

Ham 95A – ASV Issues – Noise Hum

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1. Noise. What a frustrating word. We have written numerous earlier articles about noise on radios. In ham circles, noise can be divided into three segments, each with different causes, technology, and fix.
 - a. Noise associated with radio broadcast is predominantly RF (radio frequency). A common form is static.
 - b. Noise associated with speakers and microphones is AF (audio frequency). A common form is hum.
 - c. Noise associated with digital is discrete bits. A common form is pixelation.
2. Noise that is static or crackly is usually the result of a loose connection.
 - a. Look for poor connections from loose fittings.
 - b. Observe poor contact between surfaces.
 - c. Lousy solder joints are not-smooth, not-shiny, or discolored.
3. Audio noise with a constant tone is hum. It is the result of impedance changes.
 - a. Capacitance occurs from a wire routed near another signal carrier.
 - b. Resistance occurs as length increases, resulting in a poorer connection.
 - c. Inductance occurs when a wire is bent or coiled.
4. Sources of noise persist from three major sources.
 - a. Electronic switching consists of LED, switch-mode power, and computer timing or oscillators.
 - b. Electronic sources such as WiFi, cellphones, and radios are a problem from a distance.
 - c. Power noise comes from wires, motors, and poor grounding.
5. Shielding properly can compensate for all three impedance issues.
 - a. A shield is a solid or braided metallic conductor around the signal carrying conductors.
 - b. The shield must be electrically continuous along the length of the wire.
 - c. Always connect the shield to the ground terminal at the source.
 - d. If the opposite or load end is not grounded, connect the shield to its metal.
 - e. If the load end is grounded, do not connect the shield. That would cause circulating current and hum.
6. Mic shielding is particularly critical.
 - a. The low signal level can easily succumb to a noise. The relationship is the signal to noise ratio.
 - b. Mic E, the microphone return path is not connected to ground except near the source.
 - c. Lower quality mics do not run a shield.
7. Radio interface boards, sometimes called URI, are tightly designed with very short audio paths.
 - a. Consequently, they induce very little audio noise or hum.
 - b. A mic amplifier separate from its load circuitry induces noise on the signal and hum.
 - c. Audio amplifiers between a mic and the control board are notoriously noisy in all applications.
 - d. Audio amps add length of wire, have wire routing issues, and cannot be easily shielded or isolated.
8. It's the combo, Ethel.
 - a. An audio amp with a poorly shielded mic in the presence of noise is a recipe for disaster.
 - b. Fixing one can compensate some, but issues may arise later from a different point.
9. We have an old saying in the Failure Analysis business.
 - a. One event is a nuisance. It takes at least two events for a catastrophe.
 - b. That carries to all noise issues.

