

Installation TOF in AL811 and AL811H

Rev1A 2/16/2024

All necessary parts except solder are included in the kit

Tools required:

#1 and #2 Phillips screwdrivers

Soldering equipment with small rosin flux solder, preferably WRAP2 rating but any electronics solder will work

Drill for LED if you choose to install it in a hole (be careful of ruining the decal!)

The amplifier must be tested and properly working before installation.

1.) Select a well-lighted clear work area and disconnect the amplifier from the mains. Allow a safe discharge time for capacitors, 10-15 minutes is far more than ample time.

2.) Check the HV meter to be sure it is at zero volts. Remove cover

3.) You may want to remove just ONE side brace as shown in figure1. Do NOT remove the opposite side's bracing. It is necessary to bow the back and front to remove the brace slightly. Removing the brace does give more working room for wiring. This is also true for the front outside power supply standoff if it hampers your work:

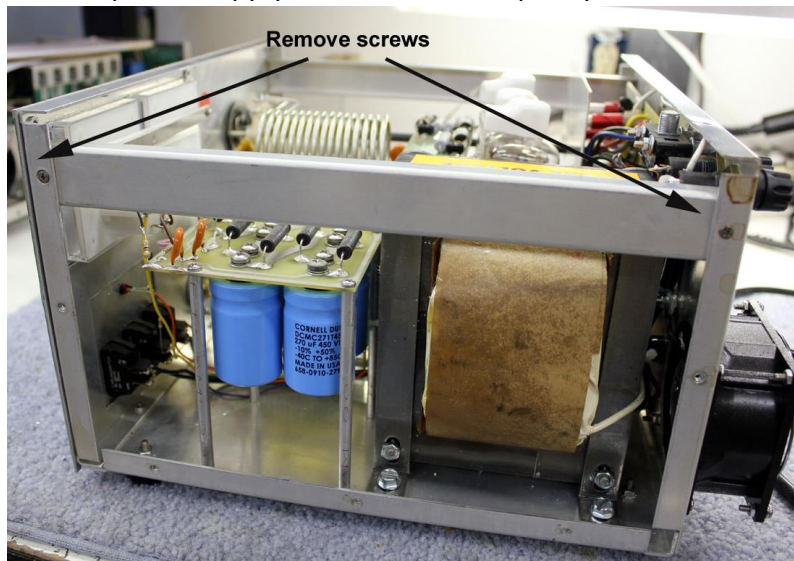


Figure 1 side brace and/or front circuit board spacers can be removed for more working room

4.) The amplifier should now look like this, with the exception you may want to remove the front outside power supply spacer for improved room:

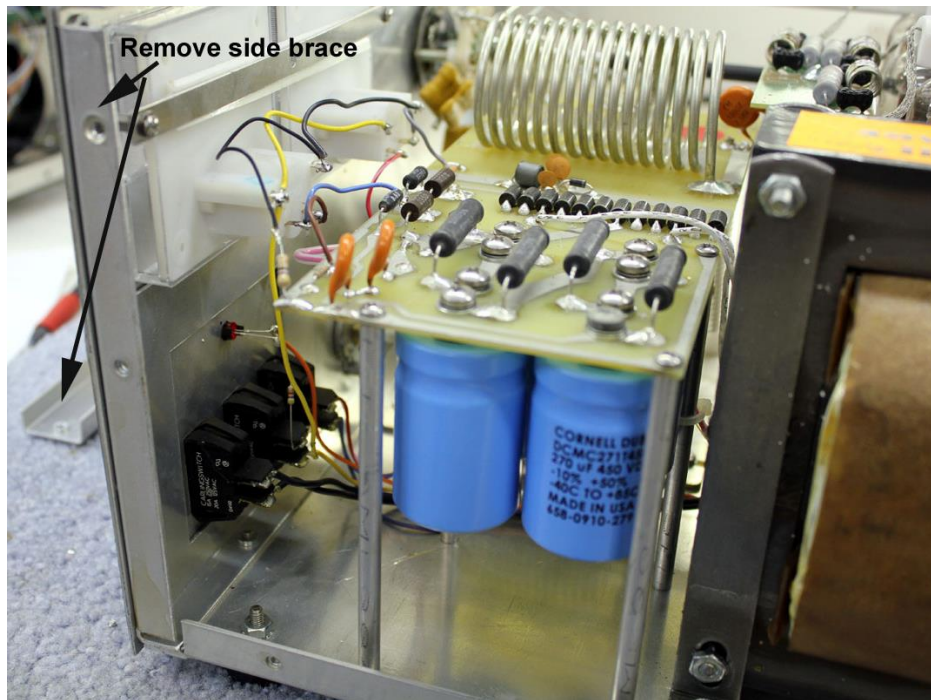


Figure 2 front spacer can also be removed

Warning!

1. Never reconfigure a parallel resistor and XMT LED. If the LED has a resistor across it, that resistor remains. The TOF gray wire must be used in parallel with the orange wire
2. A series resistor and XMT LED can have the resistor removed for wiring convenience but never with the gray wire connected. This is explained later

Important Note!!! Read this before wiring! Later production AL811 amplifiers use two cube relays (not the single large relay). Late production amplifiers have a high-value series resistor (typically 1K to 4.7k) hanging in the air between the upper standby switch terminal and the 811 transmit (XMT) LED indicator. This resistor limits LED current and provides a current-limited operate signal to the more complicated relay system.

Depending on how MFJ wires the switch to the LED, you may not want to have their factory resistor hanging in the air. Sometimes the resistor mounting is such that using it is no problem. In this case you can leave the series resistor and connect the TOF violet wire to the free resistor end. In the case the gray and orange wires go to the former standby switch resistor terminal.

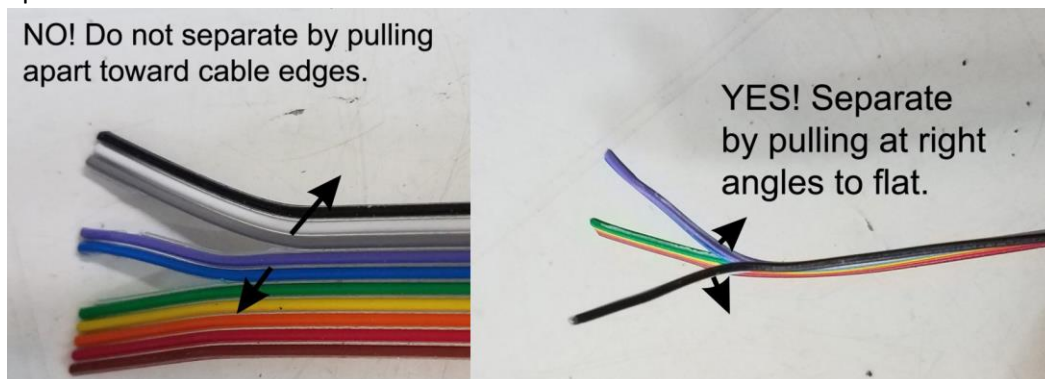
If you do NOT want to have the resistor hanging in the air, the TOF has an internal resistor between the gray and orange wires. By connecting **ONLY** the orange wire to the standby and not using the gray wire for anything, the internal TOF resistor is activated. This will allow you to connect to the XMT LED without using an external resistor.

Critical points for series XMT resistor and LED cube relay systems!

- 1.) Series resistor LED cube relay 811 units must have the TOF internal resistor used by not connecting the gray, or they must connect the gray and orange to the standby and use the external factory XMT LED series resistor. In this case, the violet lead goes directly to the LED where the resistor once went. This is a cleaner installation because it eliminates the hanging resistor, but that is the only difference.
- 2.) We only provide this internal resistor choice because of the various ways MFJ wires things. You can loop the violet wire through the power switch tabs to support the violet wire and resistor. See figure 3

Early AL811 amplifiers with a single large open frame relay have a low-value (typically 33-ohm) resistor soldered directly across (parallel to) the factory XMT LED. These parallel LED-resistor units **MUST NEVER** have the XMT LED system altered. They must have the gray and orange TOF lead connected to the standby switch. The violet wire then feeds the XMT LED where the small red factory jumper wire between the standby switch terminal and the XMT LED once was. That small jumper wire, normally a red wire, is discarded.

You must separate the wires of the ribbon, as necessary, by pulling on the wires to split the wires apart in the ribbon.



5.) The picture below only applies to later 811s with the small enclosed rear circuit board cube relays. Early versions with an open frame relay have the resistor soldered across the LED but otherwise connect the same way. Orange to the standby switch where the LED feed was attached, and Violet connects to the LED lead that formerly went to the standby switch.

The standby switch resets the overload lock-off by removing the 12Vdc to the TOF orange. The relays are powered through the TOF violet wire, which is interrupted at 30% grid overcurrent.

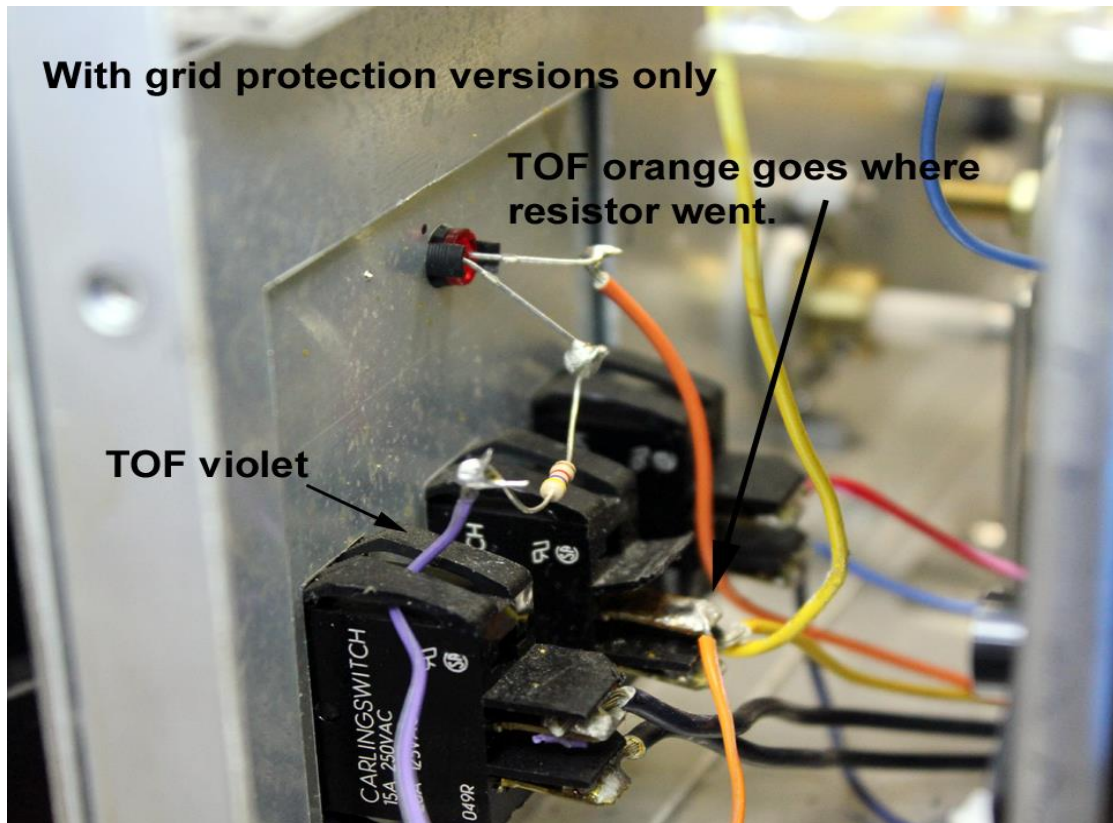


Figure 3 Series resistor (later cube relay amplifiers) using a switch locking tab to support the violet wire

All TOF units now have the overload relay.

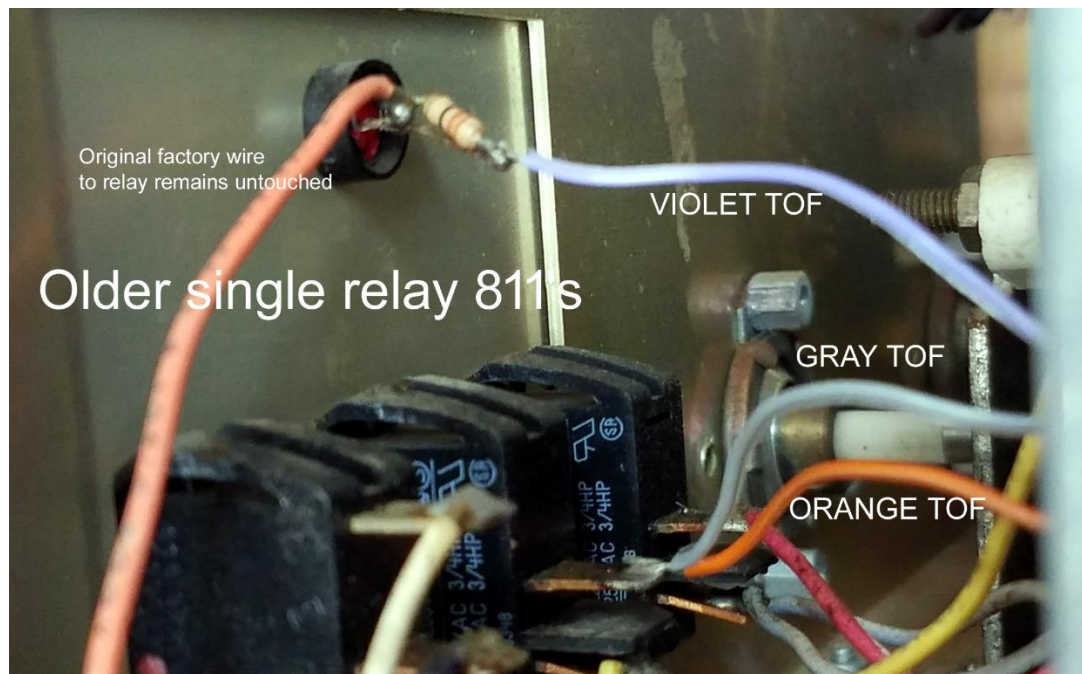


Figure 4 Older 811 amplifiers must always retain the parallel resistor and tie gray and orange TOF to standby switch

6.) Install the TOF as shown in figure 5 or 6

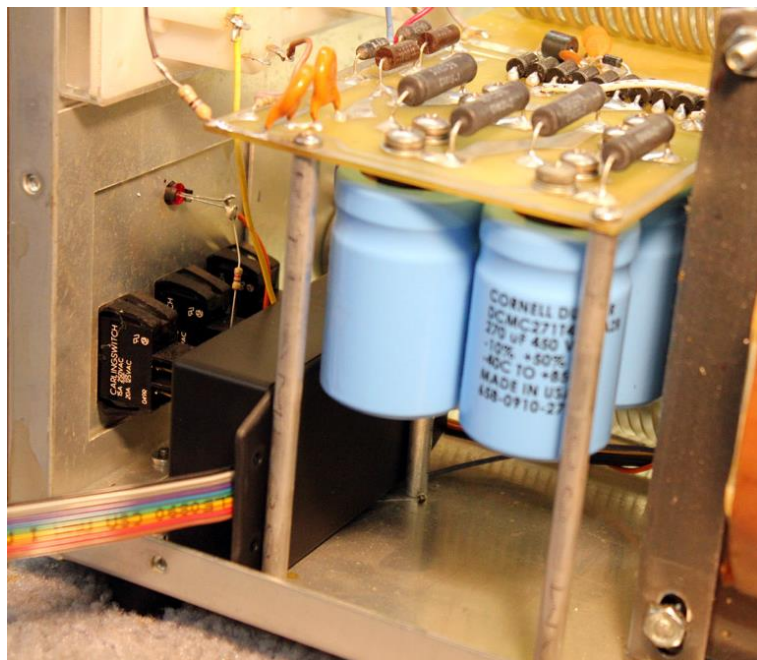


Figure 5 Vertical TOF mounting if filter capacitors are too tall (very early units)

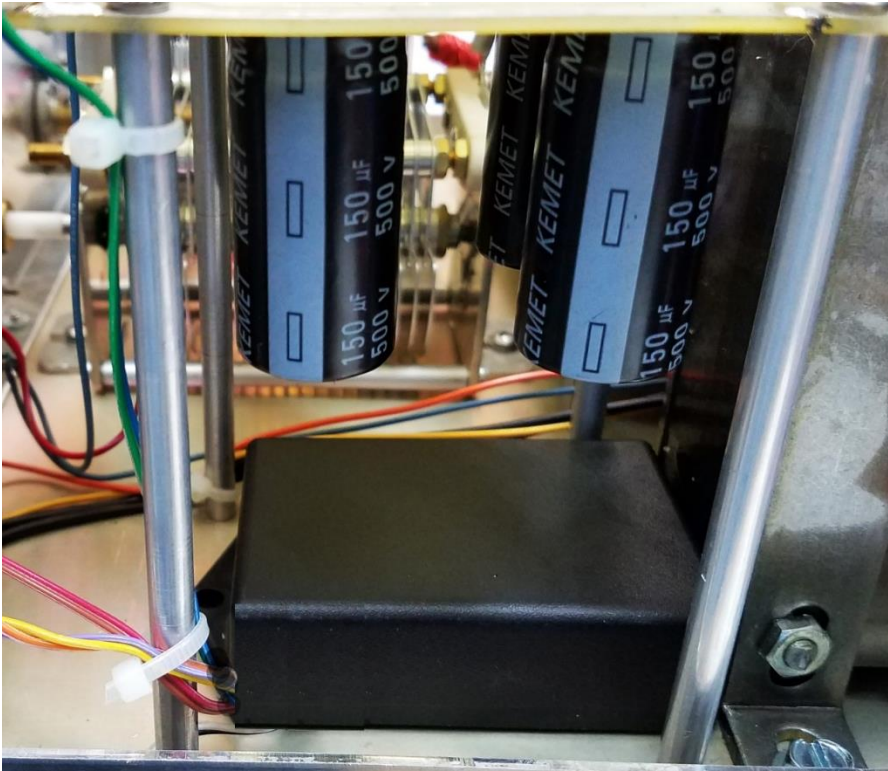


Figure 6 Normal mounting position using tape in all units with shorter electrolytic capacitors

- 7.) After looking things over to be sure the TOF is positioned in the clear, tie wrap or use the supplied tape to hold the TOF in place. Be sure to not pinch or damage the wires.
- 8.) The original meters and wiring will look like this. Unsolder the blue wire from the grid meter:

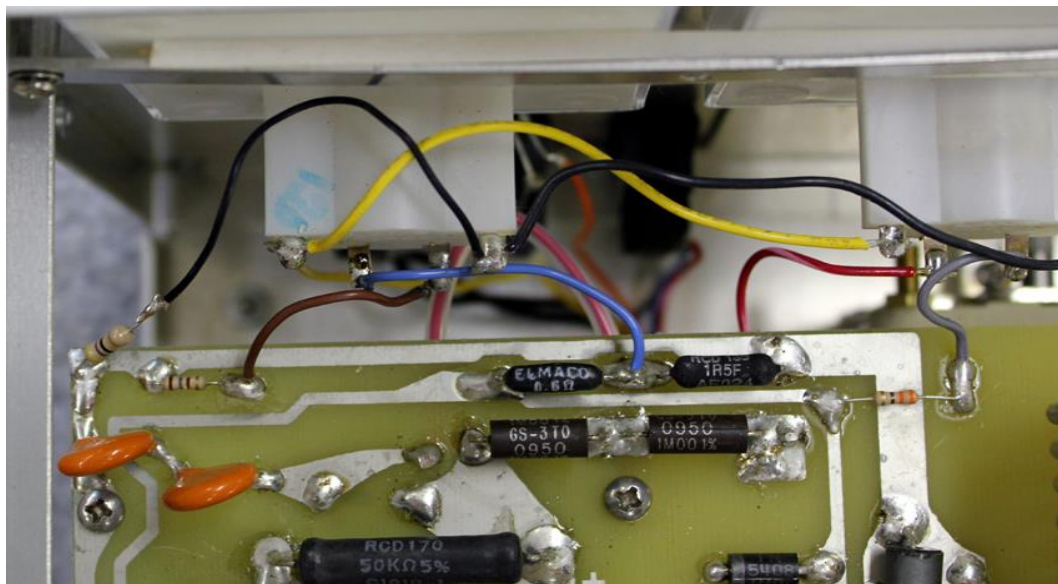


Figure 7 The TOF green and blue replace the factory blue wire connection

8.) Pre-tin any connection points with fresh solder. The FOUR connection points are shown below, along with a diode that protects the meter. Meter protection diode D116 is shown for troubleshooting purposes. If D116 is shorted the meters will be unreliable:

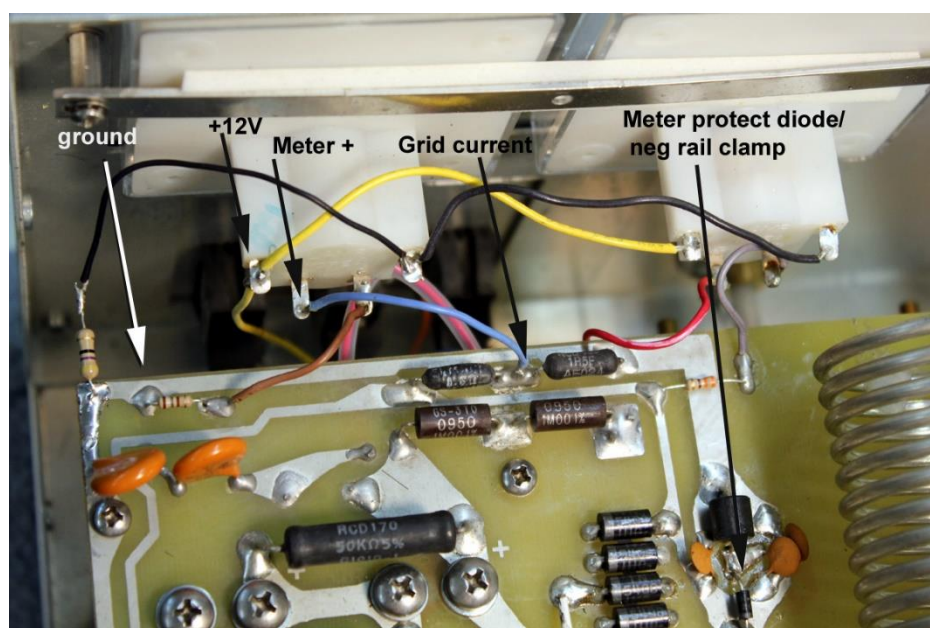


Figure 8 upper connection points

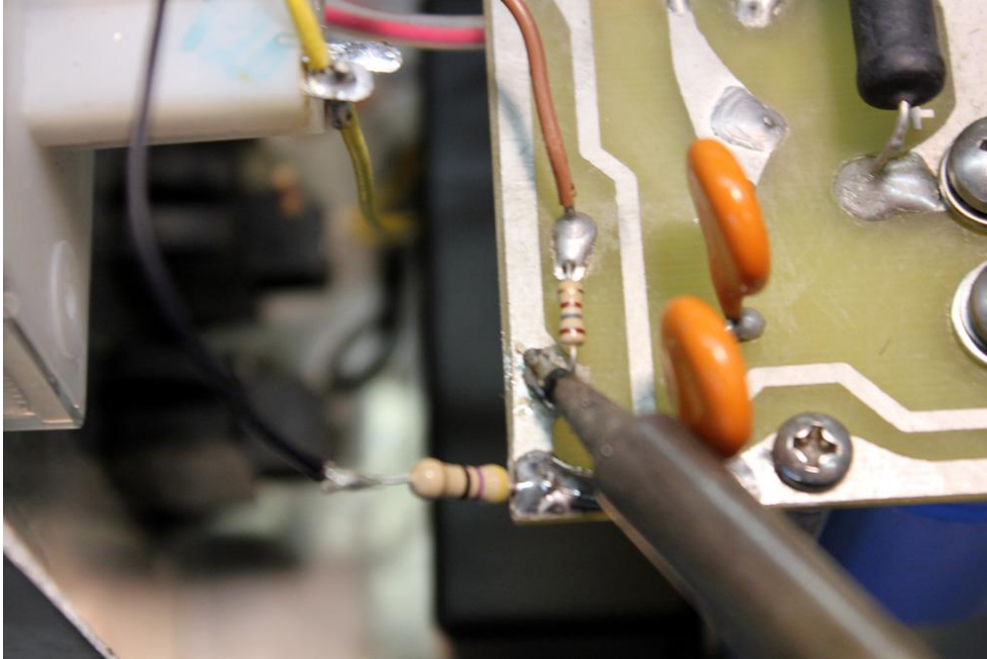


Figure 9 Flow fresh solder onto connection points

9.) Connect the wires as shown below. First the black and white wires. It is perfectly acceptable and I recommend laying the tinned wires on the wetted pads of the board and sweat-soldering them. Lead-free solder almost always looks a little like a cold solder connection. Just make sure the solder flows and, by gently pulling, confirm the joint is mechanically sound:

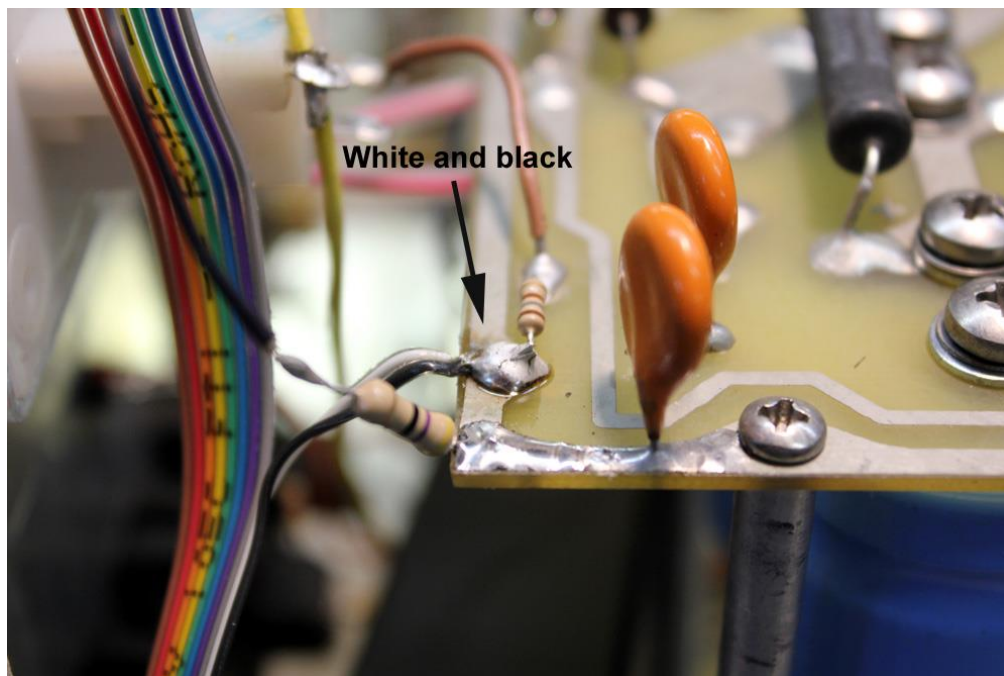


Figure 10 The TOF white and black ground leads generally work best up near the spacer. Exact location not critical

10.) Proceed to the other wires. You will have three yellow wires on the meter lamp supply line, two original and one new wire. You will also remove the original blue wire that connected between the two black meter shunts:

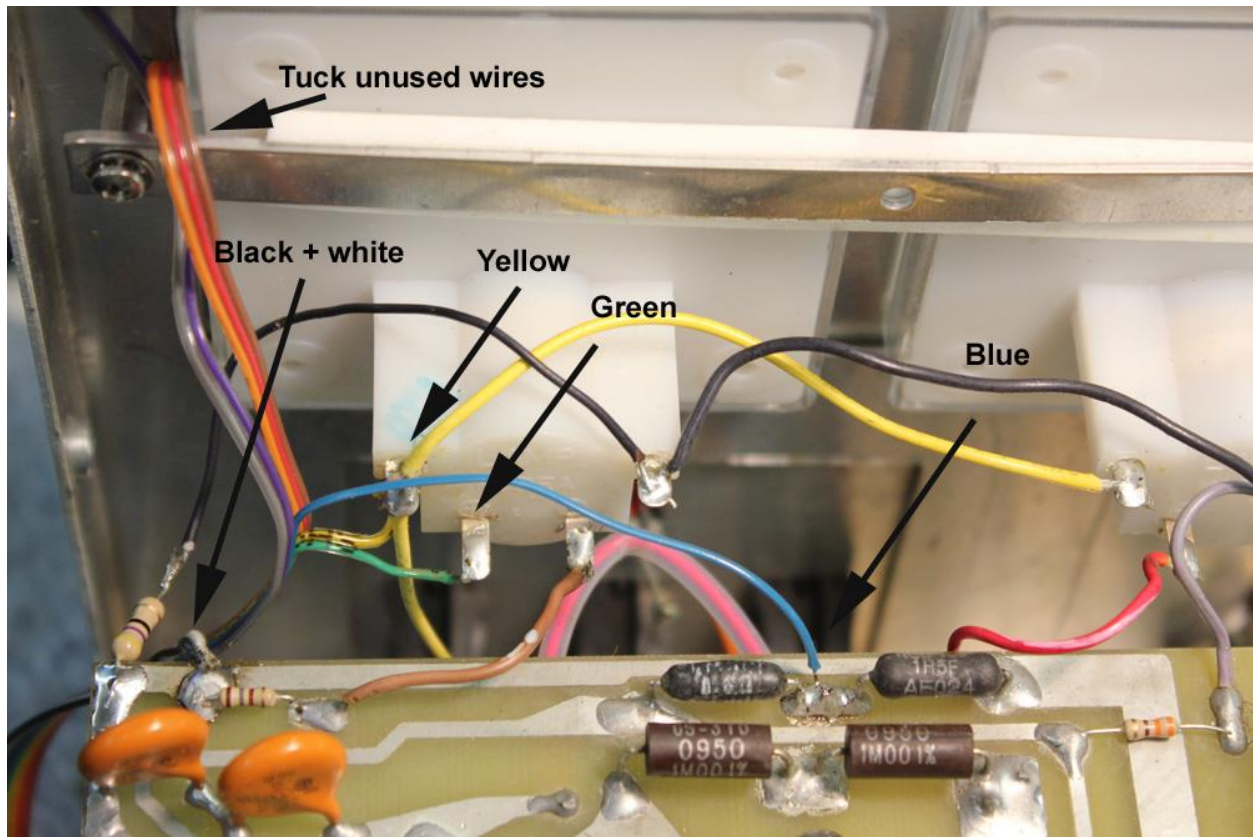


Figure 11 TOF leads

11.) The warning LED has a wide illumination angle. Mount the warning LED below and between the meters. Mounting under the meter mounting strip is usually about ideal.

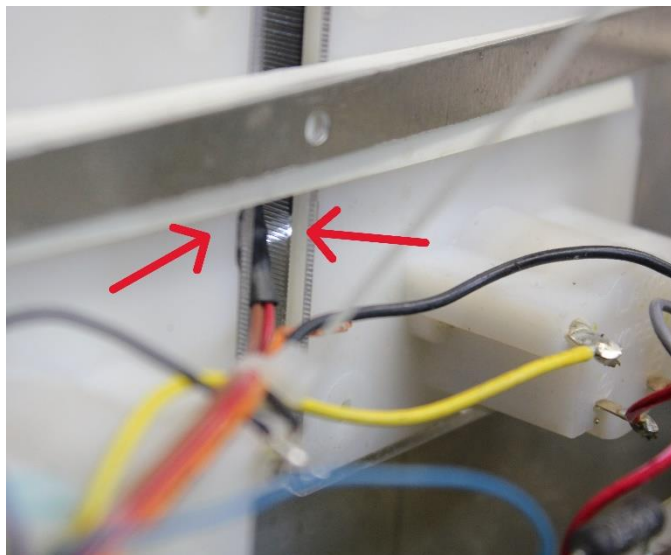


Figure 12 Warning LED mounting

Secure any wires neatly with a tie-wrap. Check your wire dress to be sure a wire does not get pinched by the cover or brace

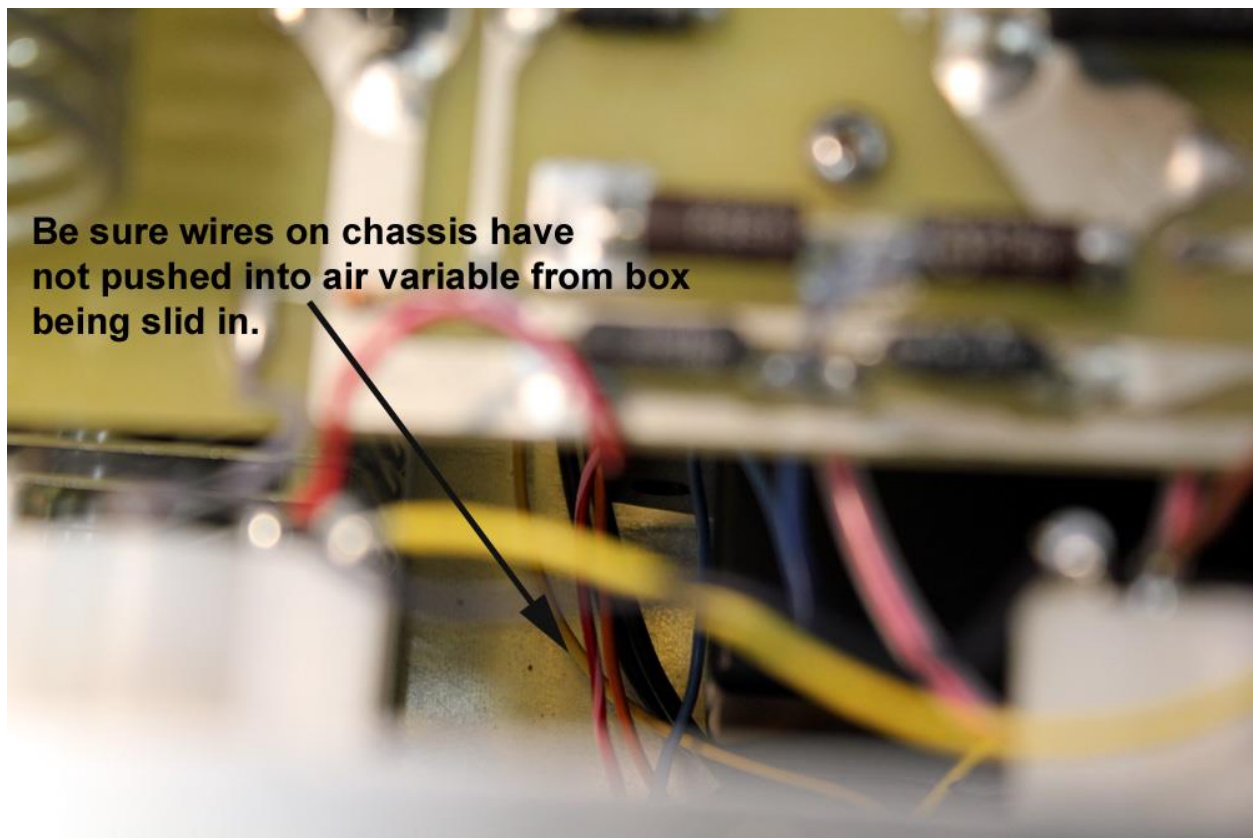


Figure 13 observe the factory wiring that runs past the air variable

12.) The factory sometimes does not anchor the harness near the Plate variable capacitor. It is a good idea to make sure it clears the capacitor

13.) Check your work to be sure it matches the instructions. Replace the brace and cover. Never operate the amplifier with the cover removed

Operation

After setting the amplifier for the band being used, adjust your exciter to approximately 80 watts PEP for the AL811 and 100 watts PEP maximum for the AL811H. I recommend an R200K resistor kit if your AL811 three-tube does not have one.

Properly tuned, speaking in a normal voice or on CW at full power, the grid should never exceed the *figure 14* currents:



Figure 14 Typical voice SSB absolute peaks or CW absolute peaks while Plate current is largely irrelevant

Voice SSB

At full safe power and properly tuned, the meter should occasionally bounce over near the arrow marks. If the meter pointer bounces past the arrow marks above, advance the LOAD. If it never reaches those marks on peaks, move the LOAD counterclockwise.

The red warning LED will flash quite often if peaks are too high. If the TOF trips off, the loading control is too far closed (toward zero), the exciter is peaking too high, or there is some other problem. (The tune adjustment (PLATE) should always be set for the maximum possible grid current.)

This adjustment procedure also works on CW.

Note: Most amplifiers require a special TOF module to set the current range. The wire colors and resistor values are different. Be sure you have the correct TOF module.

LED Warning Indicator

The LED warns by brightly illuminating when exceeding the typical maximum peak grid current for proper linear amplification. The LED system indicates occasional over-current much better than the panel meter. If you open the LOAD control (clockwise) and the LED does not go back to occasional sharp quick flashes (from occasional ALC overshoot or strong peaks) or does not stay completely off, the amplifier is likely being overdriven. Reduce the drive power until the LED just flashes occasionally or better stays completely off.

Note: The warning LED may occasionally flash on voice peaks from radio power overshoot. This is generally not disruptive to others or harmful to your amplifier. If the LED illuminates longer than very brief occasional flashes and illuminates with almost every word, the amplifier is being overdriven or has been mistuned. You must increase the loading control or decrease the peak exciter power.

The plate current meter will still show the average current. It should never track the grid current.

AL811 (3-tube) with LED being slightly overdriven. In this amplifier, the TOF LED is positioned to make the grid meter light red:

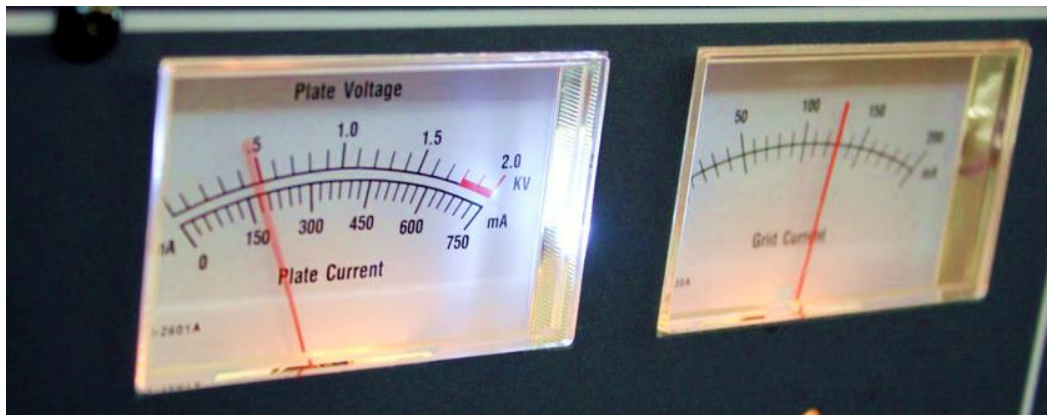


Figure 15