



**Permalloy
Type 50
Amplifier**



The EMIA Permalloy Amplifier is an all-triode, two-stage, transformer-coupled, single-ended amplifier comprising three chassis. Each side chassis contains the last stage of the high voltage filter, the filament regulation, and the entire signal amplification circuit. The shared center chassis contains the the power transformers and first filter stages for both driver and output stage high voltage as well as both driver and output filament supplies.

Before detailing the operation information, safety procedures must be clarified:

WARNING!

This amplifier operates at *lethal* voltages. Do not ever reach under the amplifier or even move it unless it has been unplugged from the wall for a full two minutes. Reread this paragraph. Make sure your family understands this. It was common knowledge in the early 1900's. We have lost this knowledge. Let us revive this and other wonderful things from the past.

Initial Setup and Operation:

___ Do not insert the power-cord yet! After unpacking, we will first connect the umbilicals with a push and twist and then insert the tubes. The power supply tubes (6DM4 or 6DA4) are already inserted and are inside the power supply chassis. The signal tubes consist of a driver tube and an output tube. The driver tube is always type 5608. This tube goes into the front socket.



One very important note about the 5608. It has come to our attention that certain 5608 labeled "Flameatrol" have had a external straps applied between two pins. You must disconnect this strap by either unsoldering it or cutting it out with nippers or snips before use in the EMIA Amplifier.

___ Next we will determine which output tubes to use and also determine what impedance to reflect to the tubes. The output stage will accept both the type 300b and the type 50. The amplifier produces approximately two watts with the type fifty and approximately eight watts with the type 300b. Please choose which tube you would like to use and insert it into the socket. The switch on the rear of the power supply must now be flipped to match the chosen tube. This is a locking switch, so it must be pulled out slightly before switching settings. (Please note Dave has already made his choice in the photo below.)



___ Next we must select the impedance we would like to reflect to the output tubes. This is different than just selecting the secondary impedance to match your speaker. The output transformers have been wound with a secondary [S] and a tertiary winding [T]. These windings are clearly labeled on the rear of the amplifier. The secondary winding, for the sake of explanation, can be thought of as twelve Ohms. Similarly, the tertiary winding can be thought of as four Ohms. If S and T are added in series we will get sixteen Ohms. If we reverse T, then the series connection will be S minus T, or eight Ohms. However, now we must look at the load presented to the output tubes. The easiest way is to use examples. If we use an eight ohm speaker on just the S windings,



with no connection to the T windings at all, then the reflected load is 5k Ohms to the output tube, or a turns ratio of 25:1. This impedance will actually work with both the 300b and the 50. However, the 300b power will be slightly lower, and the 50 will have to work a bit more. Listening is very important. If the T winding is connected in reverse polarity, then the turns ratio will be highest at 33.3:1 and therefore reflect just under 9k to the tube. If your speakers are efficient enough, this is my preferred setting for the 50 and an 8 Ohm speaker. If the windings are added in series, then the ratio is 20:1 for a reflected load of 3200 Ohms.

This load is too low for a 50, but will extract maximum power from the 300b. Please see the following chart for reflected impedances.

windings	S+, S-	S+, S- to T+, T-	S+, S- to T-, T+
ratio	25:1	20:1	33.3:1
16 Ohm	10,000	6400	18,000
8 Ohm	5000	3200	9000
4 Ohm	2500	1600	4500

___ Next insert the incoming and outgoing RCA cables and speaker cables.

___ Verify that the front power switch and the rear main power switch are in the off position. Insert the power cord. Note that the fuse (?A) is located under the middle of this IEC. (picture needed)



The front power switch will be used for daily operation. We only recommend turning off the rear IEC power toggle when leaving the unit for extended periods of time.

___ It is now time to turn the unit on. Verify that all upstream components are powered on and the volume muted. Flip both switches to the up/on position now. You should see the filaments of the signal tubes turn their dull orange. The high Voltage is slow to come up due to the long, slow action of the 6DA4 damper diodes. Before we jump to playing music, we need to verify the filament Voltages of the

output tubes. They should already be close, but every time you try a new tube, you should verify the voltage. The two Teflon test probes are on the top plate of each signal chassis. With your meter set to DC Volts, insert probes into the ports and note the voltage. If it needs adjusting, please insert a small straight screwdriver into the adjustment port and adjust. Note that the filaments are current regulated, so the final Voltage takes more than just a few seconds to settle.

Random things:

Please note that you should always turn your system on from front to back, i.e., CD player, then preamplifier, then power amplifier. The shutdown sequence will be exactly the opposite. This prevents your speakers from getting any damaging spikes or



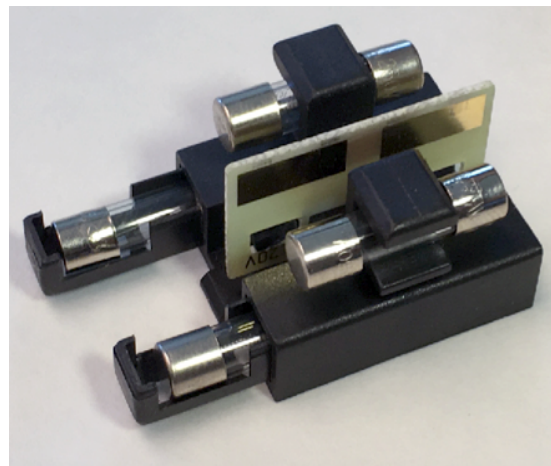
pulses from any power supplies. It is another one of those forgotten lessons of yesteryear.

Tube rolling:

When tube rolling, turn the amplifier off and wait a full two minutes before switching tubes. This is done for two reasons. One, the amplifier power supply must fully drain to avoid any shock hazard, and two, the filaments of the tubes must cool down. The tubes are very fragile until they have cooled. Once cool, they are actually quite robust, but please be careful with those seventy five-year-old beauties.

Fuse holder:

The fuse holder is in the middle of the IEC inlet. It is accessed with a small flat blade screwdriver as shown in the photo below:



The fuse type is 5x20mm 2at. Spares are held inside the slide out compartment.

I think that is all... Enjoy!... and please give lots of feedback... it is how we progress!

With sincere gratitude,

Jeffrey and Dave

Specifications

Single-ended stereo amplifier
Three chassis design
Transformer coupled circuit topology
Directly heated triode output tubes - type 50 or 300b
Indirectly heated triode driver tubes - type 5608
Nickel (Permalloy) driver transformers
Nickel (Permalloy) output transformers
Five discrete choke input power supplies
Dumper diode rectifier tubes - type 6DA4
Nickel (permalloy) power supply chokes
Silver internal wiring and connectors
Silver wound output transformers
Silver wound coupling transformers

Input impedance: 100k Ohms

Input Voltage: 220Vac only

Power output: 2 or 8 watts

Gain: varies with tube selection and transformer taps

Residual noise: <1mV