

## PM-400 DRAKE L-4/L-4B/L-7 REPLACEMENT POWER SUPPLY MODULE v4.1 ASSEMBLY & INSTALLATION INSTRUCTIONS

**WARNING: Voltages inside the amplifier CAN & WILL KILL YOU! You MUST know how to work around HIGH VOLTAGE safely. If you do not, get assistance from someone who does. You MUST also be able to read your specific amplifier schematic and understand the design, theory and wiring of your amplifier to properly perform this upgrade.**

### PM-400 POWER SUPPLY MODULE ASSEMBLY

- ( ) **Read, re-read and fully understand these instructions prior to beginning this upgrade.** Make sure to perform the steps in the order they are listed. Also, be sure to label wires as they are disconnected from various points inside the amplifier. This will help when the time comes to re-attach the wires that will be disconnected during installation of the kit.
- ( ) Go through the Bill of Materials (BOM) and compare that list with the parts in the kit to make sure all parts are present. If you are missing any parts, please contact Harbach Electronics, LLC.
- ( ) Assemble the PM-400 according to the parts layout diagram and silkscreen on the printed circuit board (PCB). A suggested assembly sequence is diodes D1-D14 (**pay attention to polarity**), followed by resistors R1-R8 first and finally electrolytic capacitors C1-C8 (**pay attention to polarity**). **NOTE: Resistors R1-R8 MUST be spaced approximately ¼" above the PC board for proper heat dissipation. Use any kind of spacer you have, but make sure the bodies of the resistors are above the PCB!**

### PM-400 POWER SUPPLY MODULE INSTALLATION

- ( ) **Be sure that all high voltage has been properly bled to ground before removing any covers or putting your hands inside the amplifier. You CAN BE KILLED by the high voltages inside this equipment!**
- ( ) Unplug the power cord from the mains outlet and unplug the supply from the amplifier (both the heavy control cable and the HV line). Place the power supply on the bench in front of you. You are now ready to proceed with the assembly (if required) and installation.
- ( ) Remove the bottom cover of the power supply.

Note: The wire colors described in these instructions are for an original unmodified power supply. Some or all of the wires may have been replaced with different colored wires in your particular supply over the years. Make sure to verify you are working with the correct wires as shown on the power supply schematic.

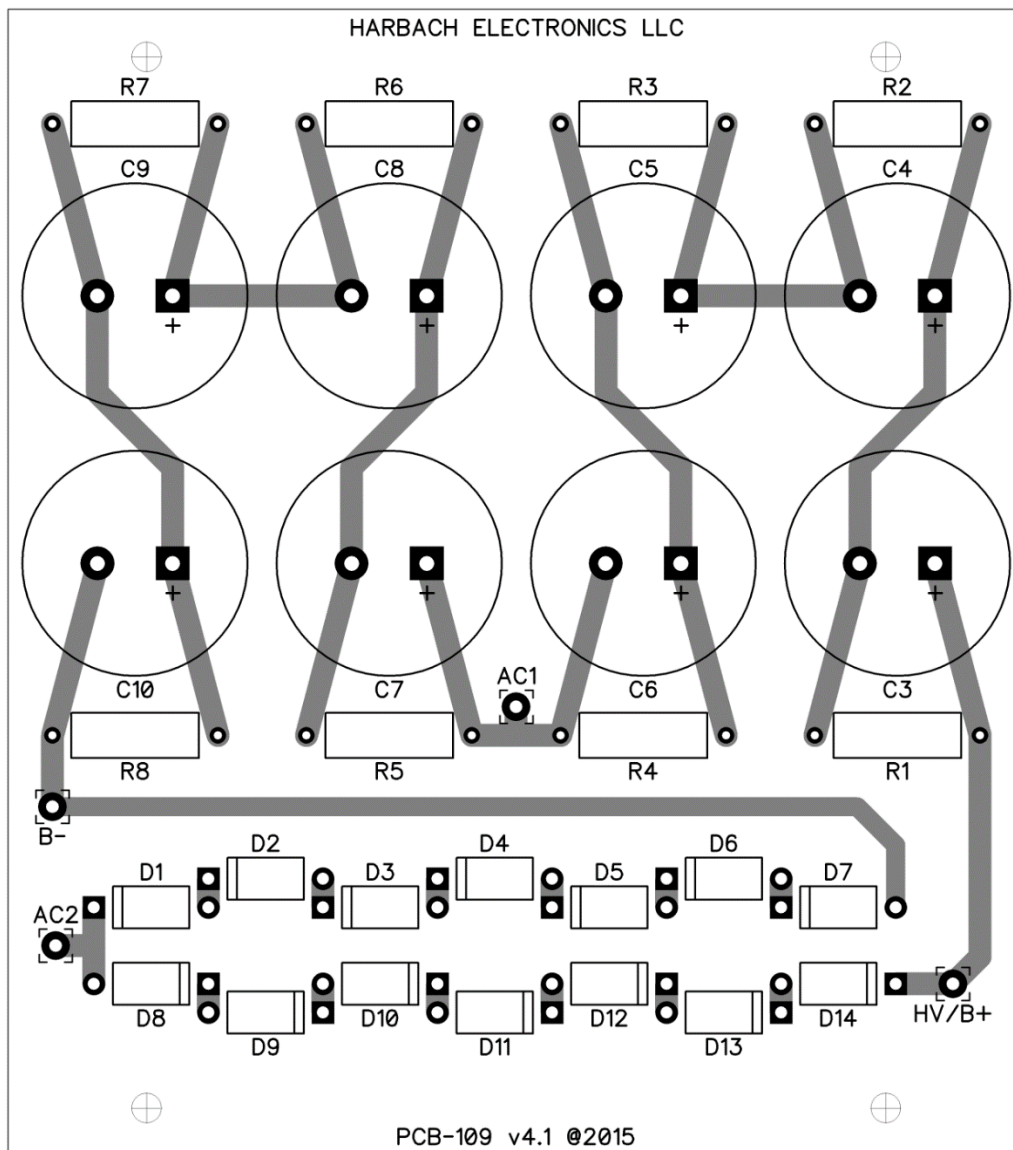
- ( ) Remove the bottom cover of the power supply.
- ( ) Remove the 2 primary AC power leads from the terminal strip. Also remove the AC ground (green wire) from the ground lug next to the terminal strip.
- ( ) Remove the power supply cover and AC line cord together. You do not need to remove the strain relief from the top cover!

- (\_) **MOST IMPORTANT: Use a shorting stick or large screw driver to short out the HV supply before you do ANY work inside the power supply cabinet!!!**
- (\_) Unsolder or clip the wires that are **DIRECTLY** attached to the original diode/capacitor boards. If you clip the wires, do so at the point where they attach to the boards. Leave all other components intact.
- (\_) Carefully remove each original diode/capacitor board. They will slide out, but may need a little help. On the end with the ceramic insulator, in order to assist with board removal, you may back out the large screws under the chassis that anchor voltage selector/transformer wiring terminal strip. Once the diode/capacitor board is out, don't forget to re-tighten the screws!
- (\_) Remove the small **RED** and **BLACK** wires that were attached to the boards (they also run under the chassis). Save the small **RED** wire, it will be used later.
- (\_) Remove the mounting brackets from one of the original diode/capacitor boards. Mount these brackets on the assembled PM-400 board using 4 of the 6 screws you removed. Sandwich the piece of fish paper between the assembled PCB and the mounting brackets.
- (\_) Mount the assembled PM-400 inside the power supply in the end of the chassis with the 2 **RED** secondary wires coming out of the transformer. The assembled PCB should be mounted such that the square solder pad labeled "**HV B+**" is closest to the serial number stamp on the chassis.
- (\_) **Be sure the wire you are about to solder does not protrude or poke through the fish paper on the backside of the PCB.** Solder the shorter of the two **RED** transformer secondary leads to the square pad labeled "**AC1**" on the component side of the PCB.
- (\_) **Be sure the wire you are about to solder does not protrude or poke through the fish paper on the backside of the PCB.** Solder the longer **RED** transformer secondary lead to the square pad labeled "**AC2**" on the component side of the PCB.
- (\_) **Be sure the wire you are about to solder does not protrude or poke through the fish paper on the backside of the PCB.** Solder the **LARGE RED HV** wire to the square pad labeled "**HV B+**" on the component side of the PCB.
- (\_) **Be sure the wire you are about to solder does not protrude or poke through the fish paper on the backside of the PCB.** Using the small **RED** wire saved earlier; solder one end to the pad labeled "**B-**" on the component side of the PCB.
- (\_) **Be sure to check one more time that the wires you just soldered to the board DO NOT protrude through the fish paper on the back of the assembled PCB.**
- (\_) Route the other end of the small **RED** wire through the chassis (through the grommet with the very small wire going through it), under the circuit breakers over to the 3-terminal strip with the **GREEN, ORANGE** and **YELLOW** wires from the main amplifier cable attached to it.
- (\_) Solder the **RED** wire to the terminal with the **YELLOW** wire attached to it. Note: There is also a small **WHITE/BLUE** wire (goes to the 50K resistor) and a small **WHITE** wire attached to this terminal. Unsolder or clip the small **WHITE** wire and discard (it was clipped at the other end when the old diode/capacitor boards were removed). Do nothing with the small **WHITE/BLUE** wire.
- (\_) **Recheck your soldering and wiring at this point!!!**

- ( ) Replace the top cover of the supply. Be sure to feed the AC main wires back through the hole in the chassis and re-connect them to the AC terminal strip under the chassis.
- ( ) Replace the bottom cover of the power supply.
- ( ) Reconnect the power supply to the amplifier.

This completes the installation of the PM-400 replacement power supply module. Through the use of modern components and design, the upgraded power supply will provide you with additional years of reliable service from your Drake L-4/L-4B/L-7 HF amplifier.

### PM-400 POWER SUPPLY MODULE PCB PARTS LAYOUT (PCB-109)



### PM-400 BILL OF MATERIALS (BOM)

Verification	Part Number	Quantity	Description	Designation
[ ]	FP-400	1	5.3" x 6" Insulating Fish Paper	N/A
[ ]	PCB-109	1	PM-400 Power Supply PCB v4.1	N/A
[ ]	CAP-111	8	220 $\mu$ F 450 VDC Electrolytic Capacitor	C3-C10
[ ]	DIO-102	14	3A 1000 PIV Diode (1N5408)	D1-D14
[ ]	RES-101	8	100K $\Omega$ 3W Resistor	R1-R8

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