

# FB-220 FILTER CAPACITOR BLOCK v3.1 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.**

## FB-220 FILTER CAPACITOR BLOCK 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.
- ( ) Solder diodes and resistors to the top (silk screened) side of the printed circuit board (PCB) according to parts layout diagram and silk screen on the top of the PCB. **Note: Diodes D23-D30 mount flat to the PCB and resistors R12-R19 must be raised above the PCB, but no more than ¼” above the PCB to allow for proper air circulation and cooling.** Trim the component leads flush on the bottom side of the PCB.
- ( ) Press the electrolytic capacitors through both sets of plastic holders one capacitor at a time. Note proper orientation so they match the positive/negative pads on the PCB. The positive pads are marked with a “+”.

**NOTE: Depending on the thickness of the plastic coating on the electrolytic capacitors, you may have to enlarge the inner diameter of the holes slightly using a razor blade or razor knife. You should remove only enough from the inner diameter so that the capacitors fit very snugly.** The plastic holders should be spaced so that the bottom holder is approximately 1” from the bottom of the capacitors and the top holder is approximately 2-1/2” above the bottom spacer. You may use a few beads of hot melt glue to affix the holders to the capacitors, but this is not required.

- ( ) Mount the assembled PCB to the top of the electrolytic capacitors using thirteen (13) #10-32 x 3/8” SEMS screws (screws with the integral lock washer). **The capacitors mount on the bottom side of the PCB. Use one (1) regular #10-32 x 3/8” screws (non-SEMS) and one (1) #10 bent solder lug for the holes marked L1 B+, L2 AC and L3 B-.**

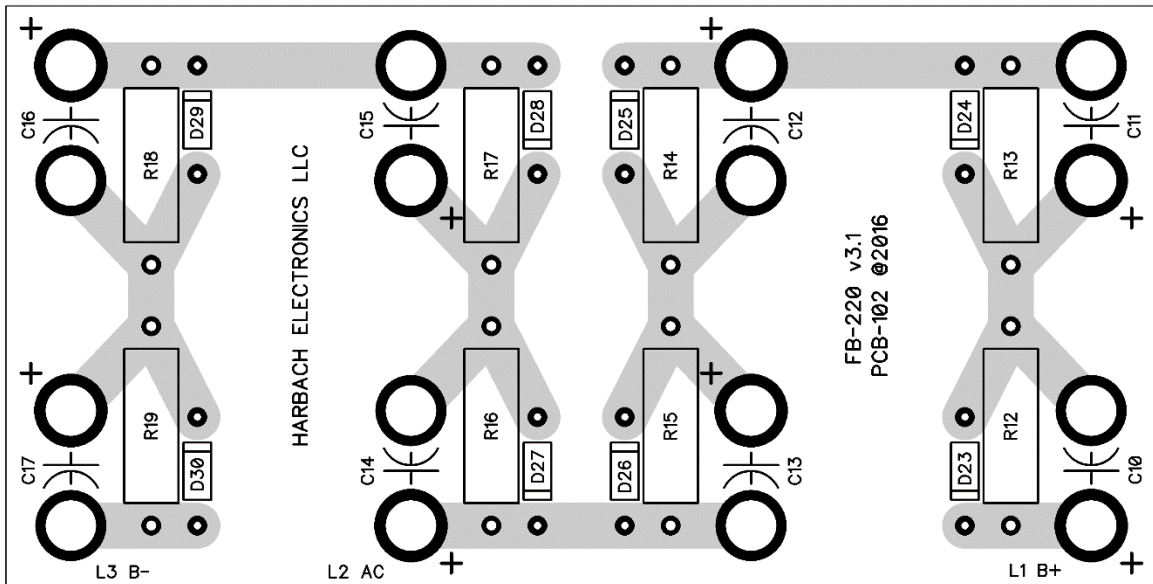
## FB-220 FILTER CAPACITOR BLOCK INSTALLATION

- ( ) Unplug the amplifier power cord from the AC mains and let any high voltage stored in the electrolytic capacitors bleed down. Verify the HV has bled down as shown on the HV meter. Place the amplifier on a book, front panel up, and remove the bottom screws holding the feet and case in place.
- ( ) Remove the 15 sheet metal screws that hold the perforated cover in place and remove the perforated cover along with the top rear plate cover.

- ( ) Use a shorting bar or “chicken stick” to short the HV to ground to make sure any high voltage is completely bled off from the electrolytic capacitors.
- ( ) Remove the top rear #6-32 screw, nut and washer holding the right side panel in place along with the 4 sheet metal screws that attach the right side panel to the chassis.
- ( ) Remove the top front Phillips-head screw on the right side of the front panel. This will release the right side panel for removal.
- ( ) Tip the amplifier onto its left side.
- ( ) Unsolder and label the three (3) wires attached to the old filter capacitor block. There is a **BLACK** wire from the rectifier/metering board, a **BLUE** wire also from the rectifier/metering board and a **RED & YELLOW** wire from the HV transformer.
- ( ) Remove the (4) #6-32 nuts and washers securing the filter capacitor bank support bracket. Now lift the bracket up about ½”.
- ( ) Remove the old filter capacitor block assembly. This task can be made easier by cutting some of the wires between the capacitors (they are no longer needed).
- ( ) Insert the new filter capacitor block assembly into the cavity with the solder lugs pointing toward the front panel. **Make sure that you fully slide the block to the rear of the cavity. Now, slide the assembly approximately 1/16” out of the cavity.**
- ( ) Press down on the capacitor bank bracket and reinstall the (4) #6-32 nuts and washers. Depending on the tolerances of the bracket, you may have to leave off the washers. Tighten the nuts securely.
- ( ) Re-attached and solder the 3 wires removed earlier; the **BLUE** wire to the bottom solder lug at hole **L1 B+**, the **RED & YELLOW** wire to the middle solder lug at hole **L2 AC** and the **BLACK** wire to the top solder lug at hole **L3 B-**.
- ( ) Place the right side panel in position and secure with the 4 sheet metal screws removed earlier.
- ( ) Reinstall the top front Phillips-head screw on the right side of the front panel and tighten and reinstall the #6-32 screw, nut and washer in the top rear of the back panel.
- ( ) Replace the perforated cover and top rear plate cover. Reinstall the 15 sheet metal screws holding these pieces in place. **DO NOT** over tighten these screws, as it is fairly easy to strip the screw threads in the aluminum underneath.
- ( ) Reinstall the case and feet using a book to support the amplifier.

This completes the installation of the FB-220 filter capacitor block. It will provide you with a better power supply that provides the necessary B+ filtering and regulation. Your amplifier should not experience any filtering problems in the future.

## FB-220 FILTER CAPACITOR BLOCK PCB PARTS LAYOUT (PCB-102)



### FB-220 BILL OF MATERIALS (BOM)

Verification	Part Number	Quantity	Description	Designation
[ ]	PCB-102	1	FB-220 Filter Capacitor PCB v3.1	N/A
[ ]	ERG-3SJ104	8	100KΩ 3W Resistor	R12-R19
[ ]	DCM211T450AC2B	8	210μF 450 VDC Electrolytic Capacitor	C10-C16
[ ]	SPA-101	2	8-Hole Plastic Support Frames	N/A
[ ]	1N4005	8	1A 400 PIV Diode	D23-D30
[ ]	SCR-101	13	#10-32 x 3/8" SEMS Screw	N/A
[ ]	SCR-109	3	#10-32 x 3/8" Non-SEMS Screw	N/A
[ ]	LUG-101	3	#10 Bent Solder Lug	L1-L3

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