

Hunting Down RF Noises

Find noise sources both outside and inside your home with a systematic approach.

Michael Foerster, W0IH

Some time ago I fought problems with noise on every band from 10 to 160 meters. My 50-foot tower is about 100 feet east of power lines that run NNW-SSE along a nearby highway. The HF noise was especially prevalent on my beam antenna in the 10, 15, and 20 meter bands. At times the noise would go away, but would always return. The noise was most noticeable when I pointed my beam to the south, and would nearly vanish when pointed to the east or west. I have a K3 radio with a P3 display so I could clearly see the noise, which also registered on the S meter, as I turned the beam through the southerly heading. I also found some spurs in the 75 meter band, where I do most of my operating.

Finding Power Line Noise

I asked my wife to drive me down the road along the power lines in search of noise sources while I operated my HF radio in the car. I watched the S meter and noticed that there was a very clear increase in the reading as we passed one particular power pole. I subsequently contacted our local power company and included the power pole number, which is stamped on a metal plate attached to the pole. About 3 weeks later a technician arrived and checked around the outside of my house.

The power company technician used two pieces of gear. One piece included a four-element beam operating in the 320 to 360 MHz band, and the second was a clear plastic dish about 16 inches in diameter with an ultrasonic detector. Using his four-element beam, he found RF noise around the back of my house. I later took him inside the house and showed him the noise on

the K3 radio and P3 display as I turned the beam. We then drove down the street to the power pole that I suspected was a source of noise. He pointed his ultrasonic device at the pole and said, "The middle insulator is cracked." I had hit it right on the nose! That day he returned with two equipment trucks, and later in the afternoon, the noise was gone and has stayed away ever since.

Noise in the Home

I was still troubled by the noise that the technician pointed out at the back of my house. I still had an S-9 or stronger noise level on 75 meters that I hoped to fix, along with about a half dozen noise spurs on 75 and 40 meters. In need of something to hunt

down the noise, I resorted to an inexpensive AM band radio. I noticed that the radio would start screaming when I held it close to any of the walls near the ac wires in our home. This happened all over the house. I then got the idea to take the AM radio down to the breaker box.

Searching the House Circuits

I started by turning on everything in the house to identify which breaker powered which circuit in the house. This also ensured that any possible noise generators would be operating. Then, I turned the breakers off, and began turning them on one at a time while listening for the noises from the AM radio. I found that I had to power up some equipment manually after turning the breaker on. Specifically, the TV and stereo did not power up as power was applied. With some of the breakers, the AM radio started to hum, or scream, or make some form of noise. As seen in Figure 1, I placed masking tape down the left side of the breaker box, and marked the breakers that

were noisy. I hung the AM radio right on one of the breaker switches.

I needed to narrow down the noise source on each individual ac line. I have a set of remote telephones that can be used in an intercom mode. These phones also have a speakerphone mode, so I connected two of them together using the intercom mode, and set them on speakerphone. You will, of course, need power on the ac circuit that runs your remote telephone system, or at least find another power source for it. I set one phone near the AM radio (see Figure 1), but not so close that it caused interference. I then started tracking down the noises on the individual circuits for each



Figure 1 — AM receiver shown hung on a switch of the circuit breaker panel, with the telephone/intercom below. [Michael Foerster, W0IH, photo]

noisy breaker, and proceeded to identify the problems.

Dealing with Noisy Devices

I could then easily identify what was causing the noises by turning off or unplugging each item on the circuit while listening to the noise through the phone extension/intercom. The worst offender I found was a “wall wart” power supply for a 7-inch TV that my wife uses in her office. Replacing that power supply cleaned up most of the noise spurs on 75 meters. I’ve had problems before with the cheap wall wart power supplies. They can be very noisy, and the best solution is to replace them with a quality unit.

The electric stove with its digital control was another noise source, as was one of our old VCRs. Even the power supply that I used with my K3 was an offender. Adding ferrite cores on the ac power cord

reduced these noises. The trickiest one was the digital thermometer that I use on my garage heater. It took a while, but I finally found and corrected the ground loop that caused this noise.

You may wish to power your ham radio receiver from the same power circuit as your telephone/intercom system. That way, you will be free to search the bands as you trip the other breakers off and on several times. Once the noise hunt is over, don’t forget to reprogram your ac clocks and reset the weekly recordings on your DVR.

Final Result

I reduced the noise level on 75 meters down to about 1 to 2 S units and eliminated the spurs on 75 meters. After turning off all of the ac power, I was able to prove that further noise isn’t coming from inside my home. Now I just need to wait for the

ac power to go down to check how much noise the power lines outside my home are causing, but that hasn’t happened in years!

In need of something to hunt down the noise, I resorted to an inexpensive AM band radio.

ARRL member Michael Foerster, W0IH, holds an Amateur Extra class license. He’s been continuously licensed since his first license, WN0VNH, in 1968, then several months later as WA0VNH. He has worked as an electronics technician, and moved into software testing about 25 years ago, which he continues today. His station consists of the Elecraft K-Line, the K3, P3 and KPA500, along with a KX3 portable radio and vintage Heathkit SB101, HW101, and SB221 equipment. You can reach Michael at w0ih@arrl.net.

For updates to this article, see the QST Feedback page at www.arrl.org/feedback.

