



I PUT A POWER MIC ON MY RADIO AND NOW IT SQUEALS!!!

Astatic power mics are designed to work with as many different radios as possible, without having to make any modifications to the mic or the radio. However, whenever a stock mic on a radio is replaced with a power mic, there exists the potential for some compatibility problems. Most of the time, all that is required to hook up the power mic is to choose the correct mic connector and wire the connector for your particular radio. Sometimes, either due to the design of the radio or the conditions that exist where the radio is located, extra modifications may need to be made to get the best performance.

The most common complaint that we hear is that the radio squeals. A squeal in a radio can be caused by several different things.

- 1- Wiring or switching problems.
- 2- RF feedback.
- 3- With older Astatic "4-wire" mics there can be compatibility problems.

In order to correct the problem, it is important to identify which type of problem you have. Read the three sections below and see if you can identify which problem you have:

1- With wiring and switching problems, the squeal can be heard coming from the speaker in the radio. Sometimes it only occurs during receive, sometimes only during transmit. The squeal is usually fairly loud, and sometimes can be changed by the setting of the receive volume control. With this type of squeal, it may or may not be heard by the person who is listening on another radio.

2- RF feedback problems only occur when the radio is transmitting. The squeal may only be heard by the receiving station, or sometimes it can also be heard coming faintly from inside the radio. (not from the speaker!). Often, changing the mic gain, or the physical location of the mic will cause the squeal tone or intensity to change, or it may even go away temporarily.

3- If you have an old 4-wire Astatic mic, (such as a TUG-8-D104, or a D104-M.) a number of radios that were produced after the mid 70's had a compatibility problem with these mics. For this reason, Astatic no longer manufactures these mics. This squeal problem always occurred when the radio was in receive. Sometimes adding an external speaker to the radio would aggravate the situation.

The fixes-

Now that you have identified what type of squeal problem you have, here are some suggestions on how to eliminate the problem:

1- If you have a wiring or switching problem, the first thing to do is to check the plug wiring. Make sure that the correct color wires are going to the correct numbered pins. Some connectors such as the popular "DIN" style connectors do not number their pins in sequence. (1,2,3,4,etc) If your not sure how the pins are numbered and you can't read the numbers on the connector body, check with the store where you bought the connector to see if they can give you the correct pin numbers for that connector. Also be sure to look for any small strands of wire that may be shorting two pins together or shorting to the connector shell. There are some radios that have a small switch located in the radios' mic connector. When your trying a new mic, make sure that you put connector completely together before you try it. The possibility also exists that the radio manufacturer has made changes in the radio that require a different mic hook-up. This is unusual, but it has happened. If this is the case, you may need to send, or fax a copy of the radio schematic to our factory to get the correct plug wiring. The other possibility is that there is a switching problem in the mic itself. If it is an older mic or one that was purchased used, look inside the mic for any obvious signs of tampering. Also look for any loose wires or anything that could possible cause a short to the mic switch or amplifier board. In severe cases the mic may need to be returned to the factory for service.

2- RF feedback problems are caused by the mic picking up stray RF energy and coupling it back ("feeding it back") to the input of the radio. Because power mics have amplifiers in them, it takes a lot less of this stray RF to cause a problem then it does with a stock mic. This stray RF is always present around a transmitter, but there are things you can and should do to reduce it.

A- Check the SWR (standing wave ratio). A bad SWR or "match" as it is called will create a lot of stray RF around the radio. Use a good quality SWR meter and make sure that your SWR is at least 1.5 to 1 or better.

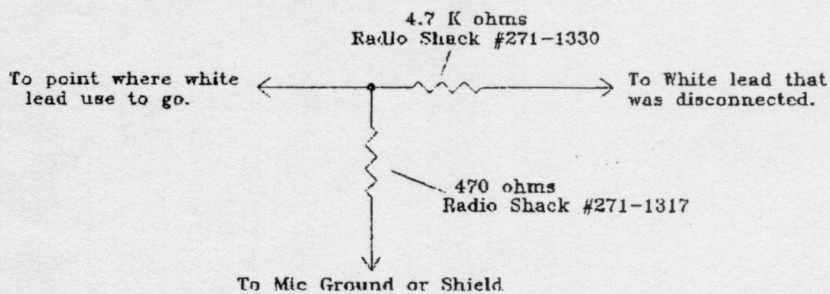
B- Make sure you have a good ground on the radio. With a base station this means a separate ground wire from the chassis of the radio to either a cold water pipe or an outside grounding rod. This wire should be heavy gauge and as short as possible. In a mobile installation this means a good heavy wire from the radio chassis to the vehicle frame.

C- All modern radios have limiter circuits to prevent over-modulation. Many people have these circuits modified or removed completely to increase "talk-power". Any modification that allows modulation over 100% is not only illegal, but is asking (make that begging!) for RF feedback problems. Over-modulation creates distortion that leads to RF being generated on adjacent channels, and also at total different frequencies that can be picked up by devices such as telephones, TV's, stereos, etc. Since the radio antenna is not designed to broadcast all these different frequencies, this extra RF energy winds up being radiated by the radio chassis and the feedline! Of course, this also makes it much easier for the power mic to pick up some of this RF and feed it back into the radio input.

If all else fails, there are things that can be done to the mic itself to help reduce RF feedback. The first thing to look at is mic gain or "volume". Does turning the mic gain down eliminate the feedback? If you can eliminate the squeal just by turning the mic down some, that's

probably what you should do. Power mics have much higher output than the stock mic that comes with the radio. On some radios, you may find that the gain control on the mic seems to be very sensitive. A slight adjustment of the mic gain control may cause the modulation to go from 0% to over 100%. If this happens the best cure is to add a pair of resistors to the mic to reduce its gain. The circuit shown below is what is known as a 20db "L" pad. The values shown will usually cure this problem. If your not handy with a soldering iron, this is best done by a technician.

Inside the mic, disconnect the white lead that comes out of the coil cord. Then add these two resistors has shown. Make sure to carefully insulate all of the connections with electrical tape or heat shrink tubing.



Another possibility is shielding problems. On D104 style stand mics, use a voltmeter or continuity checker to make sure that there is a good connection between the mic shield and the metal mic housing. On mics that have plastic housings, the inside of the housing is coated with special paint that has metal particles mixed in. This coating is usually connected to the shield wire by either physical contact with a portion of the amplifier board, or with some type of metal clip. With hand-held mics, the rear housings' paint coating usually makes contact with the front housings' coating by means of the round plastic bosses that touch when the mic is put together. Again, with a voltmeter or continuity checker, you should measure a low resistance from the shield to one or more of the tops of the round plastic bosses that touch when the front and rear housings are put together. If turns out that something has happened to this coating, it is usually best to return it to the factory for repair.

In the most extreme cases, sometimes adding a bypass a capacitor between the shield and the white wire form the coil cord inside the mic can help. A ceramic capacitor with a value of .01 microfarads is a good choice. (Radio Shack #272-131)

If you have an old 4-wire mic that squeals as soon as it is plugged into the radio, you will most likely have to add a resistor in series with white lead in the mic coil cord. You also might not be able to use an external speaker even if you add the resistor. The value that usually works is 47K ohms (Radio Shack #271-1342). Some radios may require a different value. If you have problems, contact the factory.