

Crank it Back:



It's net time on 80M and signals sound distorted and barely perceptible under the noise. So, you give up and complain that you are being plagued by noise. Maybe it's the operator and not the conditions. Don't give up and here's why...Ham radio gear has been getting better and better these days with new and innovative gadgets included in them that only could have been dreamed of a few years ago. I can remember in the late 70's when the rage was to build a noise blanker for your receiver and then they got incorporated into every new rig put on the market. They were complicated to build but effective. Primarily we used

them to eliminate the irritating noise pulses from vehicles. Those noise pulses from the ignition would cause our AGC circuits to reduce the overall gain of the receiver. Noise blankers worked well for that purpose. They improved over the years and now there are several types available that are incorporated into the newer rigs with the ability to vary the width, depth, and level of the pulses you want to eliminate.

Something like that was unheard of 20 years ago and you simply had one selection and that was it.

Noise reduction (NR) is another new feature that only came into existence in the real digital age when DSP (Digital Signal Processing) was firmly entrenched into amateur radio. What is DSP, you ask? It usually means that when your analog IF signal is present and before it goes to the audio stages in your rig, it goes through an A/D converter to turn it into a digital signal and is then applied to a special Digital



Signal Processor before it is reconverted to analog again with a D/A converter and on to the audio sections in your rig. The DSP can process and manipulate the signal more easily than the equivalent and much more complicated analog signal processing could and, therefore, at a much cheaper price. It is stable and easily reproducible with thousands of different characteristics that the manufacturers and you can choose from. In the latest rigs it provides you with Notch Filters, IF filters, Noise Blankers, Noise Reduction, Equalization and much more in a single chip and at a fraction of the cost and more effectively. It truly has revolutionized amateur radio and allows us to hear things that we simply couldn't hear before by turning a few knobs or changing some menu settings. It helps to get to know your rig though so read the manual... (No, I will not use the 4-letter acronym in this family friendly newsletter.)



But there is one feature that has been in every rig on the planet since the beginning. It is the most overlooked knob on the radio. Think about it for a moment... you turn the audio gain up to a comfortable level on your rig so that you can hear the signals clearly, right? Most of the time, though this often-overlooked control is cranked to the right and stays there and all you hear is the signal buried in

the background noise. It is akin to pushing your foot on the accelerator and expecting the things you hit in the high-speed rush to get there to modulate your velocity. Now I ask you, would you turn the audio gain up full on your radio and leave it there? Of course not, you say. It would be too loud and distorted. So why do you crank the RF gain up to its fullest level and overload the RF circuitry? Does that not create the exact the same thing only earlier in the process? In fact, by doing that all you are doing is amplifying the signal and the noise together thus making them impossible to differentiate.

So here is the next question... Why would you want to listen to noise and not the signal? If you have a constant barrage of noise blasting away at your ears, does that not result in fatigue and more importantly lack of clarity because you can't differentiate between the noise and the signal? Remember when you were a teenager? We were all there once. We loved loud music and cranked the volume up to ear splitting levels until Mom or Dad came into the room and in an expletive laden roar told us to turn that bloody thing down. They simply wanted a better S/N figure so that they could carry on their day. Got my point yet?

Use the most useful knob on the radio, the RF gain control. Most older rigs controlled the RF gain by varying the AGC (Automatic Gain Control) which was also connected to the S meter circuitry which provides an automatic way to control the gain in both the RF section and the IF section of most conventional superheterodyne receivers. Unfortunately, by varying the gain control, it would also apply voltage to the AGC, and the result was an increase in the S meter reading. But wait. Didn't that provide you with an accurate S meter reading still but with the gain set at the noise level? Of course, it did. If the signal was above that level, it was still readable and showed correctly on the S meter too. Icom changed that with the IC-7300. The AGC is derived in the DSP now and the S meter is in that wonderful chip too so that when you vary the RF gain it doesn't cause the S meter to increase, but rather it decreases. So the reading is now the signal above noise. It does screw up the S meter reading a bit but it also is easy to use as well. I like it. So if you have a noise level of S7 on the rig and a signal of S8 you are trying to listen to you can drop the RF gain down to S1 for the noise and you will clearly hear the signal instead. Brilliant, eh?

The same thing is true for conventional superhets. If you drop the RF gain down to reduce the noise level, you are reducing the overall gain of the receiver to eliminate the noise and anything that is at the noise level or above is able to be heard clearly. Is that not the result you want? To hear the desired signal more clearly and reduce fatigue from straining to hear it through the noise is the ultimate goal of "communications", is it not? Have you ever heard someone give a report of "5-9" but then they have to have the other station repeat the comment over and over again? That is a pure indication that they have given the other station an erroneous report and it is likely because of noise. If you can hear the signal amongst the noise but can't clearly discern what is being said, don't give them a "5-9" signal report. The first number is "readability". If you can't read them, don't say it's a 5 when in fact it may be only a 1 or 2.

But what if the noise is only just above the signal or at the same level or even below? That is where that wonderful invention, the DSP, comes into play. You can sometimes, by using the Notch Filter, remove the noise almost completely and by using combinations of NR, NB and RF gain as well as the Notch Filter selections available, you can find that sweet spot to be able to hear the signals clearly. Back in the old days on pre-DSP rigs, we could vary the IF passband over a range that helped us remove the noise as well. I often use an old Collins 75-S3 receiver, and it has rejection tuning over a range to clear up signals. It works like a Notch Filter and is very effective in eliminating offending noise.

So, if you are being plagued by noise and want an effective way to reduce the stress of trying to listen to signals with noise, eliminate it by using the RF gain.

Have a noise free day everyone...

73

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