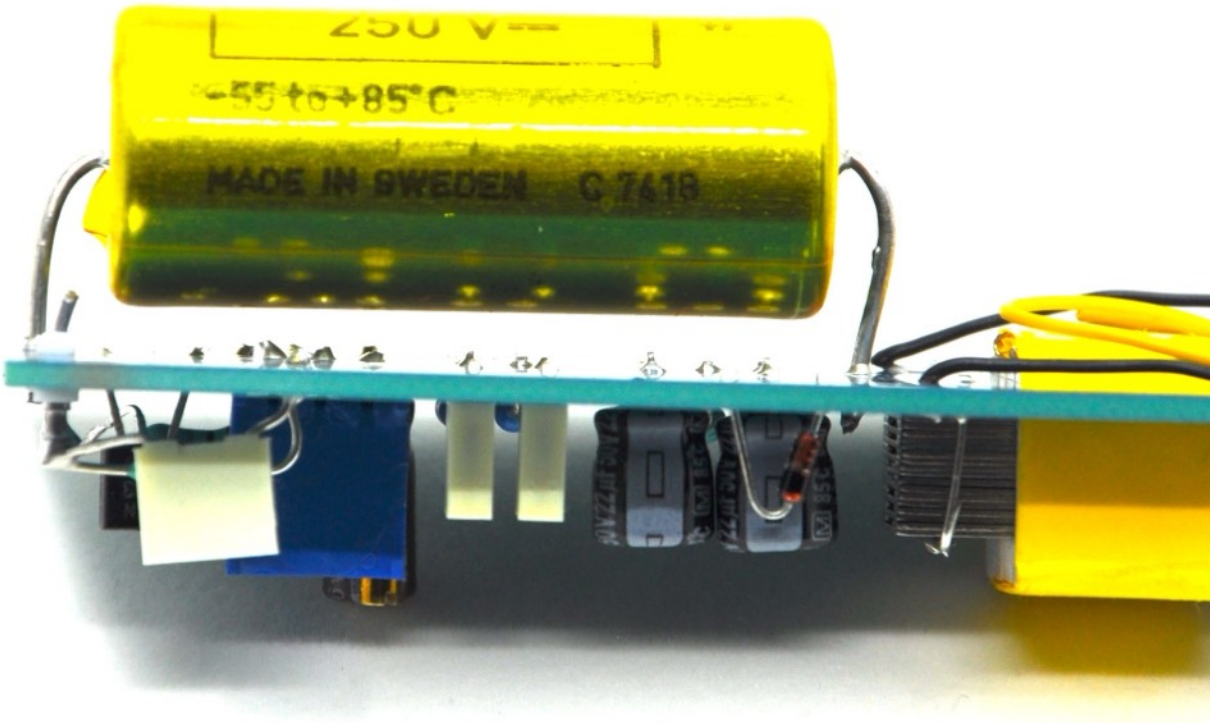


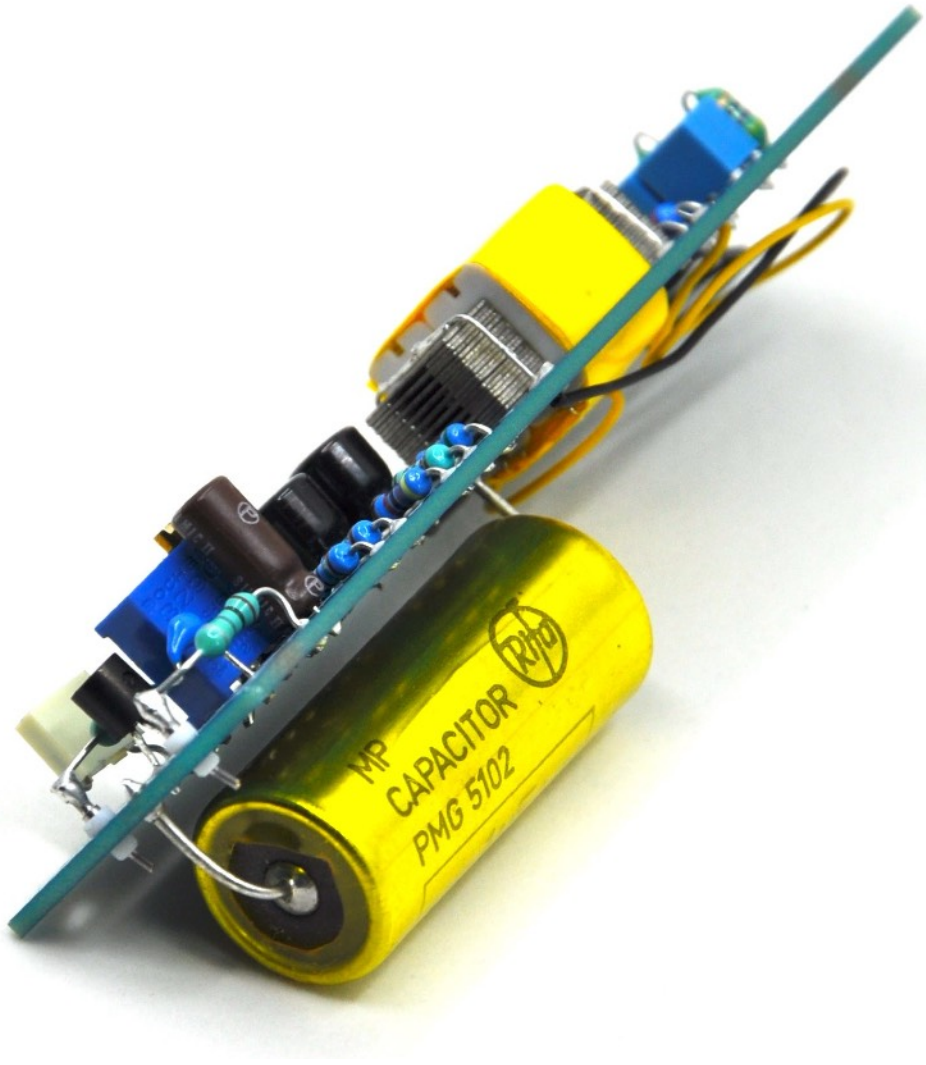
Do not shorten the wires too much, so that you will be able to swap them if necessary. Always check the phase of a finished microphone against a commercial microphone that you know has the phase right. If your DIY microphone has the opposite phase, just swap the two cables S1 and S2 with each other.

Solder the 1uF PIO output capacitor as the last component on the board.



Make sure that the condenser does not touch the board to avoid unwanted contact causing a short circuit.



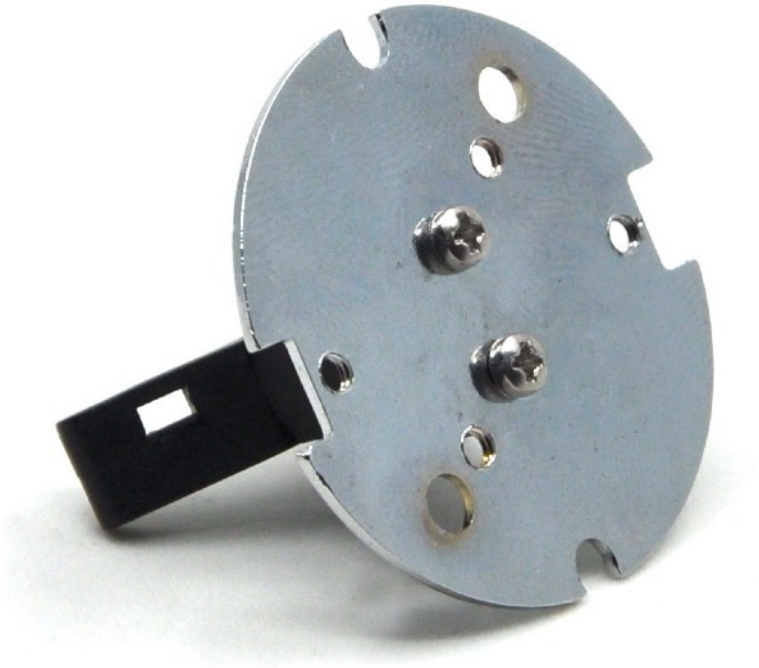


As you may have noticed the board offers two options for the output capacitor. You have a choice between a large PIO output capacitor that you install from the bottom of the board and a smaller capacitor that can be installed in the C3 footprint from the top component side of the board. When you choose the large PIO capacitor, leave position C3 on the top component side unoccupied (the reverse is also true – if you use the small C3 output capacitor from the top component side of the board, do not install the PIO footprint from the bottom side of the board).

Proceed by feeding the wires to the XLR insert. Note that pin 1 and the ground lug are connected by a resistor foot.

Unscrew the top round metal plate from the BM90 donor body. Two holes must be drilled to install the capsule holder. Draw the exact locations where the holes will be and then drill them. Use a 2.5mm diameter drill bit.

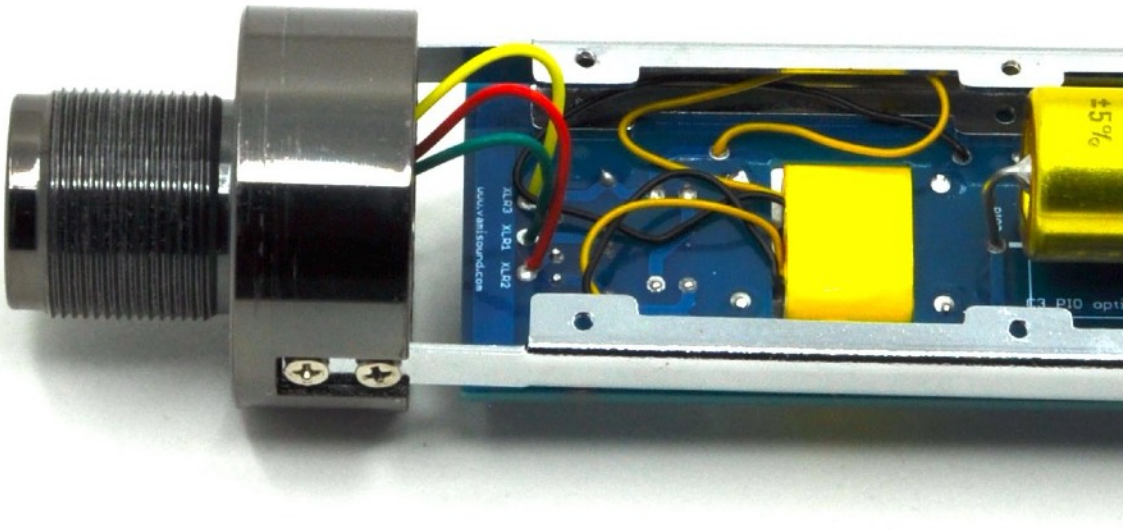
Screw the capsule holder to the plate using two screws.



Screw the prepared plate to the rest of the BM90 body chassis.

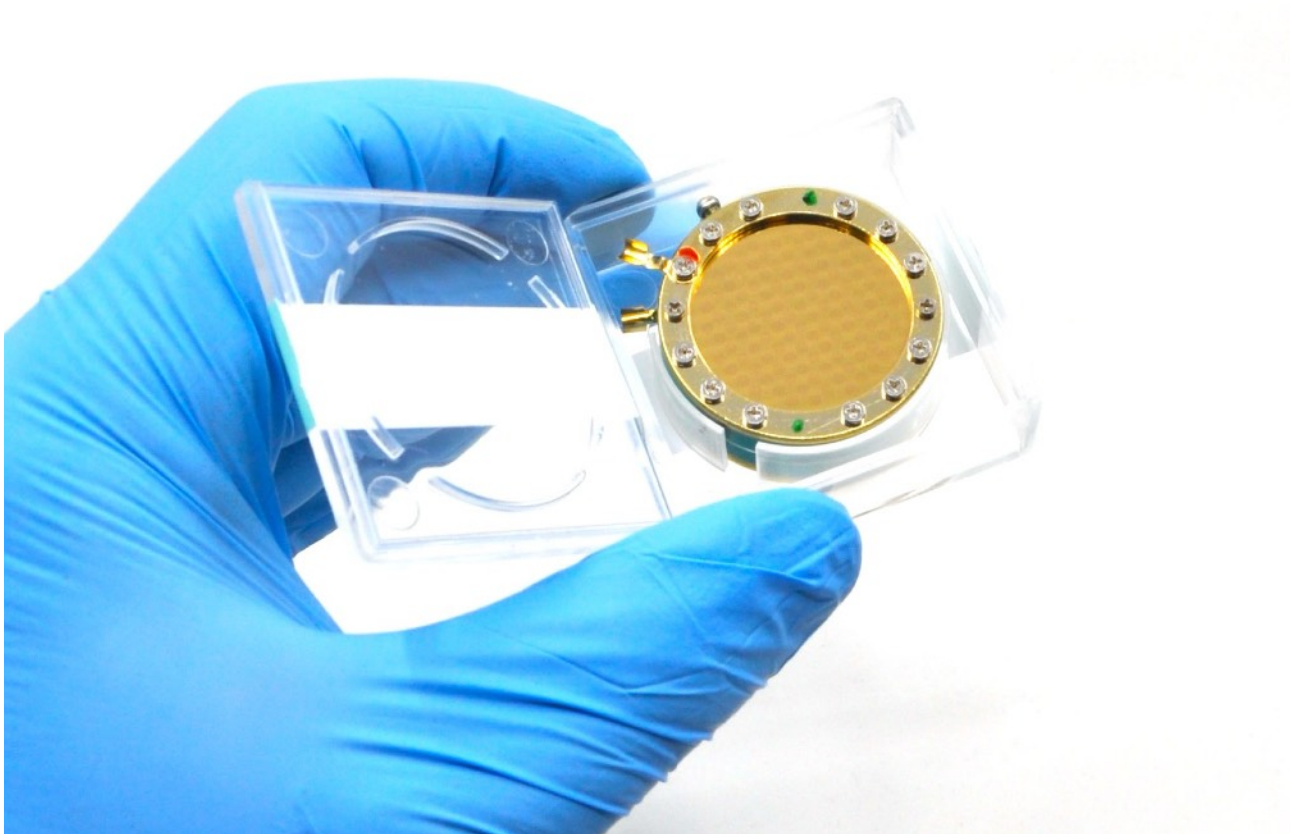
Now screw the prepared XLR insert to the body and also the fitted circuit board.

Solder the three cables to the appropriate pads on the board. XLR1 pin to XLR1 pad on the pcb, XLR2 pin to XLR2 pad and finally XLR3 pin to XLR3 pad.



Next comes the installation of the capsule.

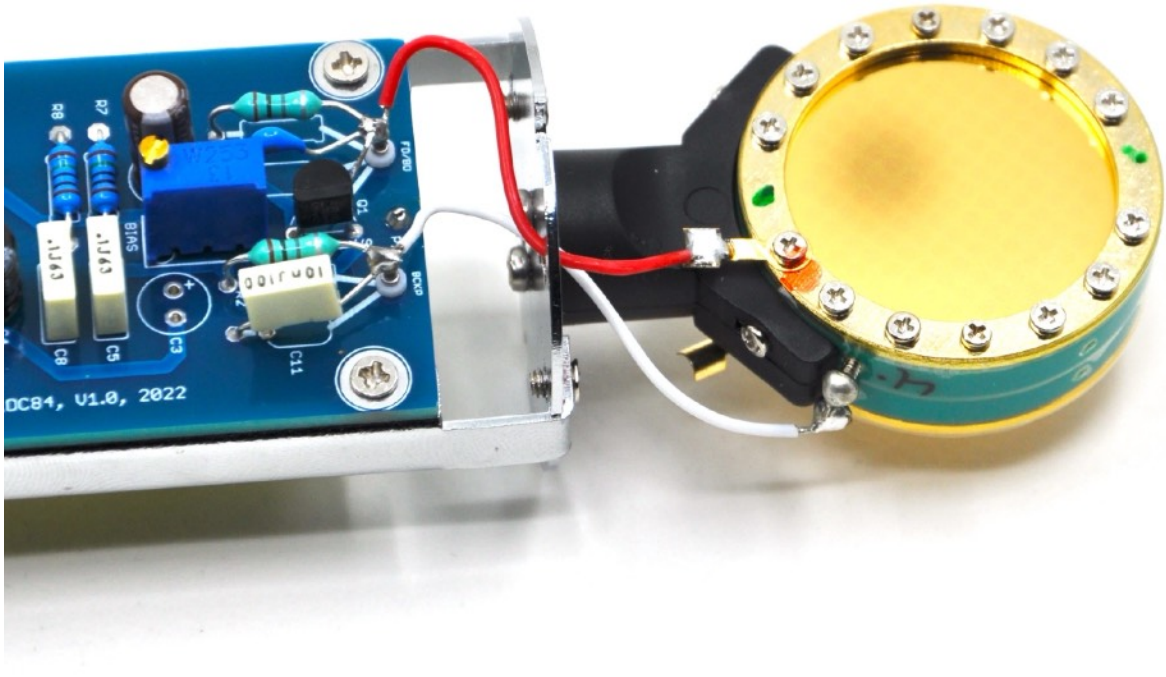
Take extra care during this process and always wear fitted gloves (powder free).



Screw the capsule carefully to the holder using the two screws and put the protective bag on the capsule. This will serve to protect you from any potential hazards caused by soldering the cable to the capsule.

Very carefully solder the red wire to the front diaphragm. Then the white wire to the backplate.

Solder the other end of the red wire to the teflon pin marked "FD". Solder the other end of the white wire to the second teflon pin. It is marked "BCKP".

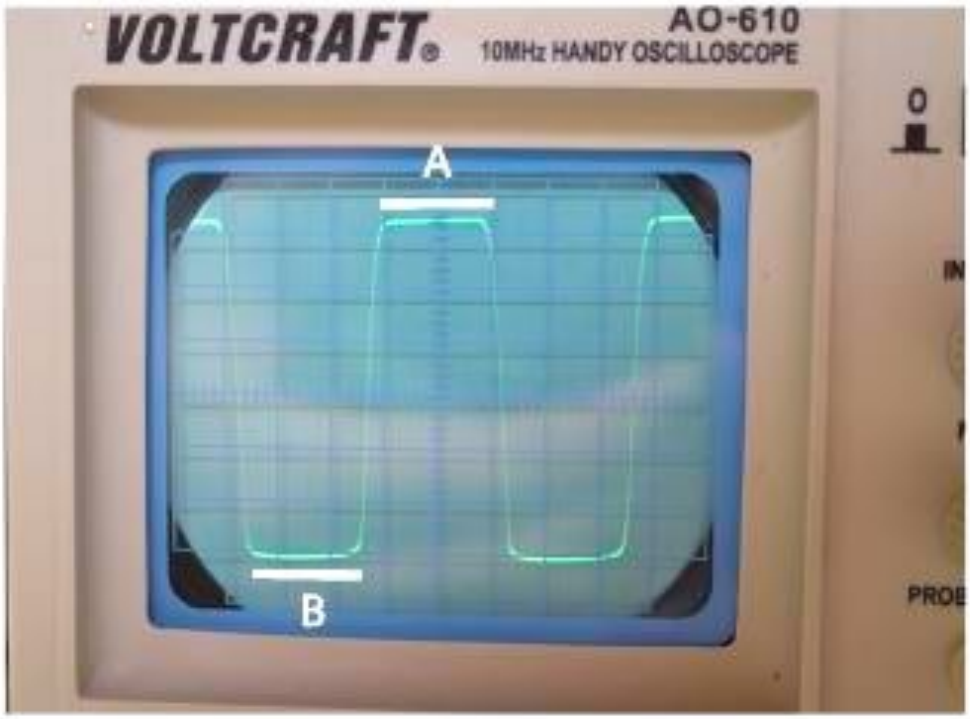


Now the capsule is connected to the circuit. Put the head basket on to protect the capsule.

Now the only last step to complete your new microphone is calibration. It is necessary to bias the FET transistor.

Bias procedure:

1) **Connect the microphone to your favorite preamp with the cable and activate the phantom power on the preamp. The microphone is with the main tube unmounted (open, head basket only).**
2) **Connect a signal generator to the teflon pin „FD". Set the generator to sine and start with approximately 0.5V to 1V.**
3) **Connect the oscilloscope to the output of the FET transistor (drain leg) and monitor this output. A PIO capacitor is very suitable for this. Connect the oscilloscope to the top side leg of the PIO capacitor (the leg near the FET).**
4) **You should now be able to see a sinusoidal signal on the oscilloscope. Start increasing voltage to the signal generator gradually so that you can see the sine signal go into clipping on the oscilloscope.**
5) **Adjust the trimmer resistor so that the sine signal is clipped equally on both sides (A=B). Take a look at the following picture:**



Of course, there are more ways to choose the right bias. The described is one of them.

Congratulations, your new microphone is now ready for service!!

WIRRING INFO

1) Capsule wiring: Front membrane cable to teflon pin marked as „FD“ from the bottom side of pcb. Cable from capsule backplate to „BCKP“ pad on the mic pcb.
2) Its always great idea to check phase of DIY microphone against commercial microphone.

ADDITIONAL INFO

Take you time when soldering the XLR insert. You don't want to burn the plastic of the XLR insert. Take a break while soldering the individual wires.

BILL OF MATERIAL

Part	Value	Tol.	Min.Volt.	Dimmensions	link 1	link 2	notes
Resistors							
R1	1G	10 %		6.5x2.5mm	mouser link		
R2	1G	10 %		6.5x2.5mm	mouser link		
R3	25K	20 %			mouser link		trimmer
R4	47K	1 %			mouser link		
R5	10K	1 %			mouser link		
R6	56K	1 %			mouser link		
R7	10M	1 %			mouser link		
R8	10M	1 %			mouser link		
R9	2K21	1 %			mouser link		matched to R10
R10	2K21	1 %			mouser link		matched to R9

Part	Value	Tol.	Min.Volt.	Dimmensions	link	type	notes
Capacitors							
C1	1-10pF		50V		mouser link	Ceramic	*3.3pF choosed value
C2	22uF		16V		mouser link	electrolytic	
C3	1uF		50V		mouser link	PIO or film	PIO - available on eBay
C4	22uF		50V		mouser link	electrolytic	
C5	0.1uF		50V		mouser link	film	
C6	22uF		50V		mouser link	electrolytic	
C8	0.1uF		50V		mouser link	film	
C9	330pF		50V		mouser link	film	
C10	330pF		50V		mouser link	film	

Part	Value	Tol.	Min.Volt.	Dimmensions	link	type	notes
Diodes							
D1	24V				mouser link		
Inductors							
L1	47uH				mouser link		
L2	47uH				mouser link		
Tranzistors							
Q1	2N3819				mouser link		
Other							
Capsule	CTS-12, Maiku C12, K47, 3U Audio C12, K47, M7						
Teflon pin	2x				mouser link		
Transformer	3U Audio GTZ-84, Moby BV.107 (not compatiable with pcb transformer hole)						
Mic body	BM90 from Alibaba or Aliexpress						