

## INSTRUCTIONS FOR USE AND ASSEMBLY OF THE FRB 15 WATT AMPLIFIER

Soldering on the fifteen or thirty watt amps can be done best with a 25-30 watt pencil iron with a 1/8" tip. Solder larger components first. Especially important is to avoid using larger irons on the transistor. Surface mounting of the larger components can be achieved best by melting some solder on the pad under the point where the component will go. Then heat the solder under the component on to it while simultaneously applying more solder. You should have some thin red wire and a gray ferrite bead. Wind the wire through the bead 6-8 times. Now sand the red enamel off the remaining lead length and cut each lead to around 3/8 inch so that when soldered it the current will go through.

When soldering the tuning capacitors, bend the ends of the leads of the capacitors 90 degrees to make a larger surface area to solder down with. Other Capacitors should have the leads bent out 90 degrees, so that there is 3/16ths of an inch between the bend and the capacitor body. The inductor coils have long leads that should be cut down to around 1/4 of an inch. Next, solder the remaining smaller components in a similar fashion. The ferrite bead should be prevented from touching the board. When finished, scrape off any rosin between the pads and the ground part of the board or other pads, as it will cause problems with the performance of the amp.

When mounting in box, remember that the transistor needs to be bolted directly to the heat sink so cut a hole in your box large enough for the transistor to go through as shown in the placement diagram under the hole in the board. The transistor should also get some silicone heat dispersing compound between the transistor and the sink. When using the brick enclosure mount the board to the bottom of the brick and the transistor to the flat portion, mounting holes have been drilled for this. Mount the circuit board first then the transistor which is soldered only after it has been mounted to the heat sink.

At this point the amplifier should be ready for testing and tuning. Prior to applying any power to the unit check continuity with a DVM (digital volt meter) or something similar. First, check continuity between the positive voltage pad and ground, there should be no continuity. If there is, you have a short somewhere between voltage and ground, look for a solder bridge. Next, check between the RF output pad and ground, there should be no continuity. Look for where the short is if there is continuity. Then go to the juncture of C6 & L2. Again there should be no connection between ground and that point. Finally check the RF input pad for the same condition.

Now that you have checked out the board for shorts it is time to prepare for dynamic testing and tuning. At this time you should have a working and tested 1/2 watt PLL transmitter ready to go. The RF output is connected from the PLL transmitter to the input of the 15 watt amplifier with about 6-8 inches of RG174 coaxial cable. Solder the center conductor to the RF input pad and the outer shield braid to ground. The other end should have already been attached to the PLL transmitter.

Using a short cable of RG8x with PL259 plugs on both ends connect the output of the amplifier to the input of a power/SWR meter. Take another cable and connect the output of the meter to a 20 watt dummy load (if you have an inline frequency counter connect it between the meter and dummy load). If you have a frequency counter with a probe, place the probe near the output of the transmitter next to the SO239 connector.

You are now ready to tune and test the amplifier. Be sure to set the PLL transmitter board on an insulated surface next to the amplifier enclosure. Attach power supply leads from the DC power source to both the amplifier and PLL transmitter. At least 18 gauge wire should be used for the connection from the power supply to the amplifier. Apply power and begin to adjust the variable capacitors for maximum power of 15 watts. Use a plastic tuning tool for this or a plastic screwdriver. A tweak tool is available from FRB. In tuning the amplifier you may notice the frequency counter locking to a frequency twice that of what the PLL is set for along with a lower than expected power output from the amplifier. This means that the output stage of the amplifier is

being tuned to the harmonic not the fundamental frequency. You need to retune that stage (L2 & the two variable capacitors associated with it and C5).

After completing the tuning and testing process your amplifier should be ready to go. Proceed to mount the PLL board on the metal plate which slides into the enclosure and permanently hook everything up. Run the positive voltage lead from the PLL board to the red banana jack and solder it in place. There should be enough slack to allowing sliding the metal plate back to expose the amplifier board beneath it. Do the same with the ground lead from the PLL board. Audio connections can now be made to the other end plate, follow the directions which come with the PLL board. Once everything is connected and in place, test the unit again for proper operation. Make sure the voltage and ground connections are correct before applying power. If everything checks out you can slide the lid into place and attach the audio input end plate and the remaining two screws at the output end plate as well.

When operating the unit be sure to have the heat sink fins pointing up, failure to do so might result in damage to the output transistor. A muffin fan blowing extra air on the unit will ensure a long life for the transistor especially in warm or hot conditions.

Finally, do not operate this unit on the air without a filter. Use our 7 element filter for this.

# 15 Watt Amplifier Parts List

HAVE

- ✓ 1 10-50 pf orange/yellow trimmer (C5)
- ✓ 2 20-100 pf mica trimmer 423 (C6, C8)
- ✓ 2 .1 uf (C1, C2)
- ✓ 2 .001 (C3, C4)
- ✓ 1 22 uf electrolytic capacitor (C7)
  
- ✓ 1 3 turns #14, 3/8" diameter (L2)
- ✓ 1 4 turns #14, 3/8" diameter (L3)
- ✓ 1 6 turns #14, 3/8" diameter (L4)
- ✓ 1 6 turns #26 on ferrite bead (L5)
  
- ✓ 1 Wideband RF transformer (T1)
  
- ✓ 1 2SC2539 (Q1)

- 2 SO239s
- 2 banana jacks (1 black, 1 red)
- 2 banana plugs (1 black, 1 red)
- 1 heavy 2-twist wire
- 1 heavy grey coaxial
- 1 black thin coaxial
- 10 4-40 nuts
- 8 4-40 bolts 1/4"
- 2 4-40 bolts 3/8"
- 2 ground lugs

