



RCA Inputs
RCA Preamp Outputs
¼" Headphone Output
4 Pin XLR Headphone Output
Alps Blue Velvet Volume Control
Sparkos Labs SS2590 Discrete OPA Output Stage
Sparkos Labs Discrete Voltage Regulators
Zero Global Feedback
No Capacitors In The Signal Path
6922 Vacuum Tube Front-End
Allows For Tube Rolling
User Adjustable Tube Bias point
The Amount Of "Tube Sound" Is User Controllable
Tube Heater Soft Start
40 second Tube Warm-Up Delay
User Gain Control Button
User Selectable Input Attenuator Of -15dB

DC Protection For The Headphone Outputs
Very Low Output Impedance < .25 ohms
High Damping Factor
10Hz – 100KHz Frequency Response
Gain Of 12dB (Low Gain) And 21.5dB (High Gain)
Unloaded Cross Talk >100dB @ 1KHz
Power Out 2 Watts Max @ 32Ohms
Power Out 750mW Max @300 Ohms
15V Peak Output Voltage
250mA Peak Output Current
THD 0.1% - 1.5% Depending On Settings
10uVRMS Noise Unweighted In Low Gain Mode
30uVRMS Noise Unweighted In Hi Gain Mode
120dB Max Signal To Noise Ratio In Lo Gain Mode
110dB Max Signal To Noise Ratio In Hi Gain Mode
9" Wide, 6" Deep, 2.5" Tall
120 / 240 VAC Operation

Hybrid Tube Design.

Vacuum tubes have long been revered in the world of audio for their ability to impart a warm, harmonically-rich sound signature that simply can't be replicated by solid-state components alone. They bring a sense of depth, dimension, and character to your music that goes beyond mere amplification. Whether you're a seasoned tube aficionado, or just beginning your journey into the world of high-fidelity vacuum tube sound, the Gemini is the ultimate platform for exploring, experiencing, and customizing your very own vacuum tube-based audio experience.

The first level of customization that you'll get with the Gemini, is with tube rolling. Tube rolling is the practice of swapping out and changing the vacuum tube type in an audio system to sculpt and customize the sonic character to one's personal preferences. Each tube type will have its own unique sonic signature, characterized by factors like warmth, clarity, imaging, richness, soundstage, and dynamics. The Gemini allows you to roll nearly a dozen different tube types, ranging from the lush, smooth tones of vintage tubes to the pristine clarity of modern ones.

The next level of customization, is through the front panel gain button. Each tube type will have its own unique sonic signature, but exactly *how much* of that sonic signature will be imparted onto the sound will depend on exactly *how hard* the tube is having to work. The gain button provides easy, immediate control over how hard the tube has to work, how much gain it has, and how much of its unique sonic signature will come through in your listening experience.

The final level of customization, is control over the amount of current that the tube is biased at. This jumper-based user control will behave similarly to the gain button, but it will do so without actually changing the gain, or the perceived volume level that the user will experience. The amount of bias current doesn't affect how hard the tube has to work like the gain button does, but rather, it defines for the tube what "work" even means in the first place. Control over the tube's bias current was the last little piece of customization that the audiophile and engineer inside me wanted to give you, but our president and CEO, Lütz, (the little doggie) couldn't justify the cost of giving you a button on the front panel to do that with. So, we compromised by doing it with an internal jumper instead.

So, there you have it. The Gemini presents a vast, 3-dimensional matrix of sonic possibilities that exist across 10 different tube types, at 2 different gain levels, and 2 different bias points each. The question now is, how far down that rabbit hole do you want to go? Some of us love nothing more than embarking on such an adventure in our search for sonic perfection, while others of us maybe "Ain't got time for all that." If you are the latter, don't worry, we got you. We already selected the best tube, biased it just right, and leave you with only a simple front panel gain button to tailor your sonic experience.

Tube Type. The Gemini comes with a 6922 dual triode tube, which also goes by the name ECC88. In our opinion, it is the one that we think sounds the best. If you prefer a different tube type or want to experiment with your listening experience, the Gemini can run nearly a dozen different tubes. See the section on Tube Rolling for more info.

Design Architecture. Tubes are great for imparting good sonics, but they are not so good at driving headphones or speakers. For this reason, the tube inside the Gemini is in the front end, and will be the first thing that the incoming audio will hit right after passing through the Alps Blue Velvet volume control. We then extract the audio signal from the tube using current mirrors rather than coupling capacitors, and then apply that signal to some of our world class SS2590 discrete op amps for driving the headphone and RCA outputs. As such, the Gemini has no output transformers or impedance matching concerns that are common when tubes are used to drive outputs.

So it is a two-stage architecture consisting of the tube followed by our SS2590 PRO discrete op amps working together in concert. The amount of tube harmonics imparted into the sound will depend on how hard the tube is driven. When the unit is in High gain mode, the SS2590's will be doing most of the amplification, so the level of tube harmonics will be low. When the gain is set to low, the tube will be doing more of the work, so the resulting level of harmonics will be higher. The gain button on the front is more of a way to control how much of the tubes sonic signature is imparted onto the sound than it is a way to control the gain of the amplifier.

No capacitors in the signal path. At Sparkos Labs, we always say that “the best capacitor, is no capacitor.” Thus, the Gemini does not have any coupling capacitors in the audio signal path. This is almost unheard of in tube designs, as virtually every tube circuit that exists will use a coupling capacitor to block the large DC voltages that exist on the tube plates and the cathode when coupling the audio signal out of the tube. We took a different approach, and used a novel cascode Wilson current mirror to couple the audio signal out of the tube. We then made use of a DC servo to strip off the bias current, and leave only the audio signal. So there is no need to agonize over the coupling capacitor, its type or value, because it does not exist inside the Gemini.

No Global Feedback. People like tubes because of the even order harmonics that they impart on the sound and that make up their sonic signature. We designed a tube hybrid amplifier, and we wanted the sonic signature of the tube to be evident. Feedback, while it totally has its merits, would serve to reduce the even order harmonics that the tube generates, reducing its impact on the overall sound. As such, we opted to have no global feedback inside the Gemini. Afterall, what would be the point of carefully imparting tube sonics into the signal, just to reduce them back down with feedback? This being said, the astute reader may be wondering how our SS2590 discrete op amps can operate without feedback, and, they don't. They have their own local feedback to set their gain as all op amp circuits require, but the tube portion and the amplifier as a whole do not have any global negative feedback.

Alps Blue Velvet volume control. The finest volume control in the industry with the best channel matching, the best feel, and the lowest noise. We evaluated several other volume controls from various other manufacturers, but we kept coming back to the Alps Blue Velvet. There are reasons why everyone uses these things, and why they cost so much.

Gain Button. There is a front panel gain button on the Gemini that will change the gain of the amplifier, and thus the perceived volume level by 10dB. The *real* purpose of the gain button, however, is to control how much of the tubes' sound signature will be evident in your listening experience. For example, if we are listening to music at our normal volume level, and then we drop the gain down using the gain button, but then

turn the volume back up with the volume control to the volume level that we started out with, there will now be 10dB more of the tubes' sonic signature imparted into the sound. The converse is also true. If we increase the gain, and then turn the volume back down to where it was, there will be 10dB less of the tubes sonic signature imparted on the sound. So the real purpose of the gain button is not to control the gain at all, but rather, to give you an easy way to customize and control your vacuum tube listening experience.

Warm Up Delay. Tubes take several seconds for their heaters to light and to begin flowing current, and to begin operating normally. The Gemini has a built-in delay at power up of about 30 seconds to allow this to happen. Thus, you won't hear any sound from the unit for about 30 seconds after powering it up.

Heater Soft Start. Tube heaters have a very low resistance when they are cold, and will draw 2 to 3 times the current when heating up that they will draw when they are up to temperature. This high current doesn't do the heater any favors, so we use a soft start circuit for the heater to ensure that they won't get dinged by a massive inrush current at startup. Just know that your multi hundred-dollar NOS tubes will be in good hands inside the Gemini, and will be treated with the care and delicate touch that they deserve.

Jumper Selectable Input Attenuator If you have some "hot" source gear that tends to be too loud once the volume control is moved past the 9:00 position, we have a fix for that. There is a built-in -15dB input attenuator that can be enabled by removing some jumpers that will cool off hot source equipment and give you a lot more room on the volume control. The Gemini is shipped with this attenuator disabled (Jumpers in). These jumpers can be removed to enable it if needed. See the section about the jumpers inside of the Gemini to see how to use it.

Output connectivity. The inclusion of both ¼ inch and 4 pin XLR headphone output connectors ensures compatibility with pretty much any headphone that you own, and eliminates the need for adapters. The RCA preamp outputs allow the Gemini to be used as a preamp to impart tube sonics into your system that runs speakers rather than headphones. The RCA outputs are down 12.5 dB from the headphone outputs, and they will be disabled when headphones are plugged into the ¼" headphone jack on the front of the unit. The RCA outputs can be used to allow the Gemini to drive power amplifiers and speaker systems in addition to headphones.

120 / 240V operation. The Gemini can run off of 120V AC wall power that is common in the United States, or 240V AC that is commonly used in Europe and elsewhere. Units will be configured for one or the other, and you must specify which AC power type you need when ordering.

Tube Rolling. This one is super fun. The Gemini can use 10 different tube types, and each one will give the unit different imaging, sound staging, dynamics, level of warmth, and overall sound. Tubes are identified by their number, and to complicate things, they tend to have a couple of different numbers that will reference the same tube. For example, the 6922 tube that comes stock with the Gemini is also known as an ECC88, and is sometimes called a 6DJ8. Then we can get into the different manufacturers of the same tube. For example, Electroharmonix and JnJ both make 6922 tubes, and this same tube from different manufactures will perform and sound slightly different. Then there are the NOS tubes (New Old Stock) which are tubes that were manufactured decades ago, but are still “new in the box.” NOS tubes were made back in the day by companies like Sylvania, Tung Sol, GE, Phillips, and so on. While these companies may still exist today, they are not still manufacturing these tubes anymore. You can still find them though, and due to their scarcity and having a fixed supply of them, they tend command a high price.

Below is a table of tube types and their alternate numbers that can be used inside the Gemini.

To facilitate rolling this many tubes in the Gemini, it was necessary to have two different configurations for powering their heater. There is a jumper inside the unit for this, and it must be set appropriately for the type of tube in use. These two jumpers are brilliantly called “Tube Type 1” and “Tube Type 2”.

Type one must be ran from a 6.3 volt power source, while type two can have their heaters configured in parallel for 6.3 volt operation, or put in series and ran from 12.6 volts. The heater supply inside the Gemini is always 6.3 volts, and the jumper configures the “Type 2” tubes to run their heaters in parallel.

Tube Type	Also Known as as	Jumper Config	Notes
6922	ECC88, 6DJ8	Type 1	This is the stock tube that the Gemini Comes with
12AX7	ECC83, ECC803S, 7025	Type 2	Popular guitar amplifier tube, lots of tube harmonics
12AT7	ECC81, 12AT7WC	Type 2	Similar to 12AX7 but biases harder and with more current
12AU7	ECC82, 6189, ECC802S	Type 2	Similar to the above two, but biases harder still. Has lower gain
12AY7	6072	Type 2	Similar to the above, but biases with less current
6AQ8	ECC85	Type 1	Originally an RF amplifier tube, odd order harmonic dominant at high volume
5751	--	Type 2	Similar to 12AX7 but with less gain
6CG7	--	Type 1	Old school vertical deflection amplifier for CRTs, slightly longer length
6N1	--	Type 1	Has a hot heater and lower harmonic levels
12BH7	--	Type 2	Popular in McIntosh amps, slightly longer length, mostly even order harmonics

Accessing the inside of the unit. If you are going to roll different tubes into the unit or play with any of the jumpers inside, you will need to take the cover off first. Just make sure to let the tube cool off a bit and unplug the unit from your wall power before doing this. Don't be a dumb ass.

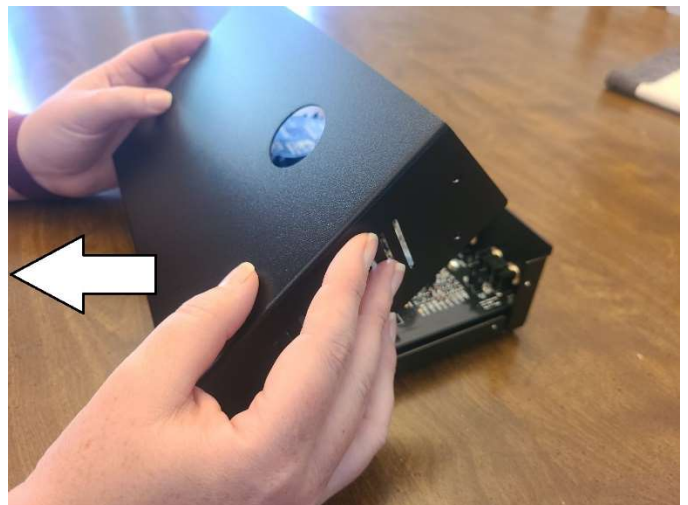
The first step is to remove the 6 screws that hold the cover onto the unit. There are 3 on each side. A plain old Phillips screwdriver will do the trick.



Next, gently lift up on the back end of the Gemini until the cover clears the tube to where it is no longer sticking out of the hole in the top of the unit.



Finally, slide the cover off towards you, being careful when clearing the volume knob on the front.



Internal Jumpers.

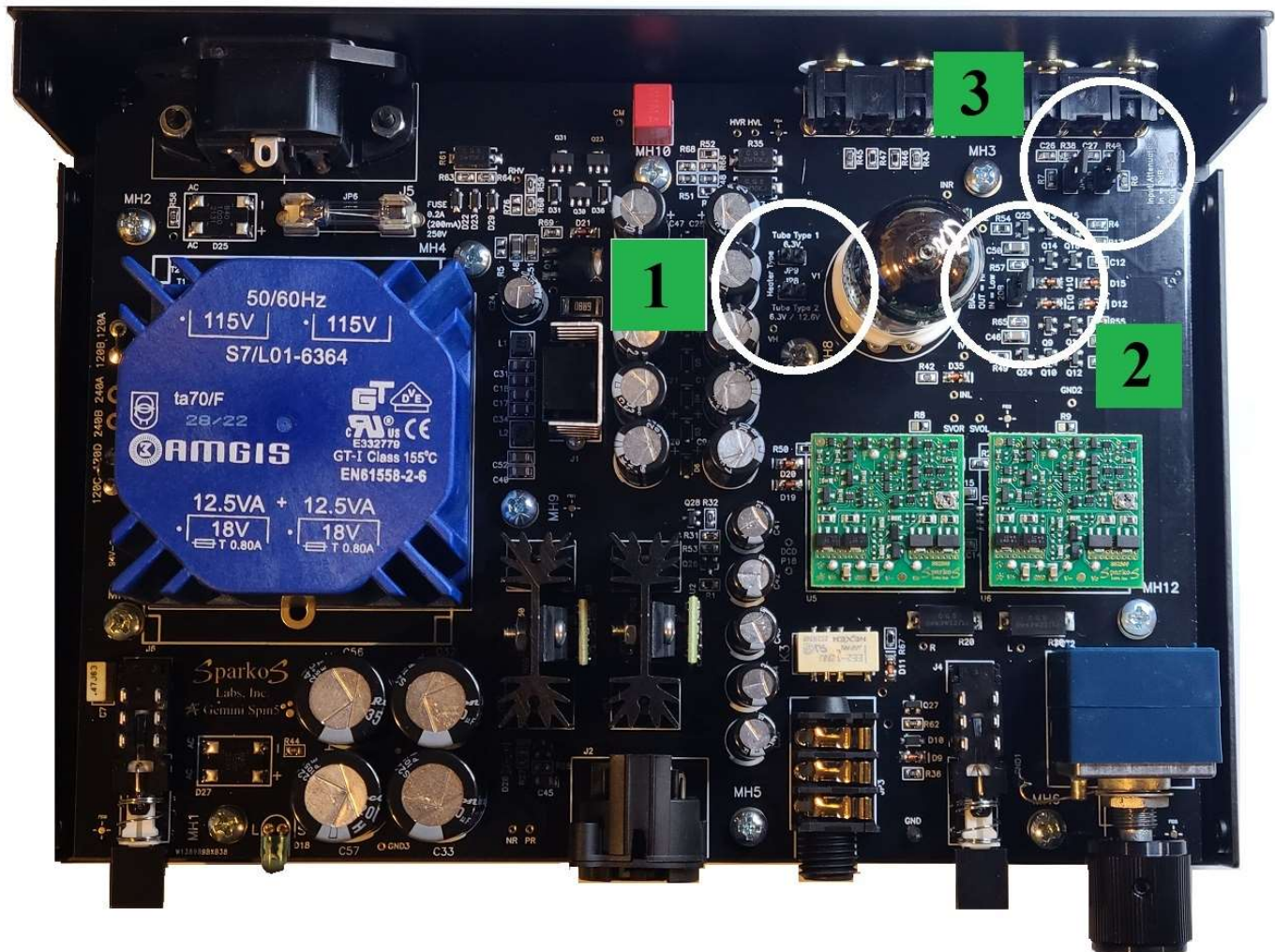
Below is what the inside of the Gemini will look like after removing the cover.

There are three sets of jumpers inside the unit that can be set by the user.

The Jumper set that is marked as #1 is the Tube Heater Type Jumper, and it will only be used if you are tube rolling different tube types into the Gemini.

The jumper marked as #2 will control the tube bias point, and can be used to tailor how much of the tubes unique sonic signature will be imparted onto the sound.

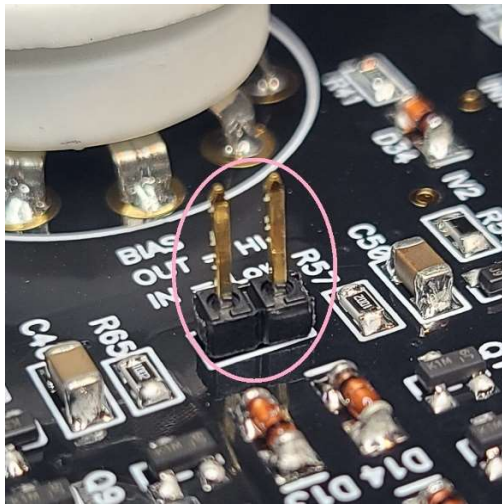
The jumper set marked #3 is an input attenuator that can be used to give you more range on the volume control.



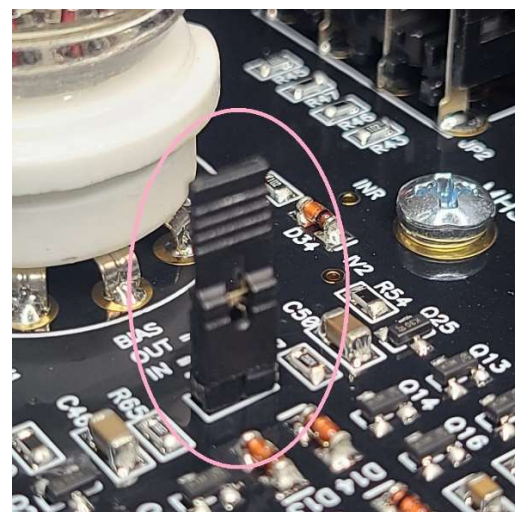
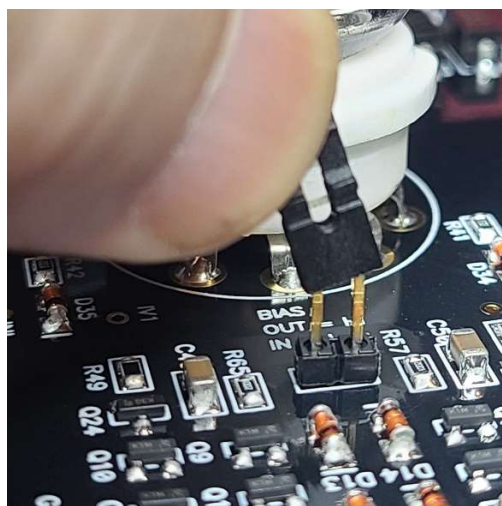
How Jumpers work.

If you are unfamiliar with jumpers, this explains what they are and how they work.

Jumpers provide a means to connect things together (or not) inside the Gemini to control how it is configured, and how it will sound. Below on the left is the bias current jumper, (Jumper #2) inside the pink circle and will be used in this example. It has two gold metal posts that can be connected together by using a jumper cap, pictured below on the right. If the jumper cap on the right were to be installed onto the posts on the left, then the two posts would be electrically connected together, and the jumper would be said to be "in".

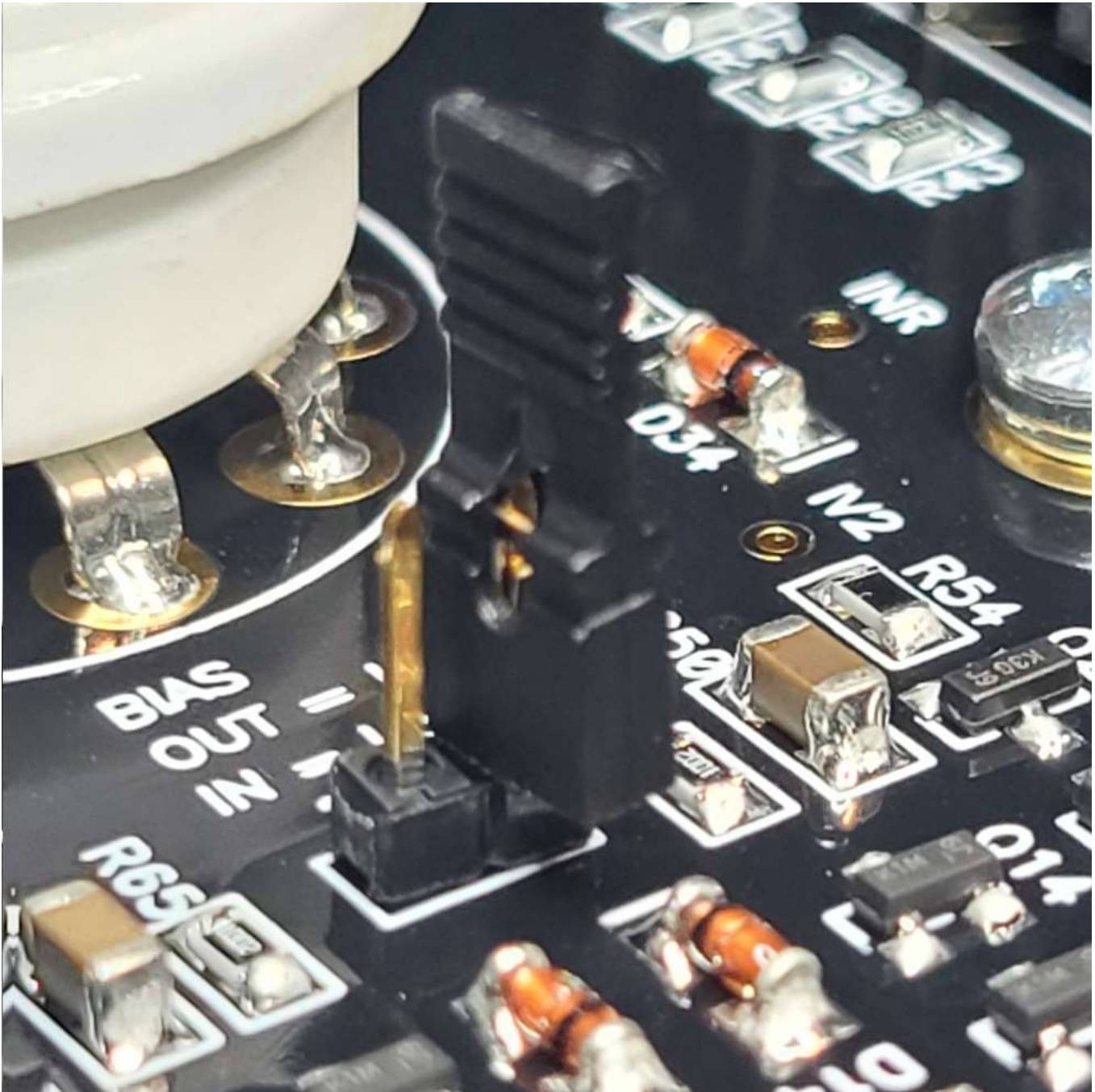


It's as simple as putting the jumper cap onto the posts as shown below on the left, and when the jumper cap is fully installed, (called jumper "in") it will look like the picture below on the right.

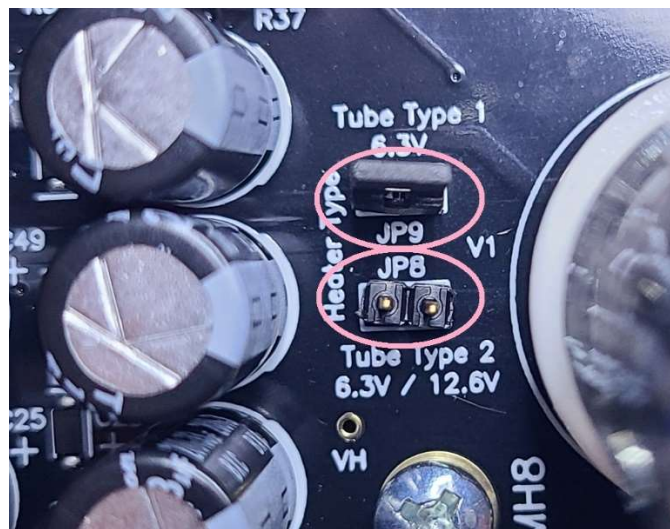


Pro tip about jumpers. When you are not using the jumper cap (this is called as the jumper being “out”) you can store it by putting it onto ONLY ONE of the jumper posts as pictured below. This way, it will always be right where you expect it to be if you decide to use it.

Otherwise, if you are like me, those little things would get lost immediately.



Jumper Set #1 – Tube Heater Type Jumper



You can roll all types of dual triode tubes into the Gemini. The tube type jumper must be set appropriately depending on which tube type is being used.

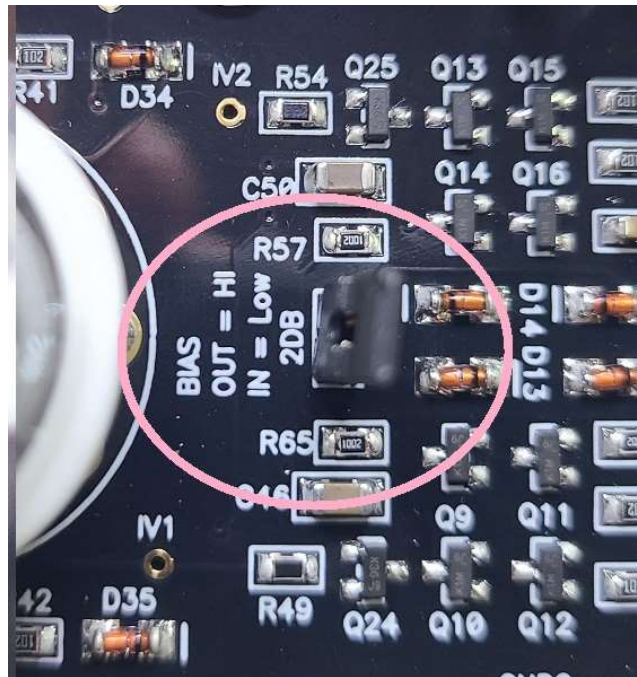
Since the Gemini uses a 6922 tube in its stock configuration, the jumper will be factory set to Tube Type One as shown in the above picture. If you start rolling tubes and find that the heaters don't light, or only one channel is lit and working and the other channel is not, then you will need to move the jumper to the other location.

It won't hurt anything if the jumper is set to the wrong tube heater type. But whatever you do, **DO NOT INSTALL A JUMPER CAP INTO BOTH OF THE TUBE TYPE LOCATIONS AT THE SAME TIME**. You can only have a jumper cap installed for type 1 OR type 2, but **NEVER BOTH** as this would short out the heater power supply.

Below is a table of tube types that can be used, and their required jumper configuration.

Tube Type	Also Known as	Jumper Config
6922	ECC88, 6DJ8	Type 1
12AX7	ECC83, ECC803S, 7025	Type 2
12AT7	ECC81, 12AT7WC	Type 2
12AU7	ECC82, 6189, ECC802S	Type 2
12AY7	6072	Type 2
6AQ8	ECC85	Type 1
5751	--	Type 2
6CG7	--	Type 1
6N1	--	Type 1
12BH7	--	Type 2

Jumper Set #2 – Tube Bias Current

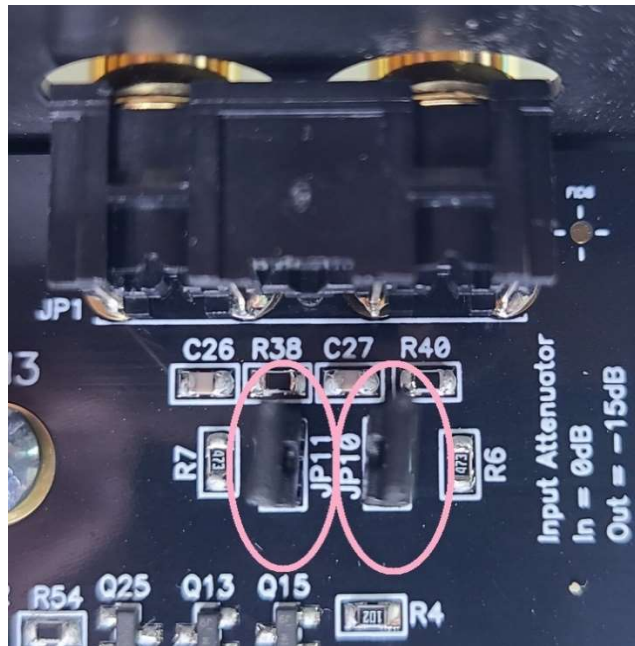


This is a fun little jumper to change the operating point and bias current of the tube, which will cause the tube to impart more or less of its' sonic signature. Low bias imparts more, and high bias imparts less. Around here, we like High Bias mode for the 6922 tube that the Gemini comes with, so that is how it will be initially set, even though the photo above is with the "Jumper In" which would set low bias mode.

It has an effect similar to the gain button, but without actually changing the gain.

As mentioned, this jumper won't affect the volume level that you will get from the unit like the gain button does, but it can be thought of as defining for the tube what "work" even means in the first place.

Jumper Set #3 – Input Attenuator



Have you ever had the problem where your source gear has a massive output signal, and once the volume control on your headphone amp is past the 9:00 position that it's already too loud? Or, it could be that you are using some super sensitive headphones or IEM's that get too loud too quickly as you turn up the volume on them?

Well, we have a fix for that. A built-in jumper selectable input attenuator.

This attenuator will knock down hot source equipment by 15dB if you pull those two jumpers. One is for the right channel, and the other is for the left. The Gemini is shipped with those jumpers installed, which means that the attenuator will not be active.

Notes: