

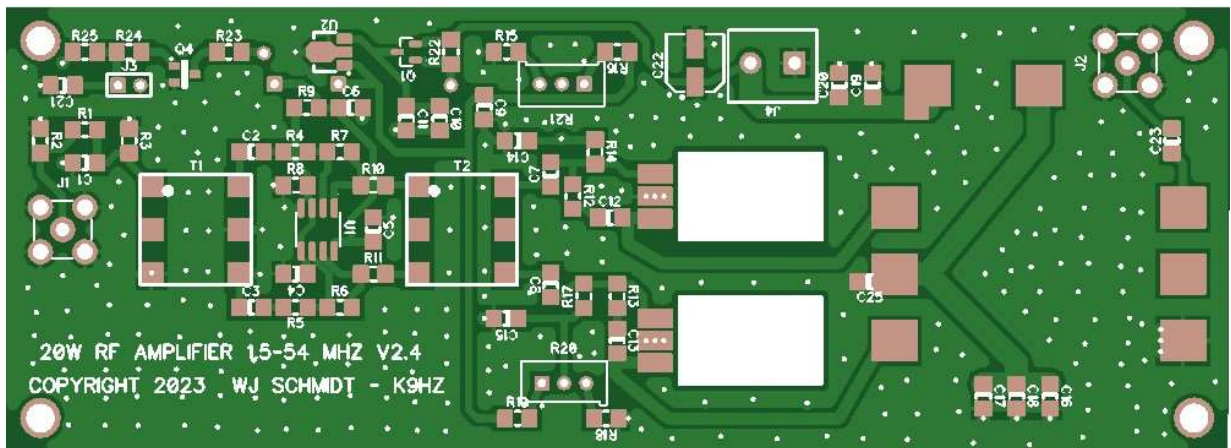
## K9HZ 20W PA – TROUBLESHOOTING GUIDE

### REV 1.01 – August 4, 2023

While the K9HZ 20W PA is very straightforward in design and operation, there are a few things you can do if the PA does not work as expected. You should first check if the PA works with a signal generator injected at the PA input. The signal generator should be set to 1mW output (about 223 mV at 50 ohms) at 14.0 MHz. Connect a 50 ohm dummy load at the output (J2) and 12V to J4. Place 3-5+ V on pin 1 (GND is pin 2) of J3 (for PTT). You should see 10-20W output from the PA under these circumstances. If you don't, follow the guide below to determine where the problem is.

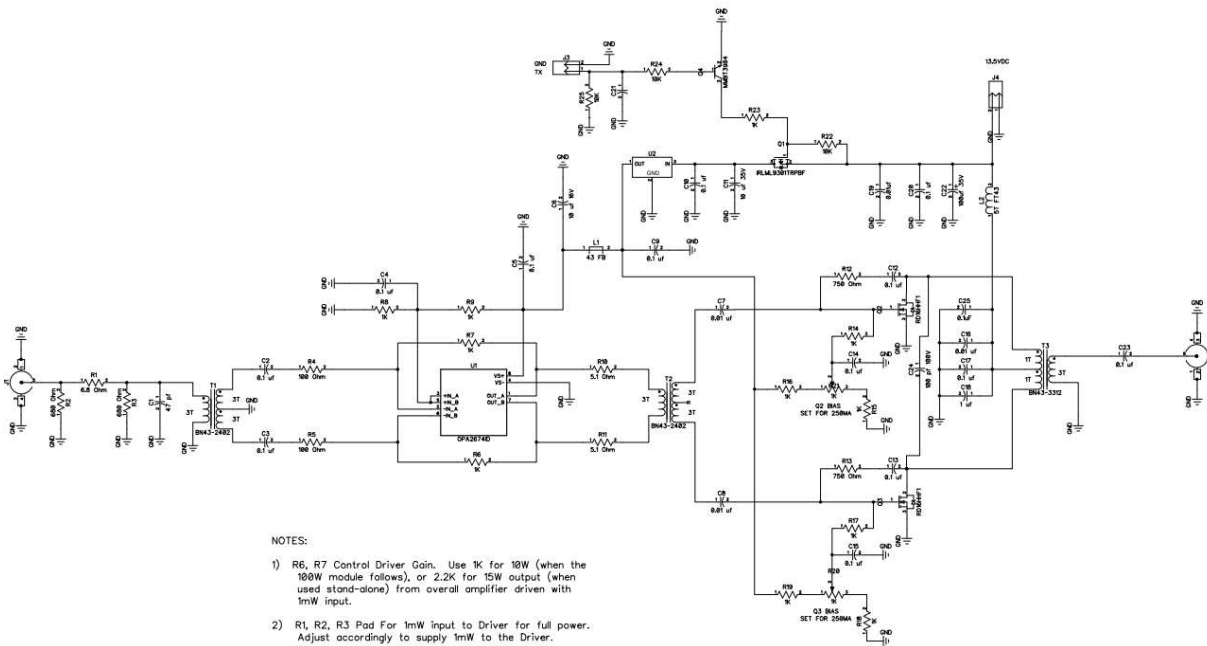
### The Pre-driver

1. Lay the board on the surface in front of you with the INPUT jack on the left and the OUTPUT jack on the right. No 12V power at J4, no PTT at J3, or RF applied at J1.



2. Check the orientation of U1. The indentation of the OPA2674 device should be with the indentation in the upper right-hand corner.
3. Check T1: The left side is connected on the top and bottom (NO center-tap), and the right side is connected on the top, middle, and bottom (middle center-tap).
4. Measure the resistance from J1 center to ground. You should get about 7 ohms.
5. Measure the resistance across the T1 secondary (right side) top and bottom. It should show a short. It should also show a short to ground at all three terminals.
6. Test the voltage to U1: Apply 12V to the PA. No RF. Short the pins of J3 together. Test the voltage on either side of L1 (ferrite bead) to ground. It should be about zero. Now add PTT voltage – put 3-5+ V on pin 1 (left pin) and ground on the other pin (right side). Test the voltage on either side of L1 again... it should be about 9V.

7. Check T2. There are NO CENTER-TAPS on T2. Note that the transformer could be put in 180 degrees turned around from its proper orientation and it will be difficult to tell. It should have 3 turns to the left and 6 turns to the right. You should measure about 4.5 volts from either terminal on the left to ground. On the right side, you will not measure any DC voltage to ground (or resistance to ground) on either the top or bottom terminal. You will measure RF voltage between the right-side top and bottom terminals if you put 3-5V+ on pin 1 of J3 and put an RF signal of about 1mW into J1... of about 5VAC at the frequency of the input.



## The PA Section

8. Testing Q2 & Q3: The TOP pin of both transistors is the gate. With the transistors removed, power applied to the PA, no PTT, no RF, you should read about zero volts to ground. With PTT, you should read between 3-6V. Move the bias pot R21 for Q2 and R20 for Q3... you should see the voltage move from about 3-6 volts. Leave the pots set so that the bias voltage is at the lowest value (about 3V). You should read a short to ground on the middle terminal of Q2 and Q3. You should read 12V on the bottom terminals to ground.
9. With PTT and RF input of about 1mW, with the bias set for 250 ma per Q2 and Q3 (each) transistor, you should see about 12V DC at the center tap of T3 on the left side of T3 to ground. No or very little AC voltage there. On the top or bottom terminals, you should measure 12V DC to ground and 18-25ACV to ground.

That's about it. If you get this far, it's working fine. Something else in your particular setup is faulty.