# PM-2500 REPLACEMENT POWER SUPPLY MODULE v3.1
# INSTALLATION INSTRUCTIONS

***WARNING: This upgrade is not for the faint of heart or inexperienced in amplifier theory and repairs as the complexity and details involved with this upgrade are extensive! Also, voltages inside the amplifier CAN & WILL KILL YOU! You MUST be able to read your specific amplifier schematic and understand the design, theory and wiring of your amplifier to properly perform this upgrade. You MUST also know how to work around HIGH VOLTAGE safely. If you do not, get assistance from someone who does.***

**ASSEMBLY & INSTALLATION**

( ) **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 all the wires that will be disconnected during installation of the kit.

**NOTE: The original wires in the amplifier are old and are often corroded and dirty. The wires MUST be properly tinned to make a good electrical connection when soldering to the new printed circuit boards (PCBs). Use a good quality flux to aid in tinning the ends of the wires prior to soldering to the new PCBs. All of the wires will be long enough to clip off the old end to start with a fresh end to strip, twist and tin.**

**NOTE: Some later production MLA-2500B's had a production change in the ALC wiring. If your model MLA-2500B has this change, there will be no wires at locations 1B and 3B on the rectifier/timer PCB. This does not affect installation of the kit; you just have 2 fewer wires to deal with during removal of the original PCB and installation of the new PCB.**

( ) 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 a part, please contact Harbach Electronics, LLC.

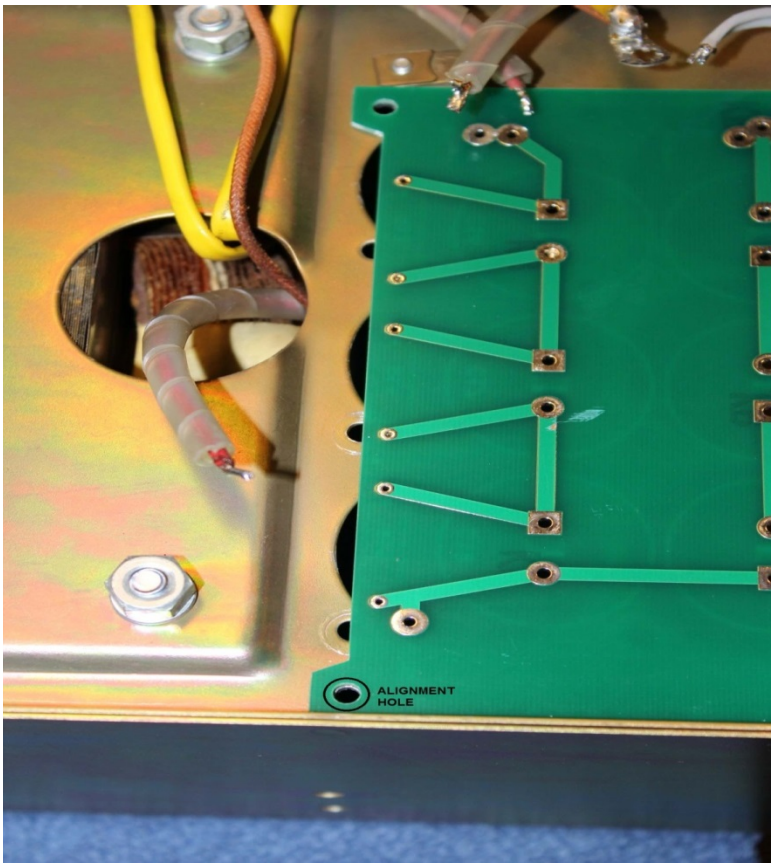
( ) Unplug the amplifier power cord from the mains outlet and let any high voltage stored in the electrolytic capacitors bleed down. Verify the HV has bled down and then remove the top cover and use a shorting bar or "chicken stick" to short the HV to ground to make sure any high voltage is completely bled off. Install a TAG on the power plug as a reminder that the unit is under modification, if desired. Remove the tubes, the thermal delay, and the relay from the old rectifier/timer PCB. Store the tubes in a secure area away from the workbench. Remove the bottom cover.

( ) Turn the amplifier over and remove the following wires from the filter capacitor PCB : three (3) wires at the B- connection point (MLA-2500) or two (2) wires at the B- connection point (MLA-2500B); two (2) wires at the B+ connection point (both models); and one (1) HV wire from the transformer connection point (MLA-2500) or one (1) wire from the SSB/CW relay (RLY4) (MLA-2500B) at the transformer connection point. See the sheet entitled "PM-2500 WIRE CONNECTION TABLE" for a listing of wires and connections. **Note: If you do not label these wires correctly, you will make a lot of extra work for yourself later.**

**I have attempted to list the most commonly used wire colors in the wire connection table, but Dentron was notorious for using different wire colors between amplifiers and using any wire color available at the time of assembly. That is why it is extremely important to label the wires carefully.**

( ) Remove the old filter capacitors and bleeder resistors. Remove the filter capacitor mounting hardware as well. If you drill out the old fasteners take care to prevent metal shavings from getting into the amplifier. When complete, there should be six (6) large and twelve (12) small holes in the chassis where the old filter capacitors were mounted assuming the amplifier has not been previously modified.

( ) Use the new filter capacitor PCB (PC-250F) as a template to mark the new mounting holes. Turn the amp upside down. Turn the PCB upside down and place it over the 6 large holes in the chassis. Make sure the right edge of the filter capacitor PCB (closest to the words “ALIGNMENT HOLE” silk screened on the bottom of the new PCB) is flush against the right side of the chassis. Use the mounting hole on the new PCB with a circle around it and the words “ALIGNMENT HOLE” as a guide to align the PCB mounting holes with the existing mounting holes. Mark and center-punch the 4 corner mounting holes. Once drilled the new mounting holes should be in line with the old rivet holes.

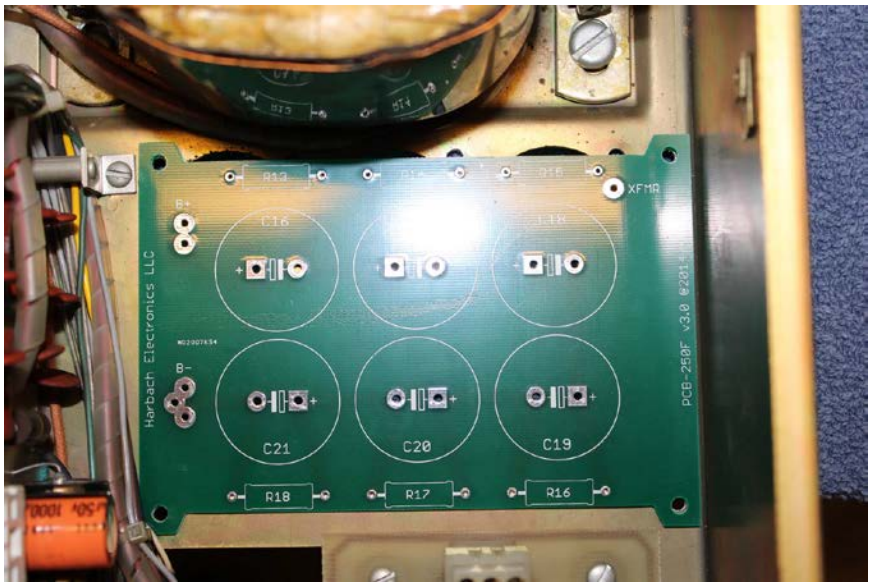



( ) Remove the new filter capacitor PCB. Apply two strips of adhesive tape to the INTERIOR side of the chassis where the new holes are to be drilled. The tape will capture most, but not all, of the metal shavings when drilling the mounting holes.

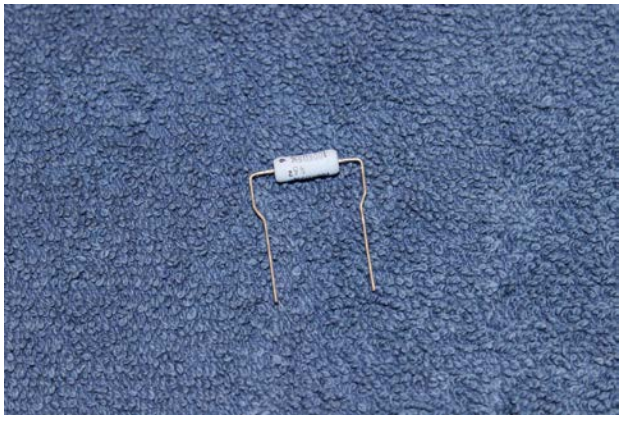
( ) Before drilling the new holes place a wooden stick between the new hole locations and any existing wiring to hold the wiring out of the way when the drill penetrates the chassis.

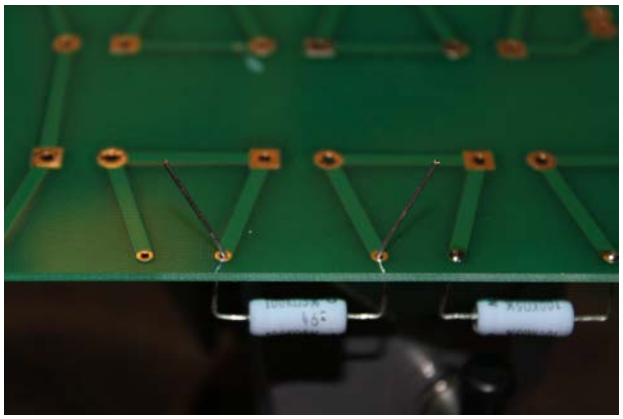
( ) Drill the four (4) mounting holes using a 9/64” drill bit.

( ) Turn the amplifier right side up and lay the new filter capacitor PCB over the new mounting holes. Check that the edge of the PCB has adequate clearance from the transformer winding. The transformer mounting tabs are slotted. If it is necessary to obtain clearance for the new filter capacitor PCB, loosen the four transformer mounting bolt and adjust the position of the transformer and re-tighten the transformer mounting bolts.




( ) Assemble the new filter capacitor PCB according to the parts layout diagram and silkscreen on the PCB. A suggested assembly sequence is resistors R13-R18 followed by electrolytic capacitors C16-C21 **(pay attention to polarity; the square solder pad or a pad marked with a "+" is for the positive terminal of the capacitor). The negative terminal of the capacitors is marked with a stripe down the side of the body of the capacitor**. **NOTE: Resistors R13-R18 MUST be spaced approximately ¼" above the PCB for proper heat dissipation.** A recommended method of spacing the resistors is to form the leads and install them as shown.



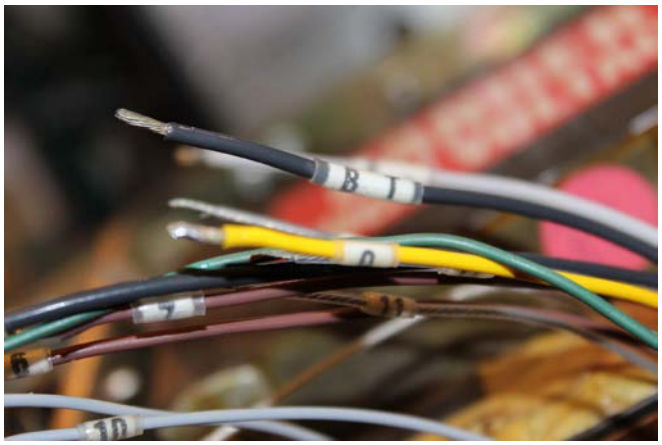


( ) Temporarily install the completed filter capacitor PCB on the top of the chassis over the old filter capacitor mounting holes in the new mounting holes using four (4) 0.025" x 0.500" aluminum hex spacers and eight (8) #6-32 x 0.25" screws. Once the spacers are aligned remove the new filter capacitor PCB and set it aside. It will be installed after the rectifier/timer PCB is replaced.

( ) Turn the amplifier right side up and remove the two (2) #6-32 screws that attach the rectifier/timer PCB to the chassis. Save these screws as they will be re-used.

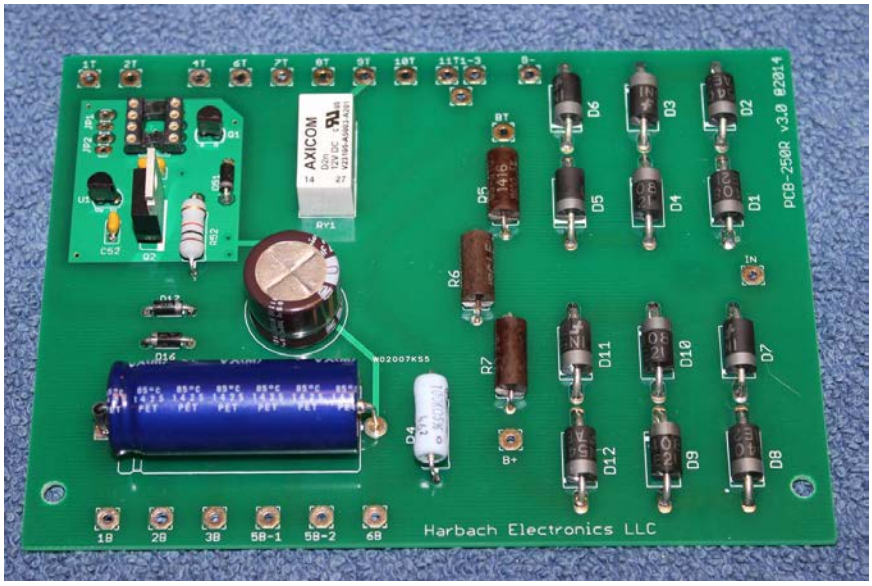
( ) Unsolder or clip, verify and label all wires from the original rectifier/timer PCB one at a time. See the sheet entitled “PM-2500 WIRE CONNECTION TABLE” for a listing of wires and connections. **Note: If you do not label these wires correctly, you will make a lot of extra work for yourself later! A recommended method of marking is the use of wire marker tape and a short section of clear heat shrink tubing. Remove and mark each wire one wire at a time.**

**I have attempted to list the most commonly used wire colors in the wire connection table, but Dentron was notorious for using different wire colors between amplifiers and using any wire color available at the time of assembly. That is why it is extremely important to label the wires carefully.**

( ) Once all of the wires have been removed from the original rectifier/timer PCB, remove the original rectifier/timer PCB from the amplifier. Remove and save the mounting hardware.

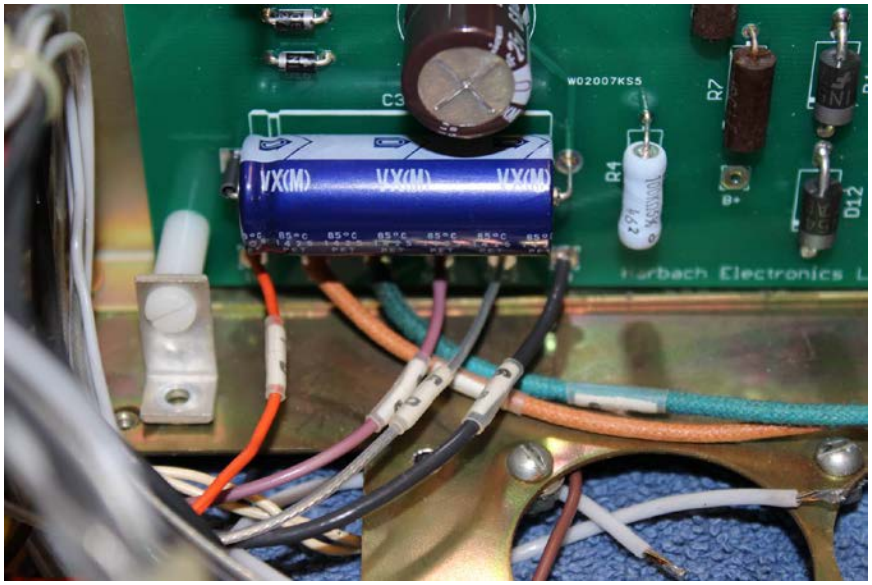
( ) Assemble the new rectifier/timer PCB according to the parts layout diagram and silkscreen on the PCB. **Do not install the 8-pin microcontroller IC U1 into the socket.** Install the header pins, but not the header jumpers for JP1 & JP2. Make sure all parts are flat to the PCB except for transistors and 2-pin headers that are mounted vertically. Pay attention to the polarity of diodes and electrolytic capacitors. The positive terminal solder pad for electrolytic capacitors is marked with a “+”. **The negative terminal of the capacitors is marked with a stripe down the side of the body of the capacitor**.




( ) Re-attach the mounting hardware to the bottom of the rectifier/timer PCB. Replace the metal screws, spacers and nuts with the nylon hardware supplied with the kit. In other words, just the original metal angle bracket will be re-used along with the new nylon mounting hardware.

( ) Before re-attaching any wires to the rectifier/timer PCB take a few moments to untangle the existing wires. This will make the overall re-wiring task easier and improve the appearance of the completed job.

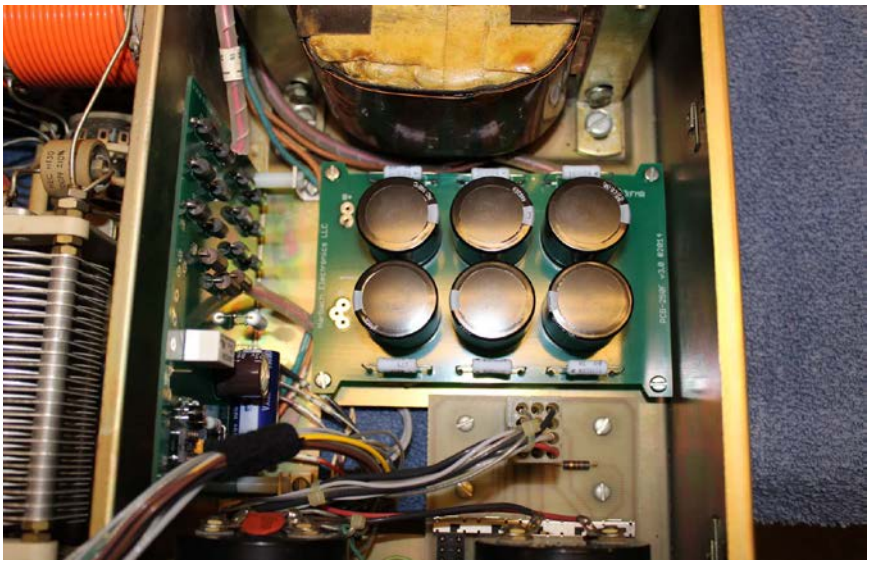
( ) Solder and trim the bottom wires back to their respective solder pads on the new rectifier/timer PCB (1B (if present), 2B, 3B (if present), 5B-1, 5B-2 & 6B) one at a time. The original GREEN wire that was connected to 4B is no longer used. Trace this wire back to the tube sockets and unsolder or clip and discard this wire.



( ) Solder and trim the B+ wire to the solder pad labeled B+ on the rectifier/timer PCB. The other end of this wire should be located and brought into the main power supply compartment. It will be shortened and soldered to the filter capacitor PCB in a later step.

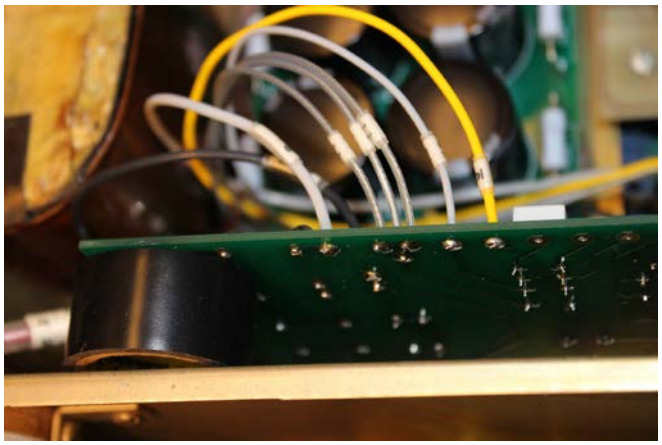
( ) Solder and trim the HV AC wire from the transformer to the solder pad labeled IN on the rectifier/timer PCB.

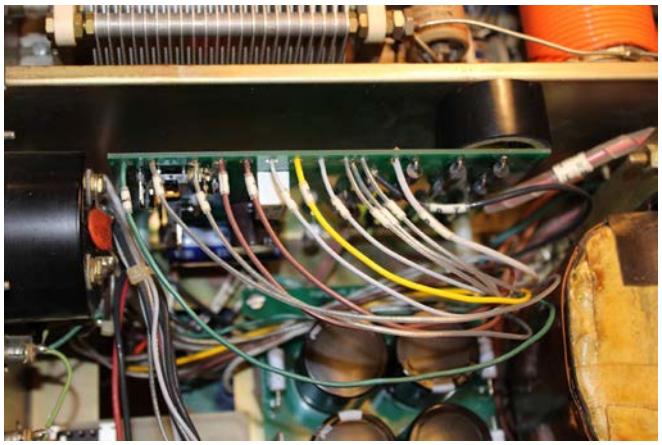
( ) Install the new filter capacitor PCB and tighten the mounting screws on top and bottom.



( ) Loosely install the two (2) #6-32 screws that hold the bottom brackets of the new rectifier/timer PCB to the chassis. Place a soft object between the PCB and the chassis to hold it stationary and provide access for re-attaching the top wires.

( ) Solder and trim the top wires back to their respective solder pads on the new rectifier/timer PCB (1T, 2T, 4T, 6T, 7T, 8T (if present), 9T, 10T (if present), 11T-1, 11T-2, 11T-3, BT and B-) one at a time. The original BLACK wire that was connected to 3T (MLA-2500 only) is no longer used. Trace this wire back to where it connects to chassis ground and unsolder (or clip) and discard this wire.

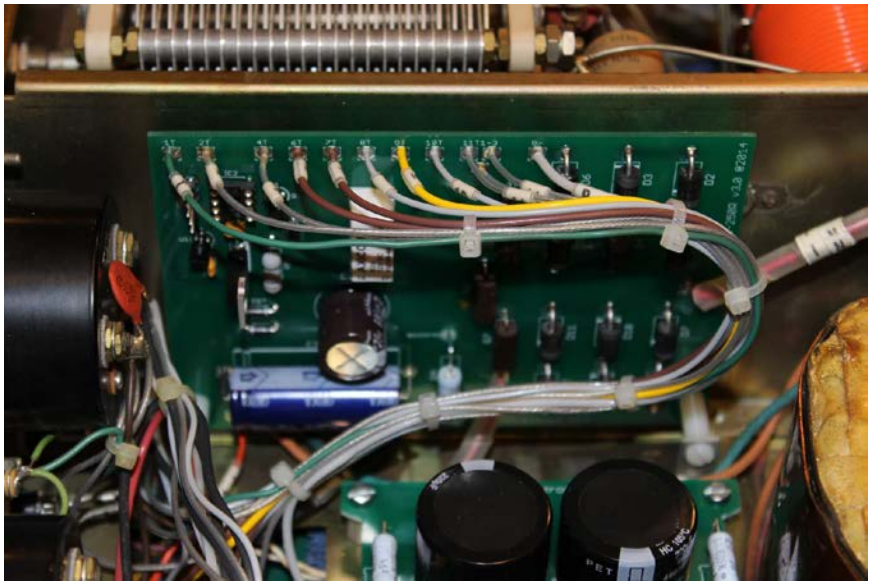




( ) Tighten the two (2) #6-32 screws that hold the bottom brackets of the new rectifier/timer PCB to the chassis.

( ) Review and re-check your rectifier/timer PCB wiring and soldering at this point.

( ) Dress the rectifier/timer PCB wiring into a neat bundle. Secure the bundle with plastic wire ties and form it so that the wiring is away from the filter capacitor PCB components.

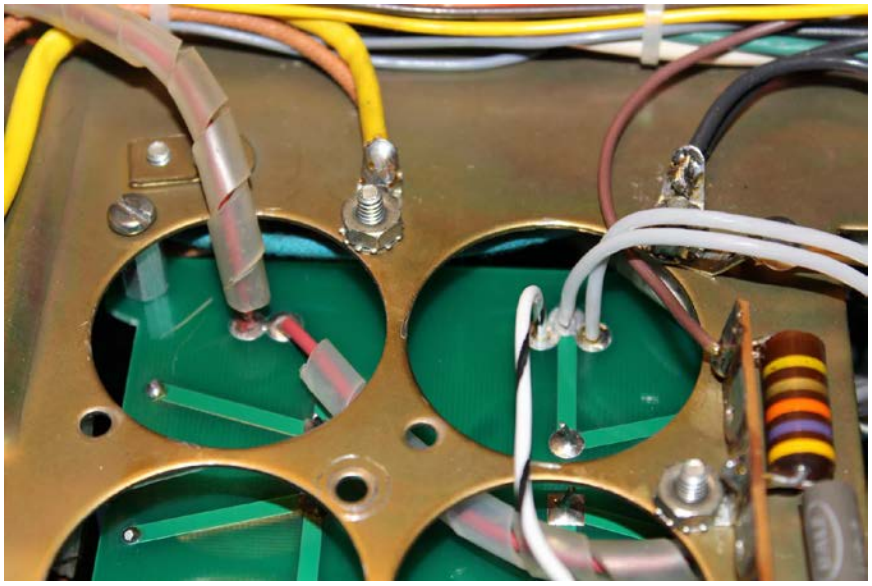


( ) The other end of the B+ wire was removed from the original filter capacitors and is connected to the rectifier/timer PCB should be routed between the new filter capacitor PCB and the chassis. Solder the free end of this wire to one of the two B+ solder pads on the filter capacitor PCB. You will have to remove quite a bit of the wire as it is now only a short connection from the rectifier/timer PCB to the filter capacitor PCB.

( ) Install the new filter capacitor PCB and tighten the mounting screws on top and bottom.

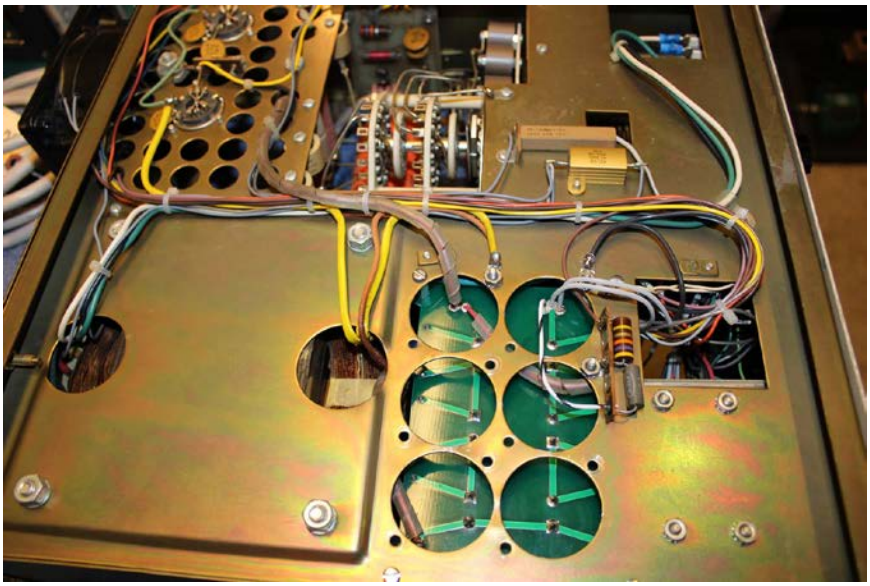
( ) Continue with rewiring the new filter capacitor PCB.

( ) Solder and trim the two (2) or three (3) B- connection wires removed earlier to the B- solder pads on the bottom side of the filter capacitor PCB. A new B- connection wire (white/black stripe wire in the photo below) may be required if the original wire that went to the original electrolytic capacitors is not long enough. A Teflon®-insulated wire is recommended.



( ) Solder and trim the remaining B+ wire removed earlier to the remaining B+ solder pad on the bottom side of the filter capacitor PCB. The wire that should be attached is the B+ wire that goes toward the rear of the amp and connects to R2 (R2 then connects to the plate choke RFC2).

( ) Solder and trim one (1) wire from the transformer (MLA-2500) or (1) wire from the SSB/CW relay (RLY4) (MLA-2500B) removed earlier to the solder pad labeled "XFMR" on the bottom side of the filter capacitor PCB. **NOTE: On some amplifiers this wire may be very short depending on how the unit was originally wired by Dentron. Check the length of this wire before cutting, stripping and tinning the end.**



( ) Review and re-check your filter capacitor PCB wiring and soldering at this point!

( ) Dress the under-chassis wiring and install wire ties to secure the bundle.

( ) Insert the pre-programmed PIC chip into the socket on the rectifier/timer PCB. This is a static-sensitive device so make sure you are grounded when handling the IC chip. Be sure to observe the notch in the socket and the dot and notch on the chip so the pin 1 is in the correct position. The notch and pin 1 are on the bottom end of the socket.

( ) Install the time delay selection shorting jumpers on headers JP1 and JP2 according to the desired warm up delay. User-selectable delay values are shown in the table below.

| **Warm-Up Time Delay Jumper Positions** | | |
|---|---|---|
| **DELAY (sec)** | **JP1** | **JP2** |
| 75 | OPEN | OPEN |
| **90*** | **SHORTED** | **OPEN** |
| 105 | OPEN | SHORTED |
| 120 | SHORTED | SHORTED |

*** Recommended time delay setting.**

**WIRING CHECKS**

( ) Perform this step to check for high voltage wiring errors. Use an analog volt-ohmmeter (such as a Simpson Model 260) to check the resistance between one of the tube plate connectors and the chassis. Put the meter on the highest ohms range and allow it to charge the capacitors. (The meter will charge the capacitors to approximately 6 VDC.) When the meter settles it should read approximately 450 KΩ.

( ) Check the action of the bleeder resistor string. The ohmmeter will charge the filter capacitors to approximately 6 VDC. Once the meter settles, disconnect the meter leads and wait at least 60 seconds. Set the volt-ohmmeter to a low DC range and re-connect the leads between a plate cap and the chassis. The voltage should be less than 0.25 VDC. This confirms the action of the bleeder resistors.

( ) Proceed to the FINAL TESTING section for your particular amplifier, MLA-2500 or MLA-2500B.

**FINAL TESTING FOR MLA-2500**

( ) DO NOT re-install the tubes yet. Position both tube plate connectors away from all other components and where the top cover would be.

( ) Replace the top and bottom covers of the amplifier.

( ) Connect a dummy load to the amplifier output and a keying cable to the relay input.

( ) Verify that the amplifier power switch is in the “OFF” position. Press the “PLATE VOLTAGE” selection on the meter switch. The “STANDBY” and “CONTINUOUS DUTY” functions should be off.

( ) Remove the caution tag from the power cord and connect the amplifier to the AC mains.

( ) MOMENTARILY switch the power switch “ON” and then immediately “OFF”. The high voltage meter should immediately indicate approximately 2400 VDC. Observe that the high voltage begins to drain down when the power switch is switched back to the “OFF” position.

( ) This step requires a timer. Turn the power switch to “ON” and measure the time delay before the green “READY” indicator illuminates. Note that you must watch for the indicator to illuminate. The old relay has been upgraded with solid state components and you will no longer hear the “click” of the old time-delay relay. The delay time should closely match the configuration of the jumpers you installed on JP1 and/or JP2.

( ) With the green “READY” indicator illuminated and no RF input applied to the amplifier, key the amplifier. The red “TRANSMIT” indicator should illuminate and you should hear the T/R relay operate. Release the key.

( ) Press the “STANDBY” switch in to place the amplifier in standby mode. Attempt to key the amplifier again. It should not key with the “STANDBY” switch pressed in. Push the “STANDBY” switch again to place the amplifier in the ready mode.

( ) Press the “CONTINUOUS DUTY” switch and key the amplifier. Observe that the fan speed increases as long as the amplifier is keyed. Unkey the amplifier and push the “CONTINUOUS DUTY” switch again to take the amplifier out of continuous duty mode.

( ) Proceed to the COMPLETION OF INSTALLATION section.

**FINAL TESTING FOR MLA-2500B**

( ) DO NOT re-install the tubes yet. Position both tube plate connectors away from all other components and where the top cover would be.

( ) Replace the top and bottom covers of the amplifier.

( ) Connect a dummy load to the amplifier output and a keying cable to the relay input.

( ) Verify that the amplifier power switch is in the “OFF” position. Press the “PLATE VOLTAGE” selection on the meter switch. The “STANDBY” function should be off (OUT) and “CW/TUNE” function on (IN).

( ) Remove the caution tag from the power cord and connect the amplifier to the AC mains.

( ) MOMENTARILY switch the power switch “ON” and then immediately “OFF”. The high voltage meter should immediately indicate approximately1800 VDC. Observe that the high voltage begins to drain down when the power switch is switched back to the “OFF” position.

( ) This step requires a timer. Turn the power switch to “ON” and measure the time delay before the green “READY” indicator illuminates. Note that you must watch for the indicator to illuminate. The old relay has been upgraded with solid state components and you will no longer hear the “click” of the old time-delay relay. The delay time should closely match the configuration of the jumpers you installed on JP1 and/or JP2.

( ) With the green “READY” indicator illuminated, press the “CW/TUNE” switch to OUT (SSB) position and observe the Plate Voltage increase to approximately 2400 VDC.

( ) With the green “READY” indicator illuminated and no RF input applied to the amplifier, key the amplifier. The red “TRANSMIT” indicator should illuminate and you should hear the T/R relay operate. Release the key.

( ) Press the “STANDBY” switch in to place the amplifier in standby mode. Attempt to key the amplifier again. It should not key with the “STANDBY” switch pressed in. Push the “STANDBY” switch again to place the amplifier in the ready mode.

( ) Proceed to the COMPLETION OF INSTALLATION section.

**COMPLETION OF INSTALLATION**

( ) Push the power switch to the “OFF” position. Per the Dentron manual, wait 15 minutes before removing the top cover.

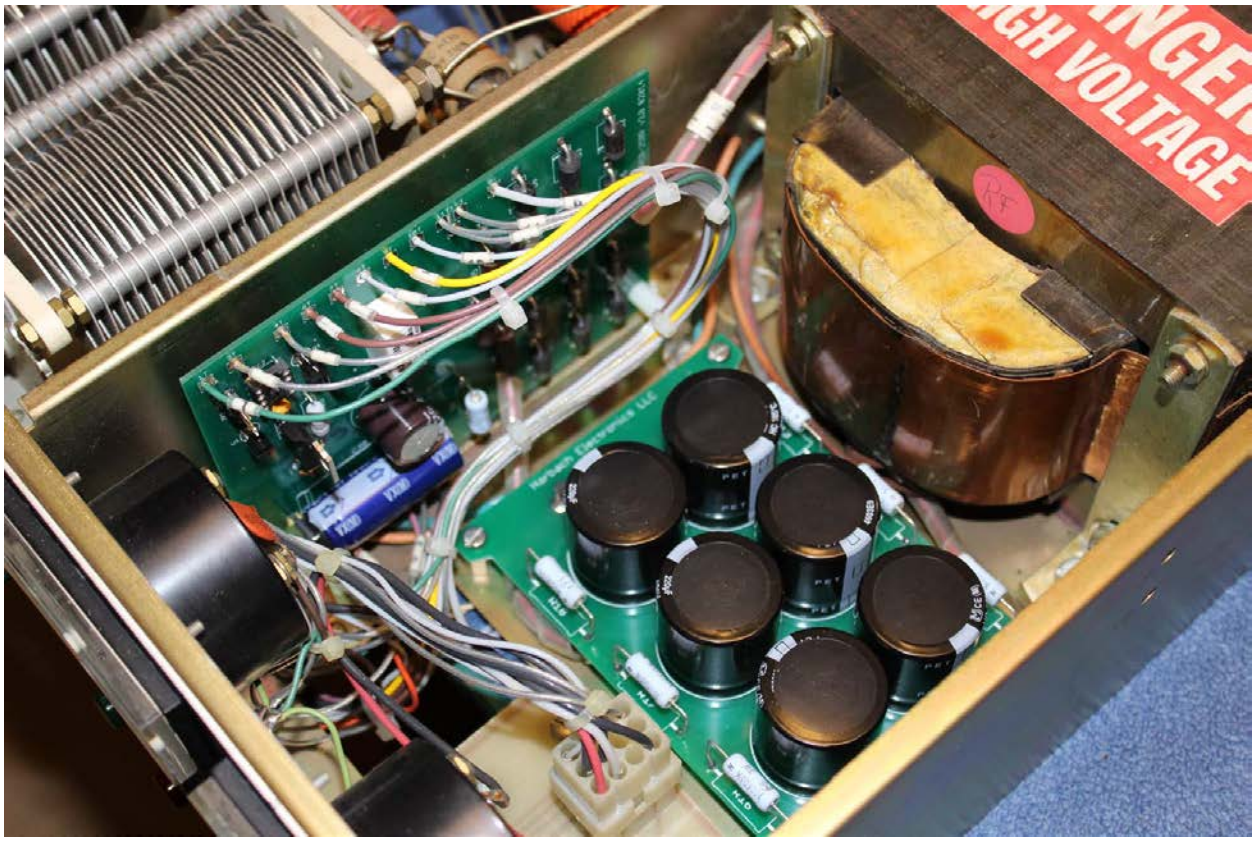
( ) Unplug the amplifier power cord from the AC mains outlet and let any high voltage stored in the electrolytic capacitors bleed down. Verify the HV has bled down and then remove the top cover and use a shorting bar or “chicken stick” to short the HV to ground to make sure any high voltage is completely bled off.

( ) Re-install the tubes and connect the tube plate connectors.

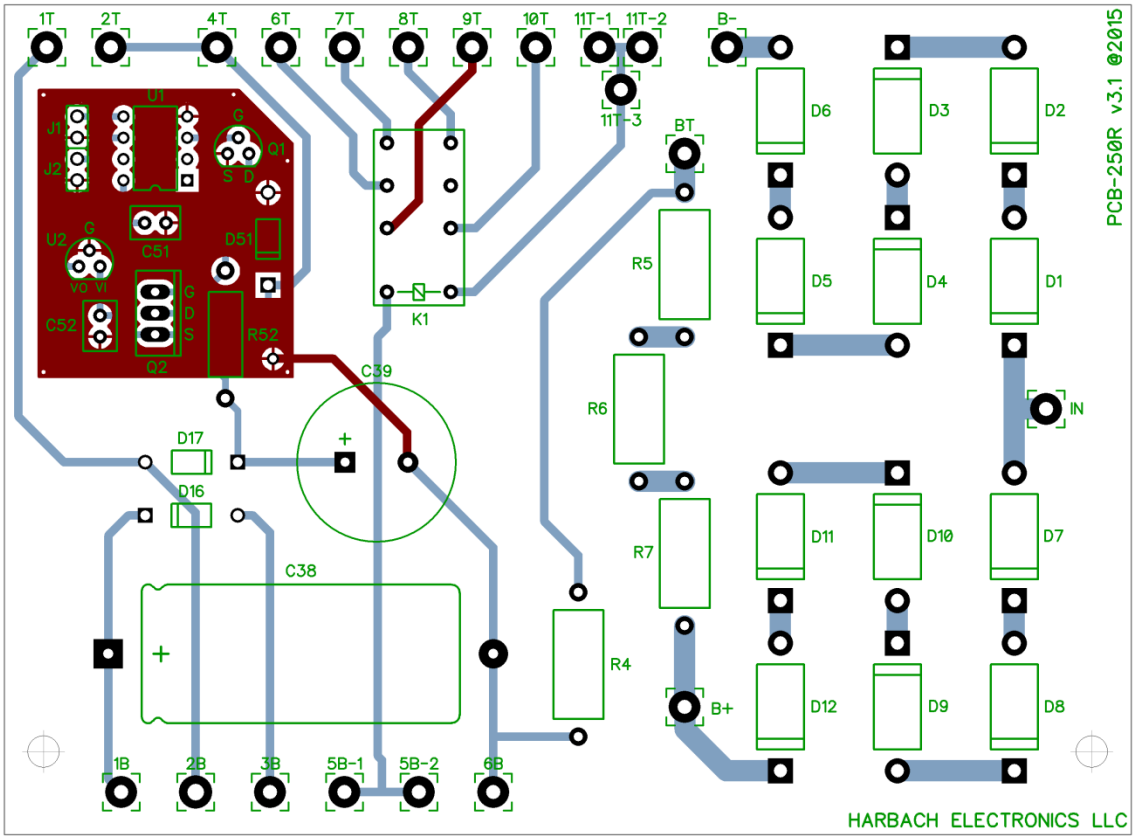
( ) Give the interior of the unit a final visual inspection. Make sure the interior is clean and free of debris.

( ) Replace the top cover.

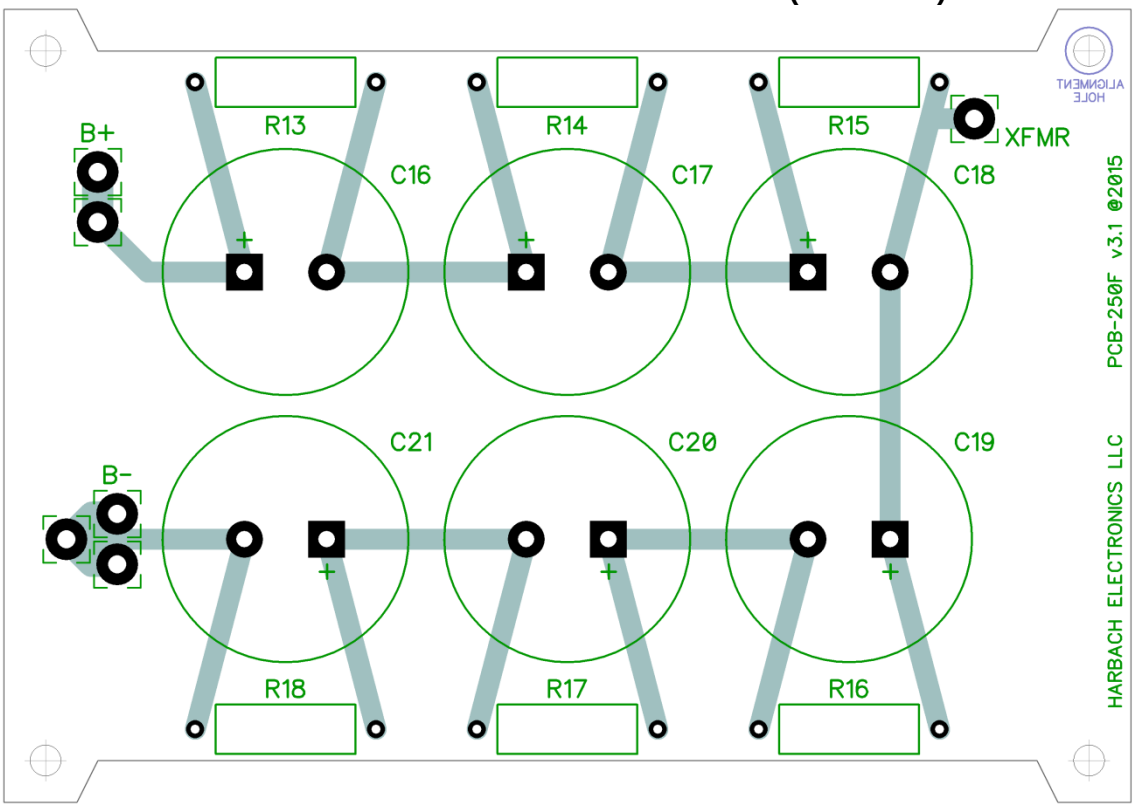
This completes the installation of the PM-2500 replacement power supply module. It will provide you with additional years of reliable service from your MLA-2500 or MLA-2500B HF amplifier through the use of modern components and an updated design.



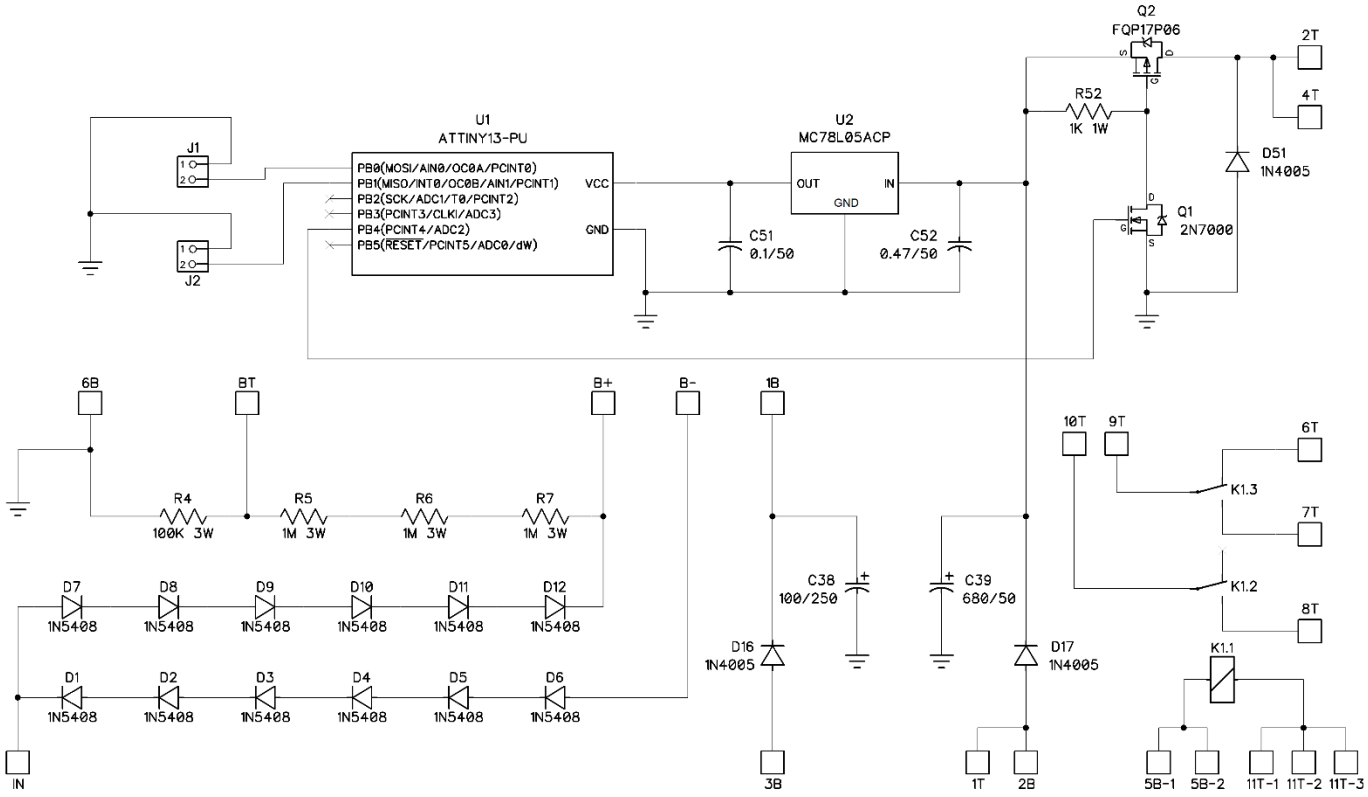
## RECTIFIER/TIMER PCB PARTS LAYOUT (PCB-250R)



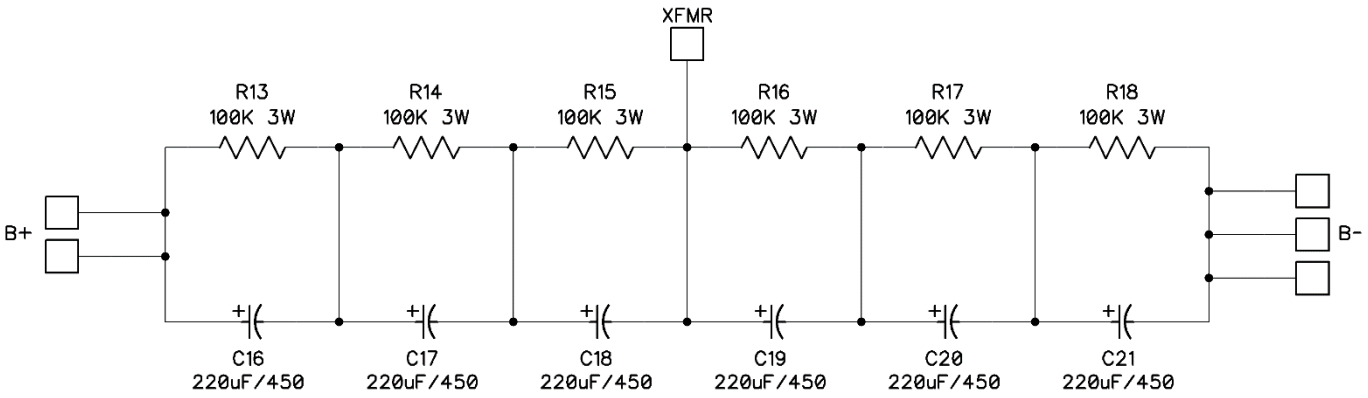

## FILTER CAPACITOR PCB PARTS LAYOUT (PCB-250F)



## PM-2500 RECTIFIER/TIMER PCB SCHEMATIC (PCB-250R)




## PM-2500 FILTER CAPACITOR PCB SCHEMATIC (PCB-250F)



# PM-2500 WIRE CONNECTION TABLE

| CONNECTION POINT | MLA-2500 | | MLA-2500B |
|---|---|---|---|
| | **RECTIFIER/TIMER PCB** | | |
| 1T | 12.6 VAC TO METER LIGHTS (GREEN) | | 12.6 VAC TO METER LIGHTS (WHITE/BLUE OR GREEN) |
| 2T | 15 VDC TO 'READY' LIGHT (CLEAR) | | 15 VDC TO 'READY' LIGHT (CLEAR) |
| 3T | CHASSIS GROUND (BLACK) - NO LONGER USED | | NO CONNECTION (NO PAD) |
| 4T | 15 VDC TO "STANDBY" SWITCH THROUGH METER SWITCH BOARD PLUG PIN 4 (ORANGE OR CLEAR) | | 15 VDC TO "STANDBY" SWITCH THROUGH METER SWITCH BOARD PLUG PIN 4 (ORANGE OR CLEAR) |
| 5T | NO CONNECTION | | NO CONNECTION |
| 6T | RLY2 NORMALLY CLOSED CONTACT [SET 1] TO R8 47KΩ (BROWN) | | RLY2 NORMALLY CLOSED CONTACT [SET 1] TO R8 47KΩ (BLUE OR BROWN) |
| 7T | RLY2 NORMALLY OPEN CONTACT [SET 1] TO CR1 8.1 V 50 WATT ZENER (BROWN OR YELLOW) | | RLY2 NORMALLY OPEN CONTACT [SET 1] TO RLY4 COMMON [SET2] FOR ZENER BIAS SWITCHING (BROWN) |
| 8T | RLY2 NORMALLY OPEN CONTACT [SET 2] TO R9 380Ω & SW3 THERMAL SWITCH (GRAY) | | NO CONNECTION |
| 9T | RLY2 COMMON [SET 1] TO F2 FUSE (YELLOW) | | RLY2 COMMON [SET 1] TO F2 FUSE (WHITE OR YELLOW) |
| 10T | RLY2 COMMON [SET 2] TO CONTINUOUS DUTY SWITCH THROUGH METER SWITCH BOARD PLUG PIN 10 (GRAY) | | NO CONNECTION |
| 11T-1 | STANDBY SWITCH THROUGH METER SWITCH BOARD PLUG PIN 1 (CLEAR) | | STANDBY SWITCH THROUGH METER SWITCH BOARD PLUG PIN 1 (CLEAR) |
| 11T-2 | COIL OF RLY1 [T/R RELAY] (CLEAR) | | COIL OF RLY1 [T/R RELAY] (CLEAR) |
| 11T-3 | XMIT LIGHT (CLEAR) | | XMIT LIGHT (CLEAR) |
| 1B | 168 VDC TO ALC ADJUST POTENTIOMETER (ORANGE) | | 168 VDC TO ALC ADJUST POTENTIOMETER (ORANGE) |
| 2B | 12.6 VAC FROM TRANSFORMER (BROWN) | | 12.6 VAC FROM TRANSFORMER (BROWN) |
| 3B | 120 VAC FROM TRANSFORMER (BLUE) | | 120 VAC FROM TRANSFORMER (BLUE) |
| 4B | 6.3 VAC FROM TUBE FILAMENT (GREEN) - NO LONGER USED | | 6.3 VAC FROM TUBE FILAMENT (GREEN) - NO LONGER USED |
| 5B-1 | RELAY CONTROL JACK (PURPLE) | | RELAY CONTROL JACK (PURPLE) |
| 5B-2 | XMIT LIGHT (CLEAR) | | XMIT LIGHT (CLEAR) |
| 6B | CHASSIS GROUND (BLACK) | | CHASSIS GROUND (BLACK) |
| BT | PLATE VOLTAGE SWITCH THROUGH METER SWITCH BOARD PLUG PIN 11 (BLACK) | | PLATE VOLTAGE SWITCH THROUGH METER SWITCH BOARD PLUG PIN 11 (BLACK) |
| B- | B- TO CAPACITOR FILTER BOARD NEGATIVE (GRAY OR WHITE) | | B- TO CAPACITOR FILTER BOARD NEGATIVE (GRAY OR WHITE) |
| B+ | B+ TO CAPACITOR FILTER BOARD POSITIVE (RED) | | B+ TO CAPACITOR BANK POSITIVE (RED) |
| IN | ONE LEG OF HV FROM TRANSFORMER (RED) | | ONE LEG OF HV FROM TRANSFORMER (RED) |
| | **FILTER CAPACITOR PCB** | | |
| XFMR | ONE LEG OF HV FROM TRANSFORMER (RED) | | ONE LEG OF HV FROM TRANSFORMER THROUGH RLY4 COMMON [SET 2 HI SSB/LO CW] (RED) |
| B+ | B+ FROM RECTIFER/TIMER BOARD (RED) | | B+ FROM RECTIFER/TIMER BOARD (RED) |
| B+ | B+ FROM FILTER CAPACITOR BOARD TO SAFETY RESISTOR R2 (RED) | | B+ FROM FILTER CAPACITOR BOARD TO SAFETY RESISTOR R2 (RED) |
| B- | B- FROM RECTIFER/TIMER BOARD (USUALLY WHITE) | | B- FROM RECTIFER/TIMER BOARD (USUALLY WHITE) |
| B- | B- FROM FILTER CAPACITOR BOARD TO SHUNT RESISTOR SH1 (USUALLY WHITE) | | B- FROM FILTER CAPACITOR BOARD TO SHUNT RESISTOR SH1 (USUALLY WHITE) |
| B- | B- FROM FILTER CAPACITOR BOARD TO METER SWITCH BOARD PLUG PIN 9 (USUALLY WHITE) | | B- FROM FILTER CAPACITOR BOARD TO METER SWITCH BOARD PLUG PIN 9 (USUALLY WHITE) |

| PM-2500 BILL OF MATERIALS (BOM) | | | | |
|---|---|---|---|---|
| | | | | |
| **Verification** | **Part Number** | **Quantity** | **Description** | **Designation** |
| [ ] | CAP-111 | 6 | 220µF 450 VDC Electrolytic Capacitor | C16-C21 |
| [ ] | CAP-250 | 1 | 100µF 250 VDC Electrolytic Capacitor | C38 |
| [ ] | CAP-251 | 1 | 680µF 50 VDC Electrolytic Capacitor | C39 |
| [ ] | CAP-252 | 1 | 0.47µF 50 VDC Ceramic Capacitor (474) | C51 |
| [ ] | CAP-106 | 1 | 0.1µF 50 VDC Ceramic Capacitor (104) | C52 |
| [ ] | DIO-102 | 12 | 1N5408 3A 1000 PIV Diode | D1-D12 |
| [ ] | DIO-101 | 3 | 1N4005 1A 400 PIV Diode | D16-D17, D51 |
| [ ] | HDR-250 | 2 | 2-Pin Header | JP1, JP2 |
| [ ] | SMI-252 | 1 | 60V N-Channel MOSFET | Q1 |
| [ ] | SMI-253 | 1 | 60V P-Channel MOSFET | Q2 |
| [ ] | RES-101 | 7 | 100KΩ 3W Resistor | R4, R13-R18 |
| [ ] | RES-250 | 1 | 1KΩ 1W Resistor | R52 |
| [ ] | RES-302 | 3 | 1MΩ 3W Resistor | R5-R7 |
| [ ] | REL-250 | 1 | 3A DPDT Relay 12VDC Coil | RY1 |
| [ ] | SMI-250 | 1 | Pre-Programmed 8-pin µController IC | U1 |
| [ ] | SMI-251 | 1 | MC78L05 5V Voltage Regulator | U2 |
| [ ] | HDR-251 | 2 | 2-Pin Header Shunt | N/A |
| [ ] | NUT-250 | 2 | #6-32 Nylon Lock Nut | N/A |
| [ ] | PCB-250F | 1 | PM-2500 Filter Capacitor PCB v3.1 | N/A |
| [ ] | PCB-250R | 1 | PM-2500 Rectifier/Timer PCB v3.1 | N/A |
| [ ] | SCR-105 | 8 | #6-32 x 0.25" Machine Screw | N/A |
| [ ] | SCR-250 | 2 | #6-32 x 1" Nylon Screw | N/A |
| [ ] | SKT-250 | 1 | 8-Pin IC Socket | N/A |
| [ ] | SPA-110 | 4 | 0.25" x 0.500" Aluminum Hex Spacer | N/A |
| [ ] | SPA-251 | 2 | 0.25" x 0.625" Nylon Round Spacer | N/A |

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