

Thank you for purchasing a JLI and Sound Sleuth microphone kit.

Historically, the marketplace – and indeed, many engineers – have sought out a microphone that provides excellent sound replication, but with a distinct personality. Think “vintage” “tube” or “transformer”. At Sound Sleuth, we take a very different approach.

First and foremost, these microphones are designed for pristine sound quality. Whether you’re miking an instrument, a voice, or a guitar amplifier, the output is clean and unadulterated. Samantha, Serena, and Endora, each start with a condenser capsule built to ISO 9001 standards in a precision clean room. From the capsule, the sound goes through a state-of-the-art unity gain buffer stage. Instead of discrete components, each uses a Texas Instruments operational amplifier providing >100dB of dynamic range, with almost unmeasurable distortion levels.

Samantha uses a 25mm electret capsule and is great for miking instruments, guitar amps and voice over work. She is the simplest to build with just a few solder connections. With the addition of a small capacitor, she can be padded for close miking toms, snare drums and high hats.

Serena steps up to a full 34mm large diameter capsule. She requires a polarization voltage that is supplied by a separate voltage multiplier board. Serena is truly world-class. She is both a fantastic mic for orchestras and choirs, while being right at home in the vocal booth. Assembly requires just a little more soldering as we have an extra circuit board to mount and connect.

Endora is two Serena’s in one. She features a dual diaphragm 34mm capsule, taking a signal from both sides and sending them separately out of the microphone. Endora’s simplified design eliminates the need for switches on the mic body, thereby reducing the need to check the pick-up pattern before recording. Now you can easily create and adjust the pattern in post. Perfect for the studio and complex live recordings. A pair of Endoras bring traditional stereo setups into whole new era. Think adjustable ORTF, Double MS and more.

Whatever your taste in sound, all three of these microphones provide a pristine blank slate of clean audio. So, whether you’re going for clean natural sound, or you’re looking to add warmth, crunch, or grunge in post, Serena, Samantha, and Endora will help you create a little bit of magic.

You will need a few tools and some patience to build these microphones. We have tried to make this as easy as possible.

Tool List:

1. Soldering iron
2. Electronic solder
3. #0 Phillips head screwdriver
4. #1 Phillips head screwdriver
5. Small flat tip screwdriver
6. Needle nose pliers or tweezers
7. Small hobby vice
8. E6000 glue for a Samantha build
9. 99% Isopropyl Alcohol

Parts List:

Please verify that your kit contains everything needed.

1. Mic Body
 - i. Head Basket
 - ii. Body Cylinder
 - iii. Frame
 - iv. Threaded Mic Bottom
 - v. Plastic cosmetic ring
 - vi. 3 or 5 pin XLR insert
2. PCB's
 - i. OPA impedance converter board: Single channel for Samantha and Serena, dual channel for Endora
 - ii. Hex Inverter for Serena and Endora
3. Microphone Capsules
 - i. JLI2555B for Samantha
 - ii. TSC-1 for Serena
 - iii. TSC-2 for Endora
4. Capsule Mount or "Saddle"
 - i. The JLI2555B glues to the capsule with E6000 glue
 - ii. The TSC-1 and TSC-2 use the same Capsule Mount.
5. 22nF capacitors used for RF/EMI suppression.
 - i. (2) for Samantha and Serena
 - ii. (4) for Endora
6. Hardware for assembly
 - i. (4) M1.6 5mm screws for the TSC-1 or TSC-2 Capsule Mount
 - ii. (2) M2.5 4mm screws (4) for Serena and Endora
 1. (2) PCB to the Frame (Samantha)
 2. (4) PCB's to Frame (Serena and Endora)
 - iii. (2) M2.5 6mm screws for the Head Basket to the frame
 - iv. (2) M2.5 8mm screws to mount the Capsule Holder to the Frame
 - v. (2) M2.5 Flat Washers for the two screws above
 - vi. (4) rubber grommets for the Capsule Holder
 - vii. (1) M2.5 5mm screw for the XLR connector. The head on this one is smaller than the rest. It screws into the XLR connector flush then is unscrewed to seat the XLR connector in the frame.
7. Prepared wire(s) for assembly
 - i. (3) for the XLR to the PCB (Samantha and Serena)
 - ii. (5) for the XLR to PCB (Endora)
 - iii. (2) for Samantha capsule to PCB
 - iv. (2) for the Hex Inverter PCB to OPA PCB (Serena and Endora)

Assembly:

Step One: Prepare the XLR

We are soldering 22nF capacitors between the signal lines and ground. This is critical for EMI and RF noise suppression. The culprit here are cell phones and WiFi signals, far more than the local AM radio station of years ago. Many commercial mics and most vintage mics don't include this. Placement of these components is as important as including them. They mount on the XLR to the common ground point of Pin-1 on the XLR. The XLR screw and shield connection tie directly to the metal shell of the microphone. This shunts all the incoming "way above the audio range" electrical interference stuff to ground.

Samantha and Serena: (3-Pin)

1. Tin each of the XLR pin solder cups.
2. Prepare and solder the 22nF capacitors. One gets a lead bent in a way we can use it to connect the ground lug to Pin1 on the XLR. See the diagram below: *Note the numbers: Match the labeling on the XLR*

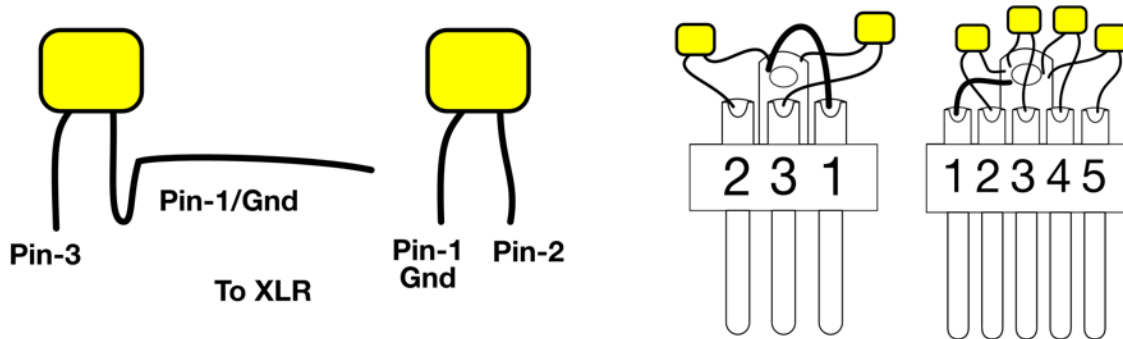


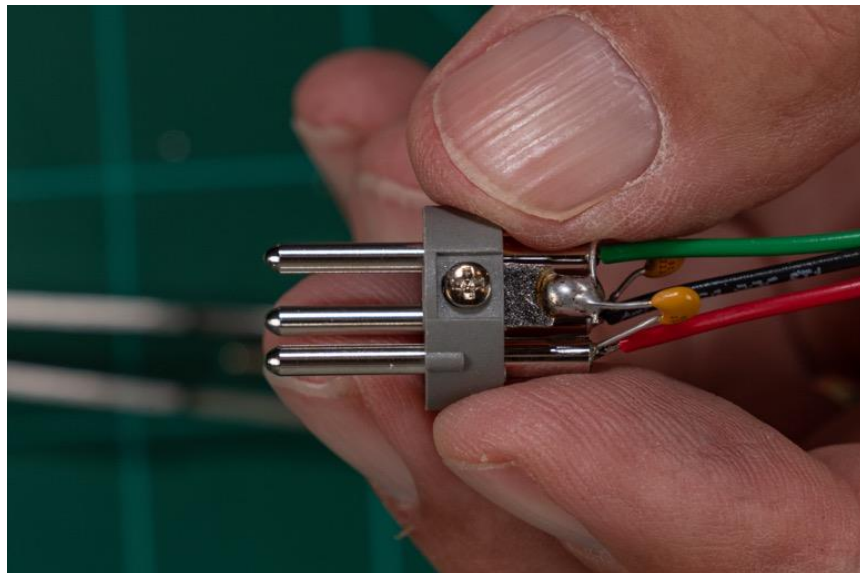
Figure 1: 22nF capacitor connections

Solder the “bent” part to Pin-1 of the XLR, then the “tail” to the back shield/ground connection. Then the other lead to Pin-3

The second capacitor goes to Pin-1 and Pin-2 of the XLR connector. It is easier to solder it to the ground lug than Pin one

Note: This is a critical step! Without it you may have buzz and hum in the microphone.

3. Attach the 2-inch XLR wire leads. Green to Pin-1, Red to Pin-2 and Black to Pin-3.
 - i. Pull off the precut insulation.
 - ii. Tin each end of the wire
 - iii. Heat each solder cup on the XLR and carefully insert the tinned part of the wire.

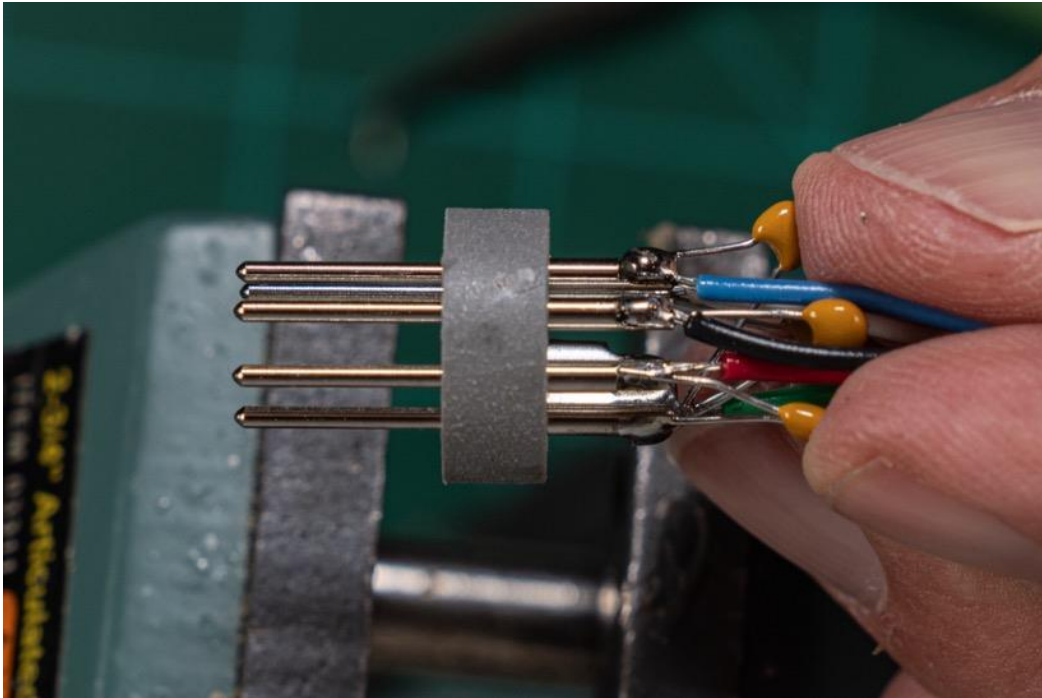


Endora: (5-Pin)

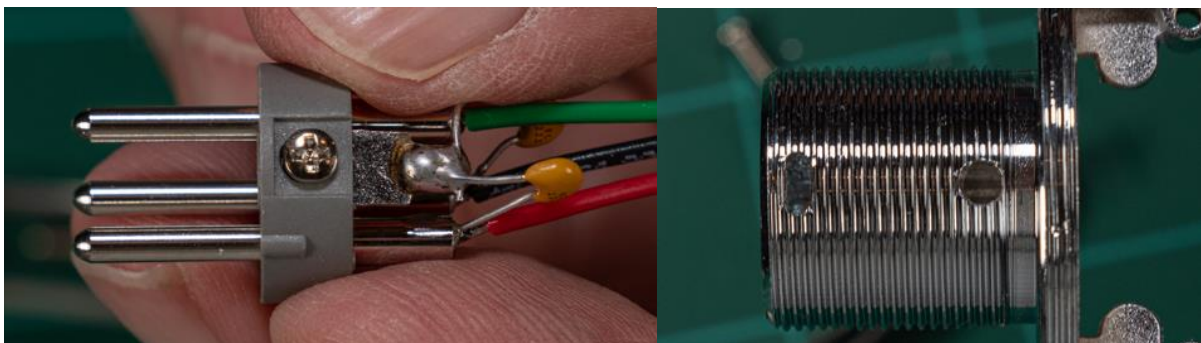
There are four capacitors total and five wires.

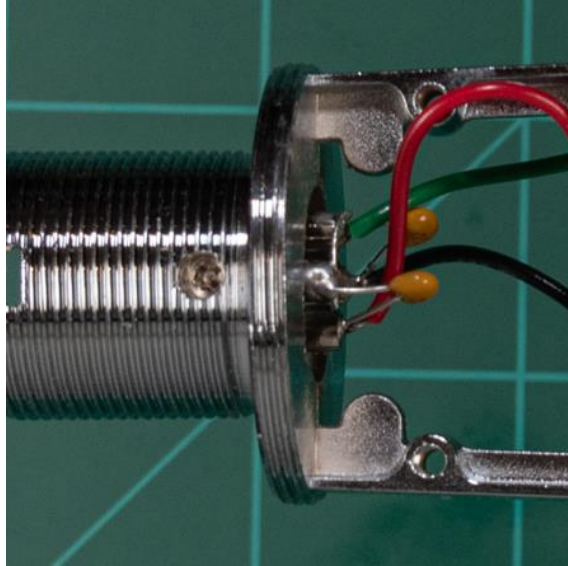
Capacitors: Connect Pin 1 to the ground lug. Install capacitors between Pins 2, 3, 4, and 5, all to the ground lug.

Wires: Green to Pin-1, Red to Pin-2, Black to Pin-3, Blue to Pin-4, and White to Pin-5



4. Insert the XLR into the frame so that the wired feeds into the frame area and the threaded hole on the ground lug is visible through the hole in the threaded part of the frame. Secure it with the M2.5 screw. This connects the frame to ground at a single point.



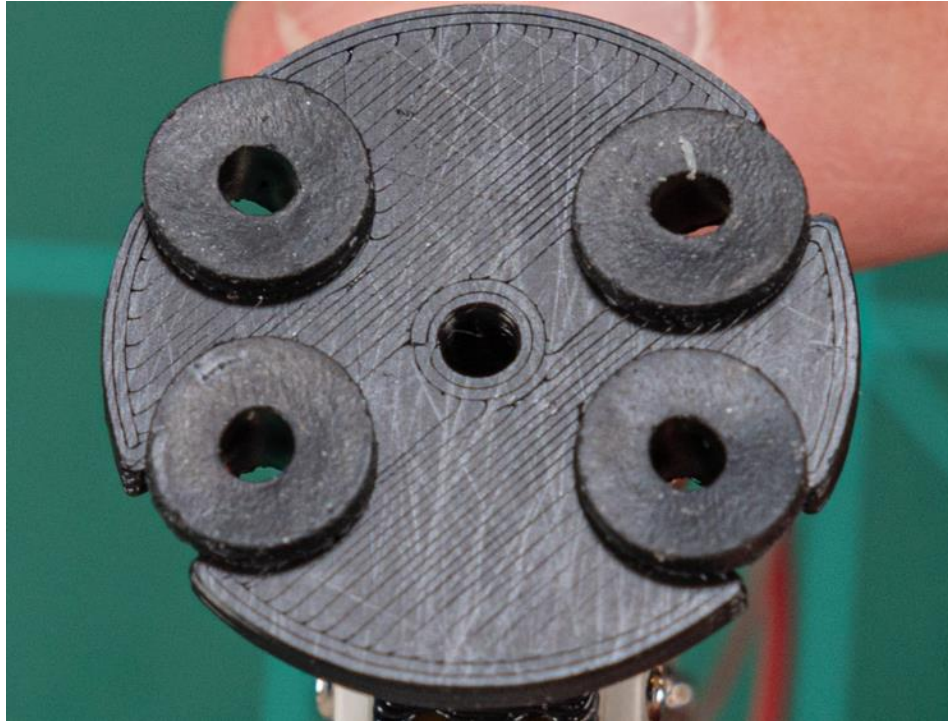


Step Two: Mount and install the capsule

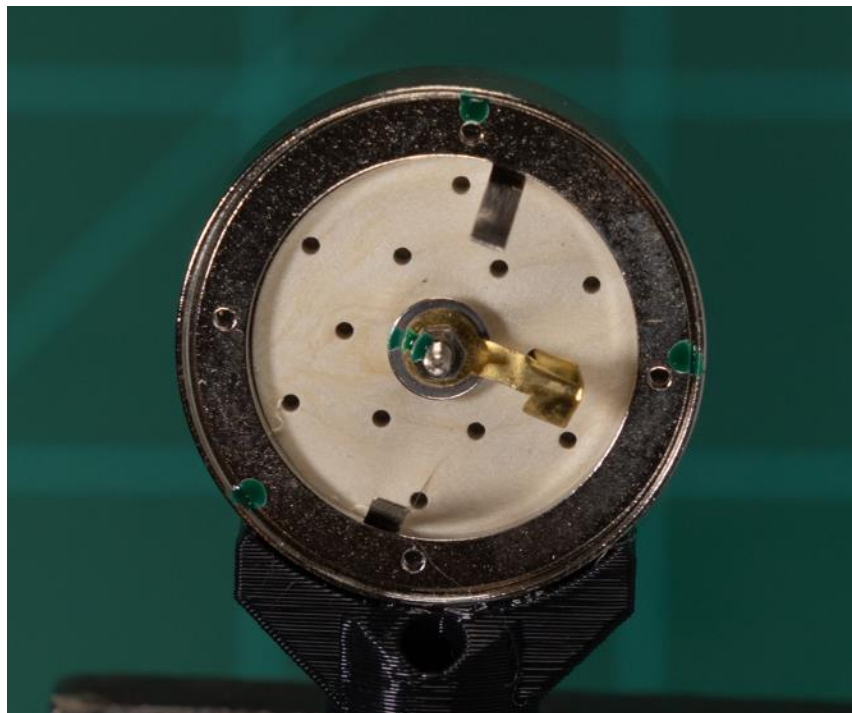
There are two styles here. Samantha uses a JLI2555B capsule glued to its Capsule Holder. You will need E6000 glue for this. Serena and Endora use full 34mm brass capsules that use (4) M1.6 5mm long screws. There are small holes around the edge of the capsule that are threaded.

Our first step is to insert four rubber gromets into the capsule holder *before* mounting the capsule.

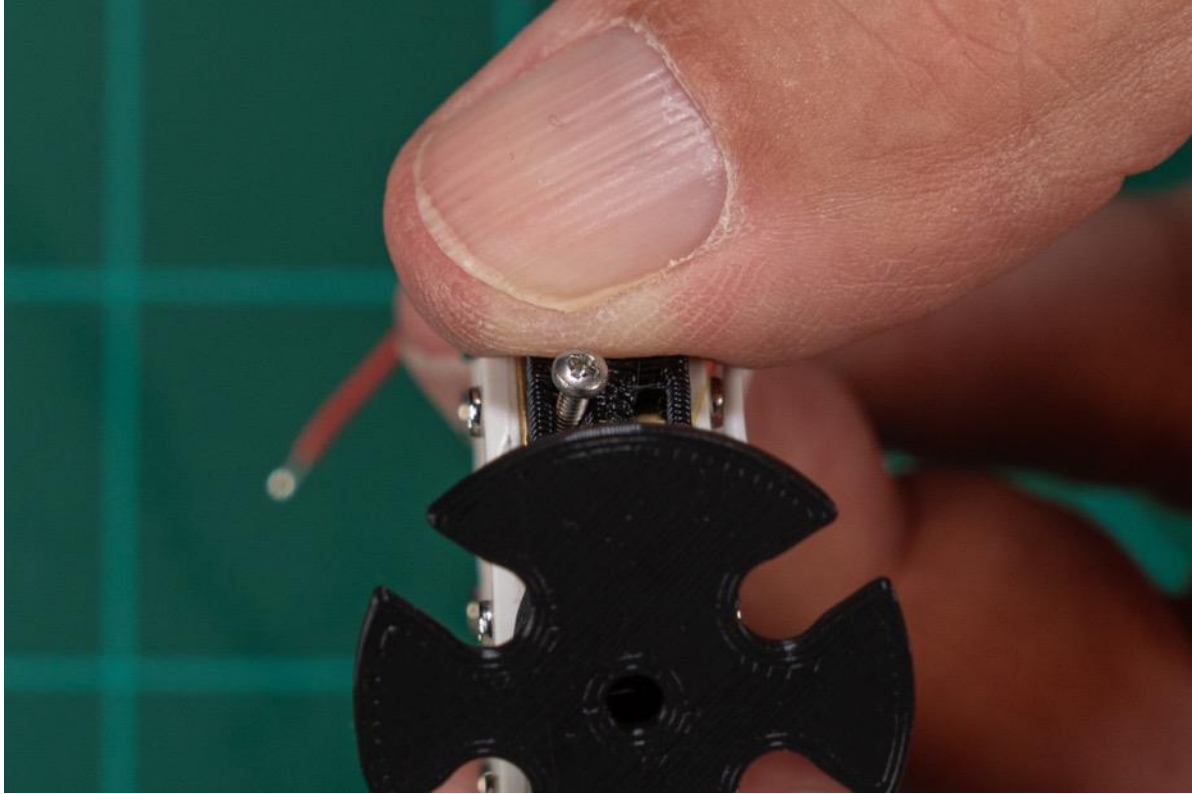




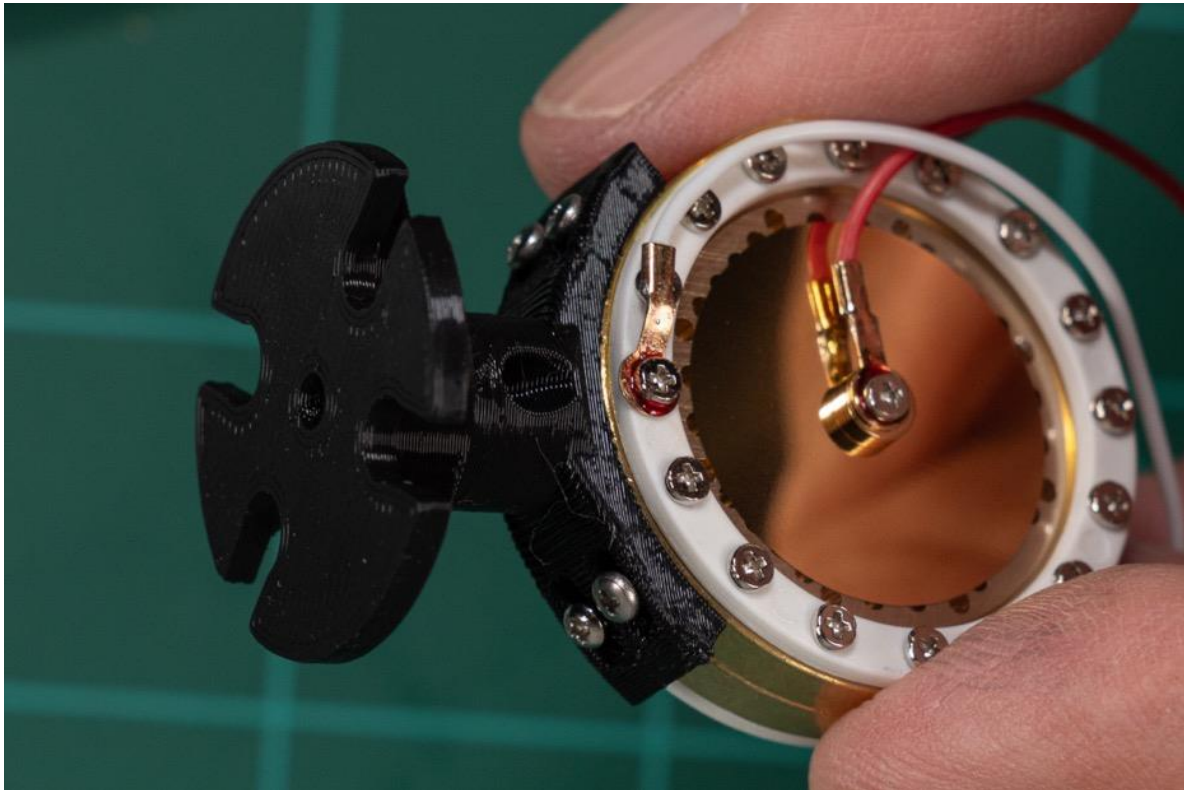
1. JLI2555B: put a small bead of E6000 glue on the Capsule Holder. Align the capsule so the ground connections are on each side. Press the capsule onto the glue bead and wiggle a little to spread the glue around. Set aside for a couple hours to dry.



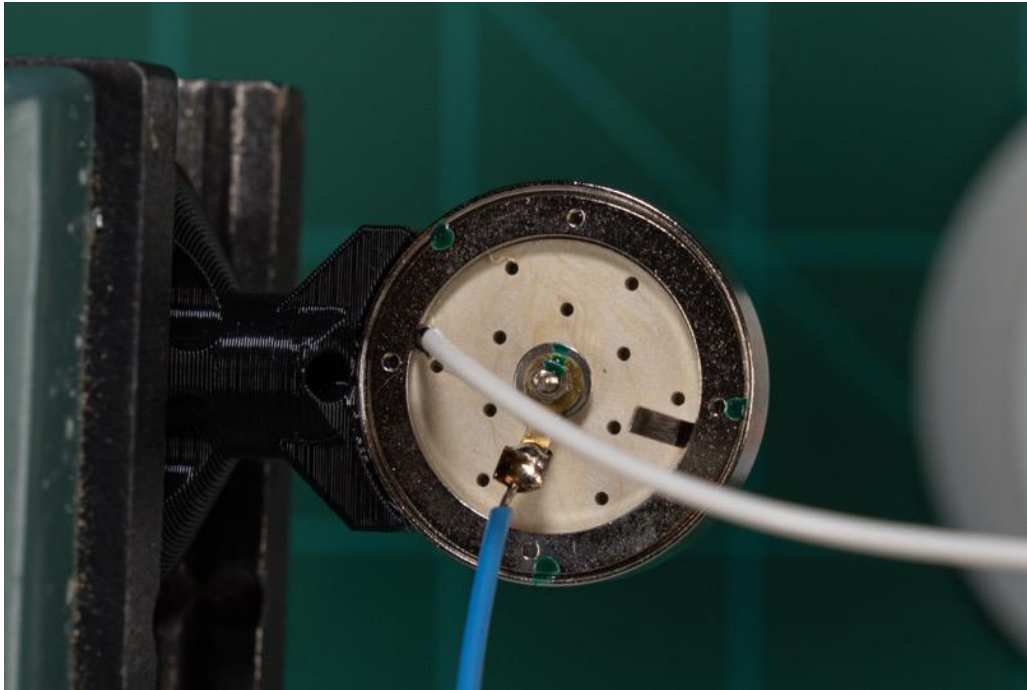
2. TSC-1 and TSC-2: Carefully mount the Capsule to the holder using four M1.6 5mm screws. There are four screw slots on the Capsule Holder and six screw holes on the capsule. Line them up and you will see which ones to use.



Caution: Do not touch the diaphragms. This can affect how the mic sounds and performs.



3. The JLI2555B needs leads soldered to the Capsule. There are two wires included for this. Use blue for the center conductor and white for ground.



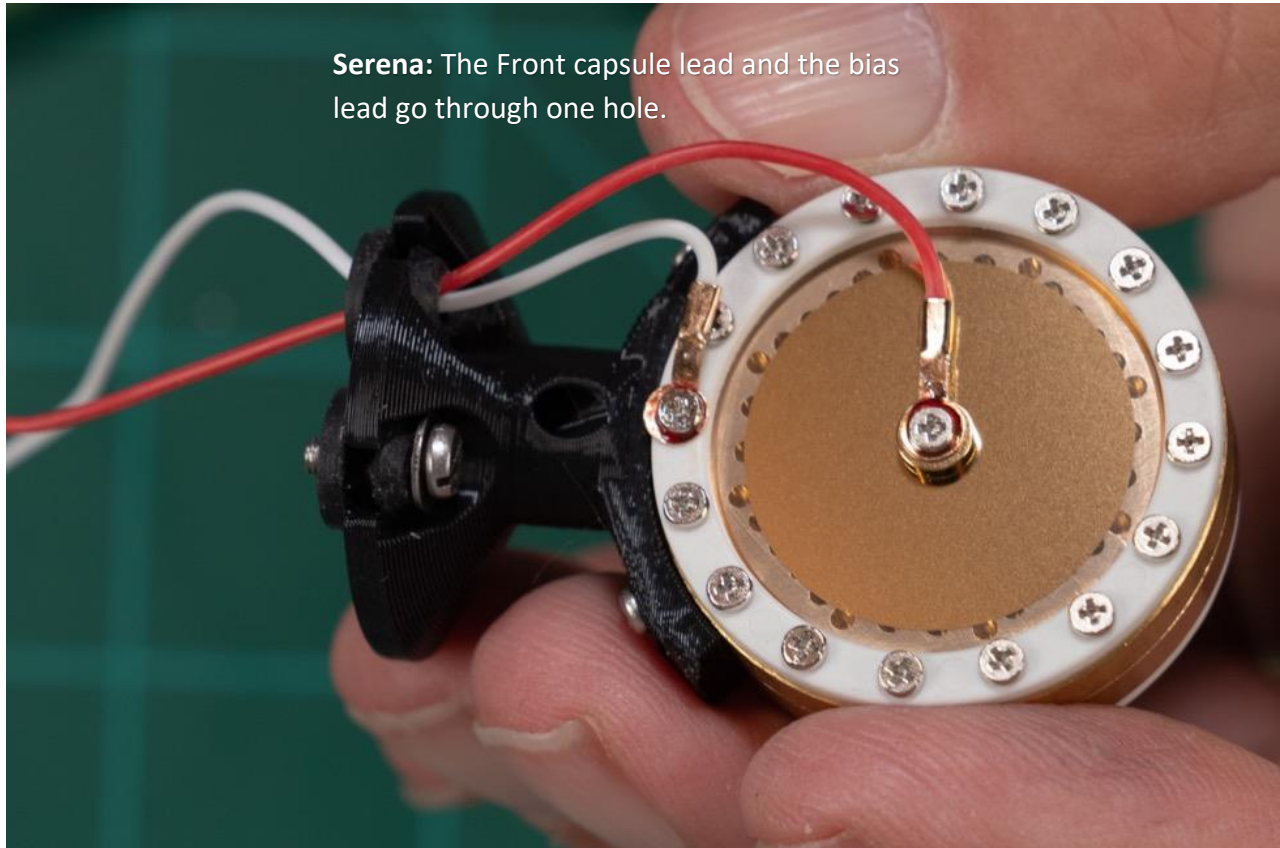
3. Mount the Capsule Holder to the microphone Frame. This uses four rubber grommets and two screws. The other two holes are used to bring the capsule wires through.

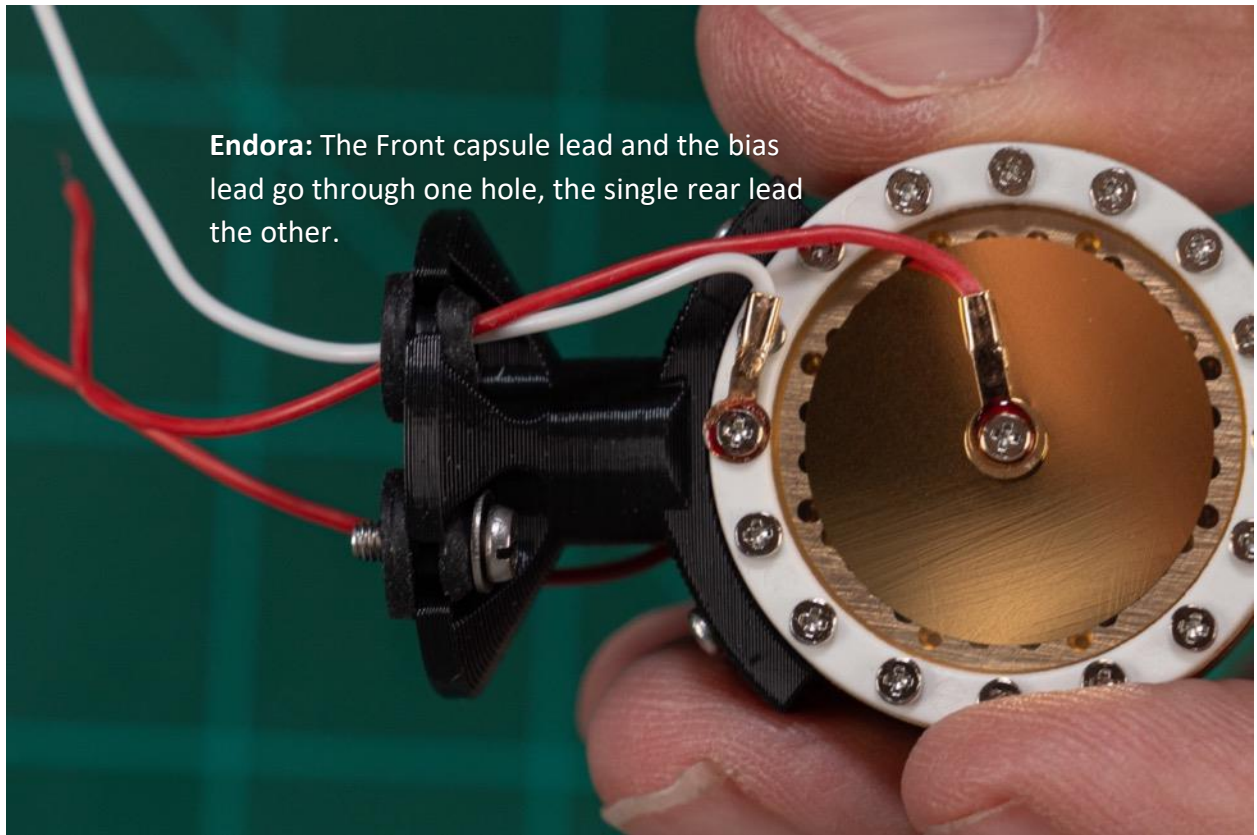
Note: There are four holes in the frame to mount the Capsule Holder. Only two of them are threaded. These will get the two screws and the other two are for passing the wires through. You may have to poke through the holes that are not tapped. There may be metal plating residue on them.



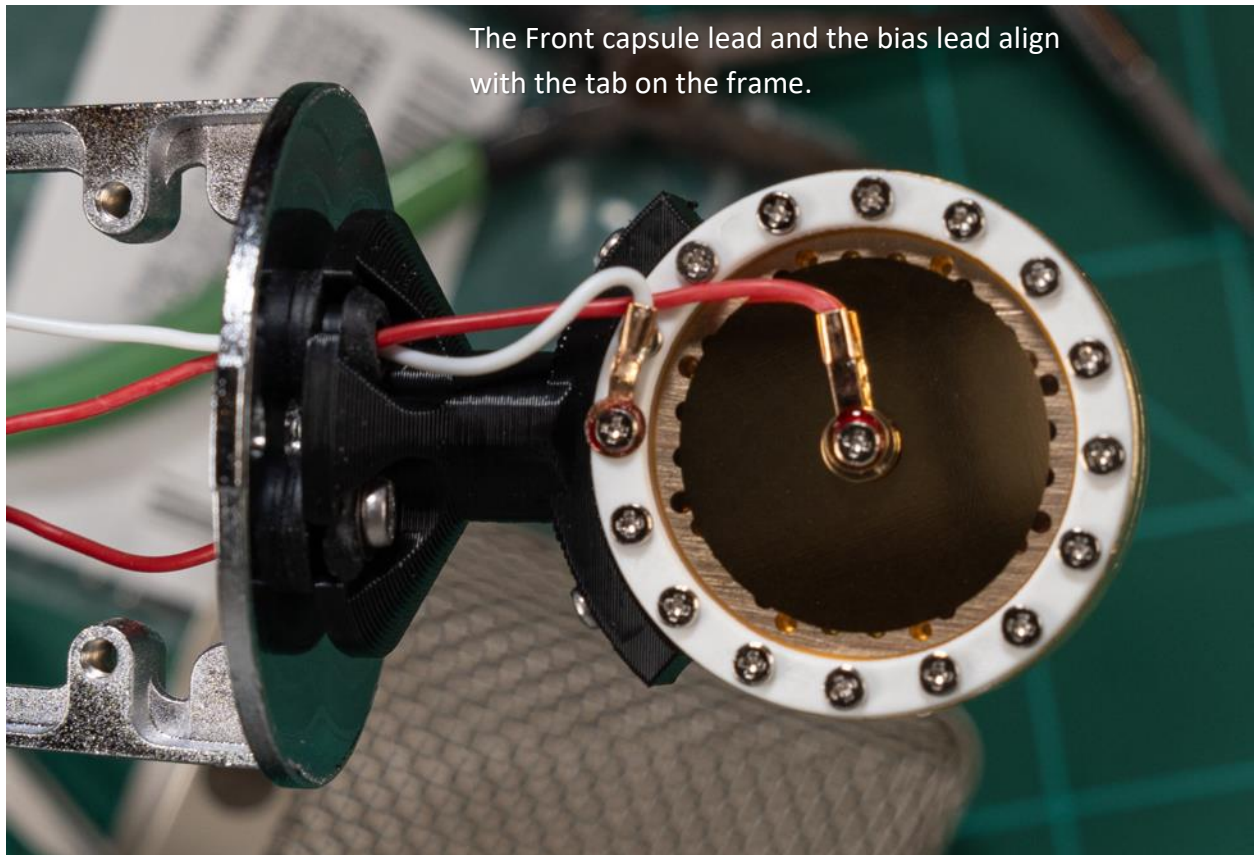
Note: There is a metal tab on the top of the Frame. This faces forward and the front of the capsule needs to face the tab.

- i. Find the two holes that are threaded on the top of the Frame.
- ii. Using two M2.5 8mm screws and the flat washers, mount the Capsule Holder to the frame.
- iii. Carefully feed the wires through the other two holes. For Endora, with three wires, feed the front facing capsule wire and the bias voltage wire through the hole closer to the metal tab on the frame. This helps keeping track of everything.

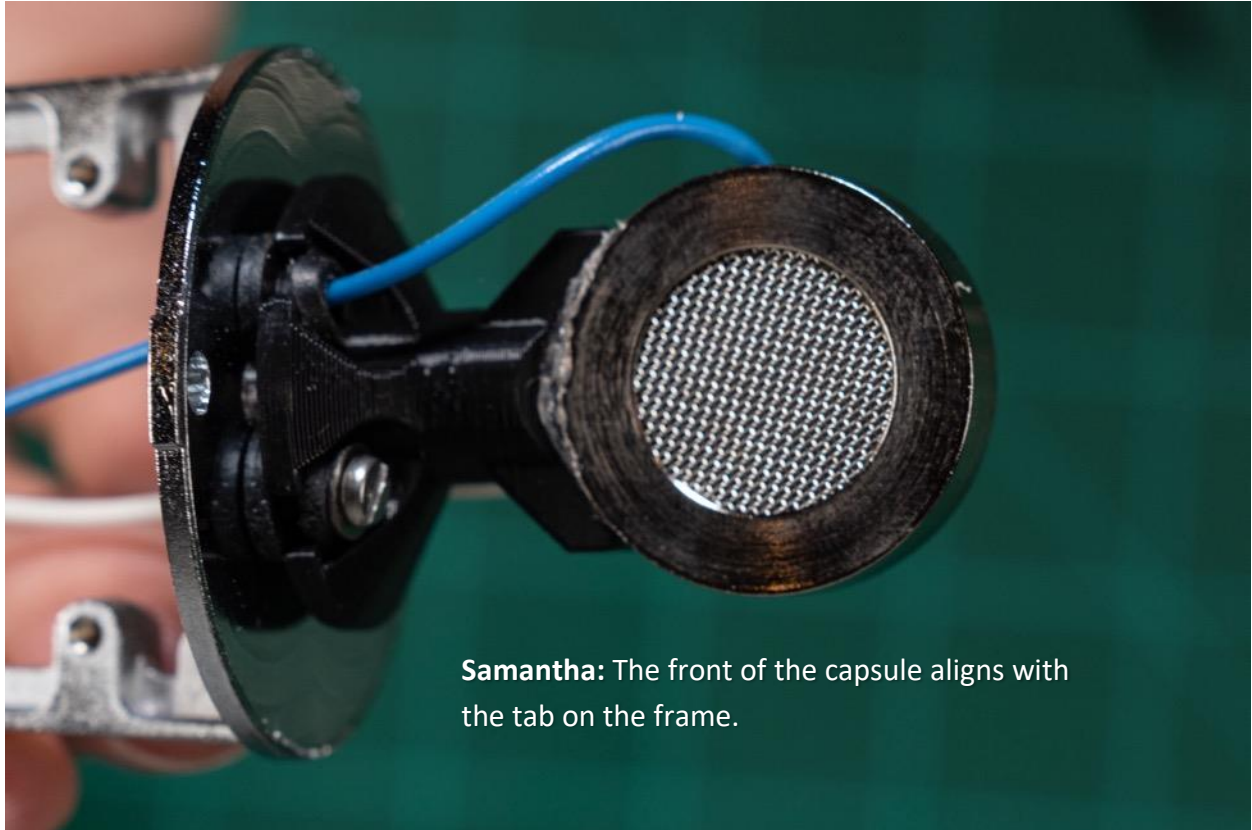




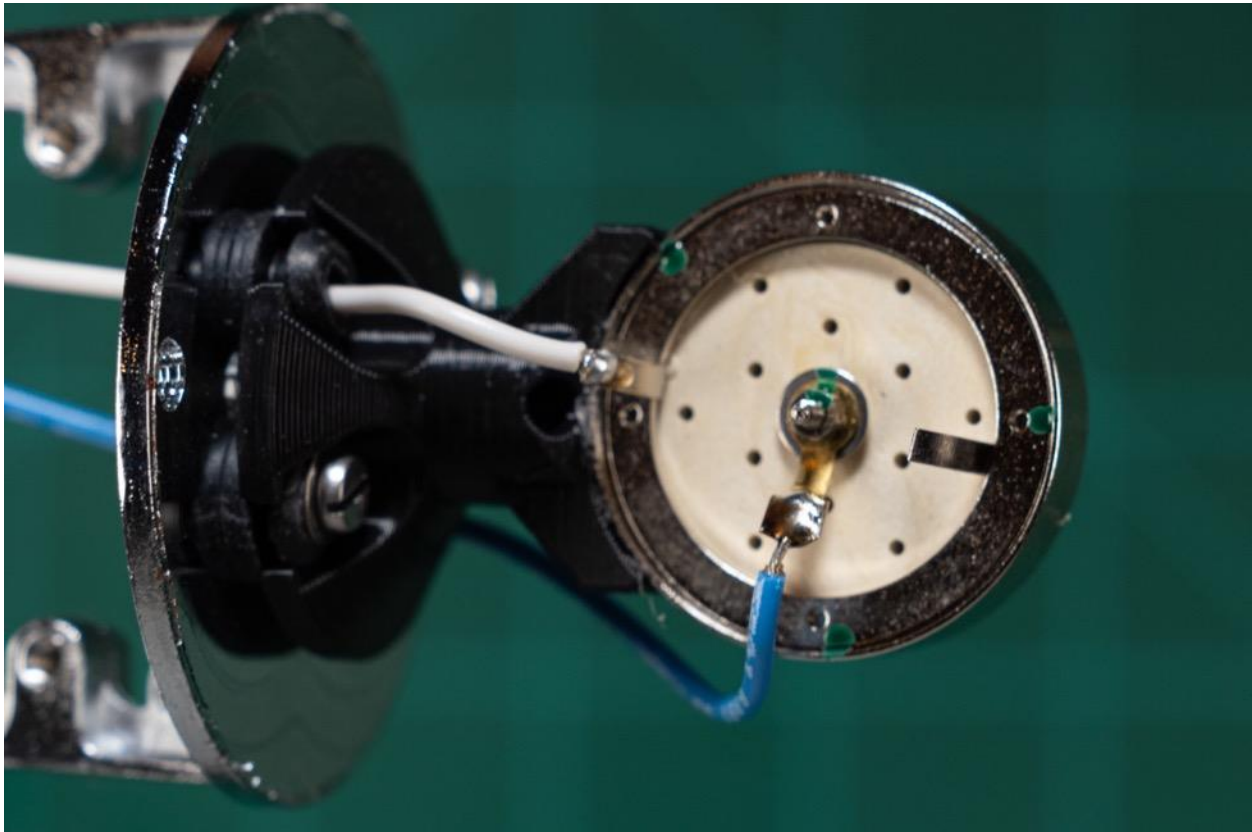
Endora: The Front capsule lead and the bias lead go through one hole, the single rear lead the other.



The Front capsule lead and the bias lead align with the tab on the frame.

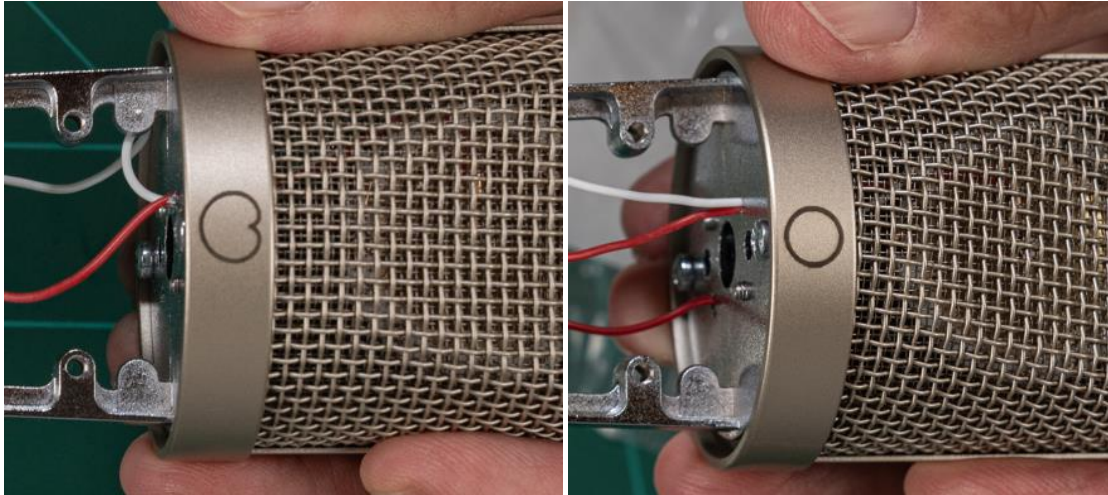


Samantha: The front of the capsule aligns with the tab on the frame.



Step Three: Mount the Head Basket

This mounts with two M2.5 screws. There are gaps on each side of the Head Basket to allow the capsule to feed through. Samantha and Serena have a Cardioid image on the front of the Head Basket. That faces front. Align the image with the metal tab on the frame. Endora has a circle outline on one side and a solid circle on the other. The outline circle faces front. This is the one that has two wires coming in from the capsule that is the front facing diaphragm. The solid circle is the rear facing diaphragm.

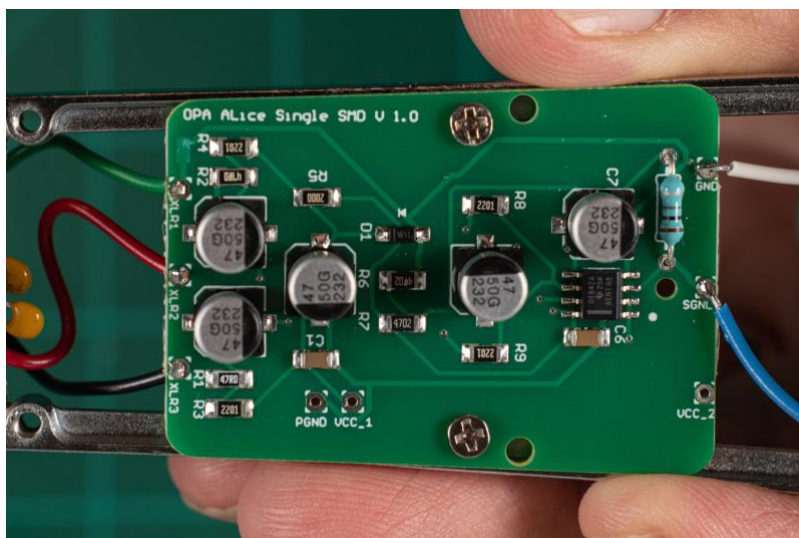


You should now have a frame with wires coming down from the top and up from the XLR.

Step Four: Connect the PCB(s)

Samantha: Uses the single channel OPA Board:

1. Place the frame in the hobby vice
2. Solder the XLR wires to the board before mounting it as follows:
 1. Pin-1 (Green) to XLR_1 on the PCB
 2. Pin-2 (Red) to XLR_2 on the PCB
 3. Pin-3 (Black) to XLR_3 on the PCB



3. Mount the board to the frame using two M2.5 screws
4. Solder the Blue wire (Center terminal) to the Signal lead on the PCB
5. Solder the White wire (Shell terminal) to the Gnd lead on the PCB
6. Clean the area around the SGNL connection with 99% Isopropyl Alcohol.

Note: This is a very high impedance circuit. Dirt and residue will affect performance.

Serena and Endora: Use both the OPA Board, and the Hex Inverter. We need to connect them together before mounting them. That makes assembly easier. Endora uses the dual channel OPA board

1. Solder an included red wire to the VCC_1 terminal on the OPA board and the VCC connection on the Hex Inverter board
2. Solder an included green wire to the DGND on the OPA board and Gnd connection on the Hex Inverter board.

Note: For Endora (the two-output mic) use Channel "A" on the Dual OPA board

Note: Bring the two connecting wires for 12V and Gnd from the bottom side of each board. This makes mounting the boards easier.

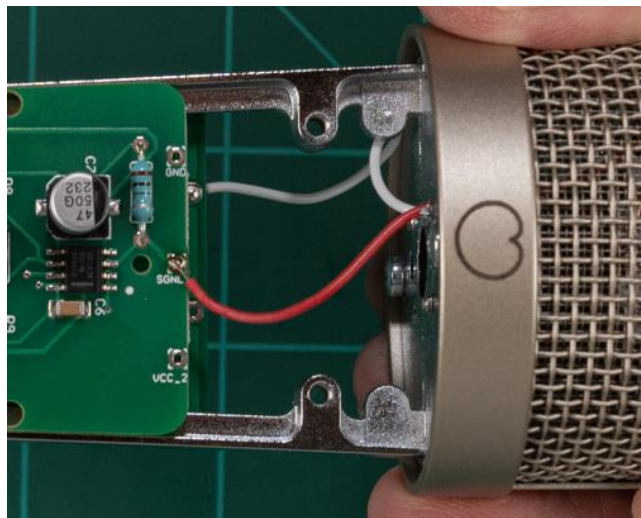
3. Place the frame in the hobby vice

For Serena:

1. Solder the XLR wires to the board before mounting it as follows:
 1. Pin-1 (Green) to XLR_1 on the PCB
 2. Pin-2 (Red) to XLR_2 on the PCB
 3. Pin-3 (Black) to XLR_3 on the PCB
2. Mount the board to the frame using two M2.5 screws.

Note: Check the wire color for the pre-attached wires on the Mic Capsules. They may be different than shown

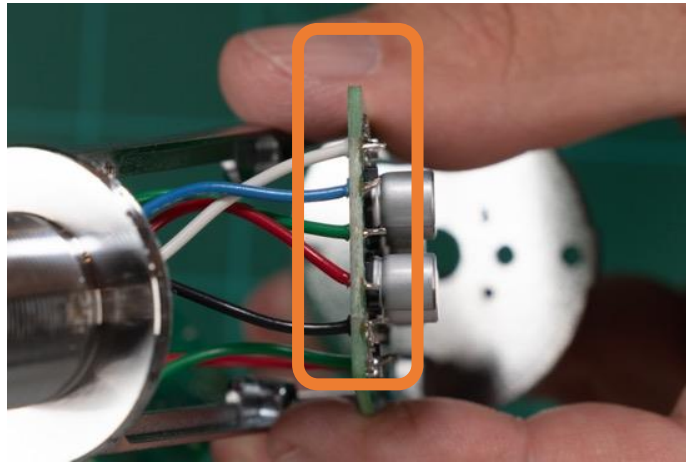
3. Solder the Red* wire (Center terminal) to the Signal lead on the OPA PCB
4. Solder the White* wire (Shell terminal) to the Pol lead on the Hex Inverter
5. Clean the SGNL area and connection of the PCB with Isopropyl Alcohol



For Endora:

1. Solder the XLR wires to the board before mounting it as follows:
 1. Pin-1 (Green) to X1 on the PCB (center of PCB)
 2. Pin-2 (Red) to X2A on the PCB
 3. Pin-3 (Black) to X3A on the PCB
 4. Pin-4 (Blue) to X2B on the PCB
 5. Pin-5 (White) to X3B on the PCB

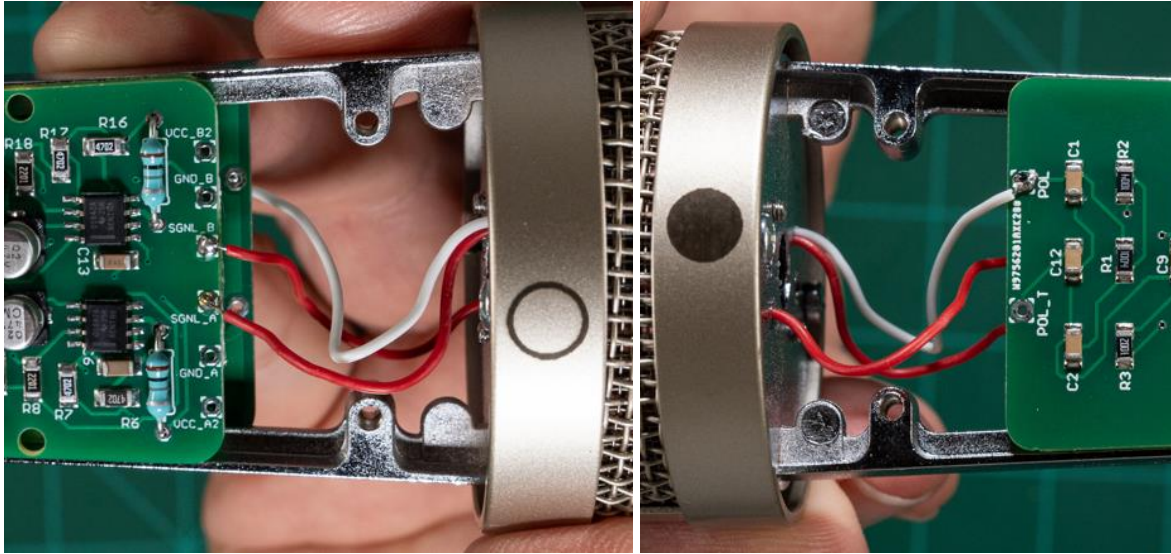
Note: This is a very high impedance circuit. Dirt and residue will affect performance.



2. Mount the board to the frame using two M2.5 screws.
3. Solder the Red* wire (Center terminal) of the front facing capsule to the SGNL_A on the OPA PCB.
4. Solder the Red* wire (Center terminal) of the rear facing capsule to the SGNL_B on the OPA PCB.
5. Solder the White* wire (Shell terminal) to the Pol lead on the Hex Inverter.
6. Clean the area of the board around the SGNL_A and SGNL_B with Isopropyl Alcohol.

Note: This is a very high impedance circuit. Dirt and residue will affect performance.

* Wire colors may vary. Ensure you are using the correct ones



Step Five: Test and Final Assembly

Let's test the microphone before going any further. Connect the mic to a recorder or preamp that has 48V Phantom Power.

Note: There will be some hum and noise as the metal body is not shielding the electronics. The goal is to verify that it works.

If there are any issues, please see the troubleshooting session.

1. Slide the plastic cosmetic ring over the frame.
2. Slide the metal body cylinder over the frame. There is a cutout at the top that fits into the tab on the top of the frame.
3. Screw on the bottom piece ensuring a tight fit and clean contact with the internal metal surfaces.

Congratulations! You just built a world class microphone.

Connection diagrams:

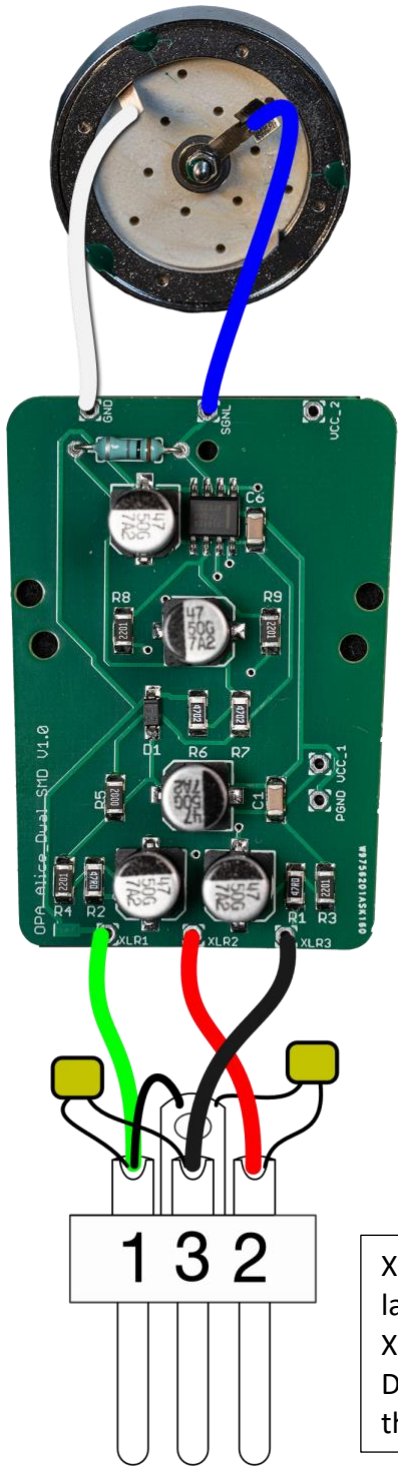
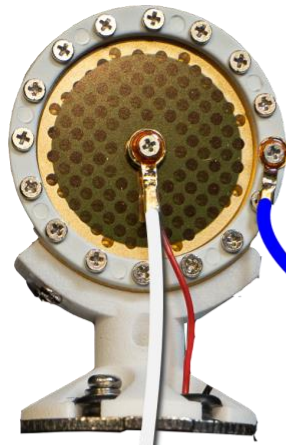


Figure 2: Samantha



See text for
TSC-1 and TSC-2
capsule wire
colors

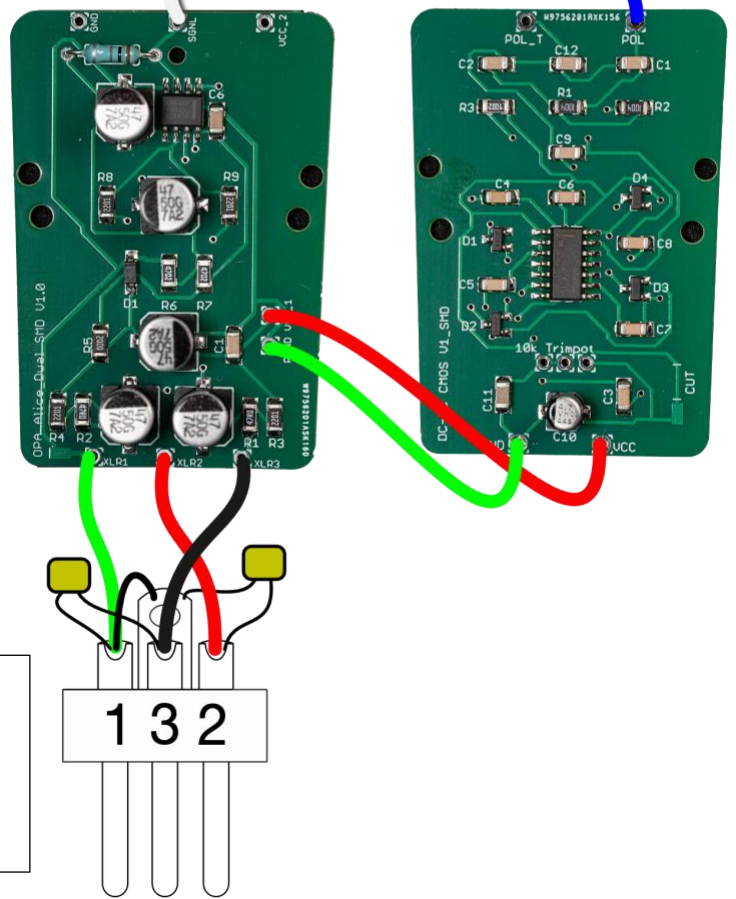


Figure 3: Serena

XLR Pins are
labeled on the
XLR connector.
Double check
this!

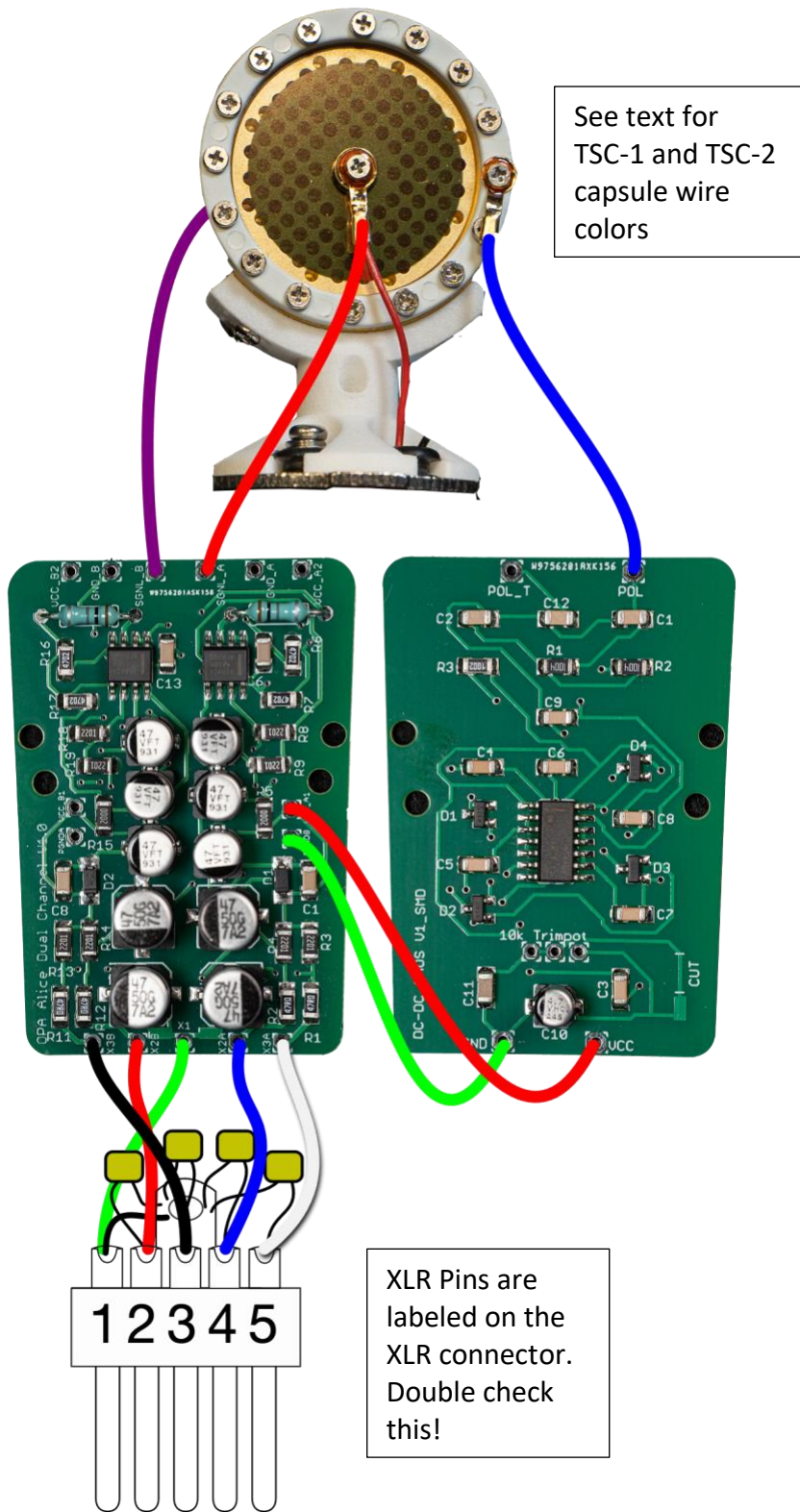


Figure 4: Endora