

INSTALLING & TROUBLESHOOTING LINEAR AMPLIFIERS

1. Make sure the antenna is rated for the high power output of the amplifier. If you can't be sure, check with a reliable 2-way radio store or technician. The wrong antenna, or one badly adjusted will result in excessive amplifier heating and possible transistor damage.
2. Check antenna SWR on the lowest and highest frequencies used. (Wattmeter/SWR meter should be installed between the antenna and radio) Use a short (12" maximum) jumper between the radio and the SWR meter. It should be adjusted to less than 1.5 for maximum range and best results. Don't use the amplifier if you can't tune the SWR below 1.8 (amplifier off). Excessive SWR will reduce the power radiated by the antenna and cause excessive heating of the amplifier, and reduced transistor life. The SWR may rise a half point with amplifier operation.
3. Standard amplifiers are designed to operate with transmitters having maximum outputs of 4.25 W. carrier (12W PEP SSB). Amplifiers adjusted for higher power levels are noted on the rear of the chassis. (i.e., 6.5 carrier, 18W PEP SSB).
4. When you are sure of the above, then continue with the installation.
5. The amplifier should be installed in a location where the heatsink fins will be exposed to good air circulation, if possible.
6. Power hook-up is very critical. The transceiver and amplifier should use separate leads to the battery. The amplifier must be connected by heavy gauge wire in good condition. The wire size is determined by the output power, as indicated below: (Coax cable is not suitable)

<u>Output Power</u>	<u>Suggested Wire Size</u>
Up to 200 Watts	Use 10 ga. up to 8', 8 ga. over 8'
200 Watts and up	Use 8 ga. up to 8', 6 ga. over 8'
7. The BLACK power lead should be connected to the auto body. Check to see if the NEGATIVE battery terminal has a short ground return to the auto body. If not, you will need to connect a short jumper of 12 ga. wire with a suitable lug terminal to the battery post and auto body. Check the battery terminal condition. If corroded and not making good contact to the cable clamps, clean all wires, dress battery, install leads and add grease over terminals after tightening. Voltage loss and reduction of amplifier output will result from poor battery connections. Connect the RED power lead to the POSITIVE battery post thru suitable cable. (For POSITIVE ground vehicles, the amplifier must be of the "FLOATING GROUND" type. The BLACK wire goes to the battery NEGATIVE. The RED positive fused lead connects to ground. Also ground the wire connected to the amplifier's chassis.)

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8. Connect a cable between the amplifier and radio. Length isn't that important here - 3' or less will do. Use RG-8 or RG-58 cable. The length can be changed later to improve matching.
9. Connect the SWR meter between the antenna and amplifier. (Don't go any further if you don't have an SWR meter capable of measuring these output levels.) The lead between the amplifier "ANTENNA" connector and SWR meter should be less than 1 foot.
10. Switch the amplifier to the AM mode. Push the transmit button and release. The amplifier should turn on with the transmitter and then return to receive mod automatically. If it doesn't shut off with the transmitter; i.e. you don't hear stations on your radio and/or the RF indicator stays lit, this is an indication that the length of coax between the amplifier and radio (or antenna) may not be optimum. Increase the coax length 2-3 feet if possible. Sometimes you may need to change the antenna coax 3-5 feet to get the desired result. (This procedure is sometimes used where transmitter SWR sensing circuits inhibit operation with some antenna or with an amplifier.)
11. Test the SWR with the amplifier operating. It should be less than 2.0. If it isn't, repeat the antenna tuning process with the amplifier turned off but connected in the line. (If there is a significant increase in SWR with amplifier operation, there may be installation problems, i.e. amplifier grounding, interconnecting coax length, high antenna SWR, antenna not rated for power, transmitter not well grounded.)

TROUBLESHOOTING GUIDE

The majority of all problems encountered with linear amplifiers can be traced to improper installation - usually wiring or antenna. For many years of trouble-free operation, it is well worth the extra trouble of making a good installation with a suitable antenna. It would be worth your while to have your installation checked by someone experienced in high power transmitters or amplifiers. A few of the more common installation problems are:

Excessive Drive Power: Excessive drive power will often cause distortion and "flat topping". Upward modulation and effective communications range is reduced. Also, the possibility of damage to the amplifier exists.

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Less than rated output power.

Most often traced to poor wiring or too small gauge wire, which causes excess voltage drop during transmit. Sometimes the transmitter is not putting out rated power when connected to the amp. Install a wattmeter between amp and transmitter. Key, and switch amp on and off. If forward power is substantially less when the amp is switched on, some improvement may be obtained in varying the cable length between amplifier and transmitter.

Feedback, whistle.

The amp may not be grounded properly, or may have high antenna SWR. Sometimes the microphone will pick up power, and requires a 220pF capacitor from each mic lead to ground inside the set. Power mikes can be a problem. Low supply voltage less than 13 volts under load at the amplifier.

Distortion, fuzzy sound.

Poor grounding of transmitter and amp. Ground each unit with a short jumper to the auto body or dash.

Amplifier remains on after transmitter is keyed off. Sometimes gets warm, resets if transmitter is switched off.

Suspect high antenna SWR, bad amplifier or transmitter grounding, improper coax cable length between transmitter or between amp and antenna. Open shield at coax connector (shield not making good contact with connector.)

