WiMo QRM Eliminator

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"If only I could get rid of the noise, I could probably copy that signal!" How often have you said something like that? Depending on your receiver, you may have a number of tools available: noise blanker, noise reduction, DSP filters, and others. The problem with these is that the noise is already in the receiver chain.

The WiMo QRM Eliminator works on a different technique. The 4.33 × 1.81 × 2.72 inch (W×H×D) package has three rotary controls, one labeled **GAIN** and two labeled **PHASE**. The unit requires connection to two antennas, and using very different and diverse antennas is recommended. When the QRM Eliminator is properly adjusted, some or all of the noise from the two antennas though the **MAIN ANT** and **AUX ANT** SO-239 connectors (see Figure 8) should subtract out, leaving only the main signal you wish to hear.

I reviewed a similar unit in the April 1998 issue of *QST*, but it had a different set of controls. While the idea between both of these units is roughly the same, and performance similar, this unit was a bit easier to use.

In the Package

A power cable is included. One end connects to a 13.8 V dc power supply, and the other has a standard 2.1 × 5.5 millimeter dc power connector that matches the socket labeled **12VDC** on the left side of the rear panel. The center conductor of the plug is positive (+) and the maximum current draw is 250 mA.

A second cable is terminated in an RCA phono plug. This is used for push-to-talk (PTT) control.

A one-page instruction sheet is in the box, and has the information needed to connect and operate the unit. The QRM Eliminator is produced by a German company, and the instructions are in English on one side and in German on the other.

Bottom Line

It works, and works well, sometimes. "Sometimes" is not a criticism, but just the result of understanding the advantages and disadvantages of the technique used to suppress noise.

Connections

In addition to the two SO-239 sockets mentioned before, a third SO-239 socket labeled **TRX** on the rear panel is used for connection to your transceiver or receiver. When transmitting, the PTT cable (center pin) must go to ground and thus protect the QRM Eliminator. The operating instructions include a warning to not use the microphone PTT line for this function. Most radios have a PTT connection on the rear panel for keying an amplifier (usually a phono jack or specific pins on an accessory port). That's the connection that should be used to trigger the QRM Eliminator to make sure that it switches safely before the transceiver starts transmitting RF.

According to the manual, transceiver power is limited to 200 W, which is fine for most radios today. If you use a power amplifier, install the QRM Eliminator between the transceiver and amplifier. However, you may damage the QRM Eliminator if high-power RF from the transmit antenna comes back into the receive antenna port. It's feasible to use the QRM Eliminator in a high-power station, but if your antennas are close to each other, consider adding an RF limiter to protect this input (these are typically used with low-noise receive antennas to protect the receiver). Operating frequency range is 3.5 to 60 MHz.

Operating Instructions

In addition to the three knobs, the front panel has a red pushbutton labeled **ON/OFF** and a LED just above the button. When this switch is **OFF**, your transmitter is connected directly to the main antenna connector. When the unit is turned on and you are receiving, the LED glows red/orange. When you transmit and the PTT line input is grounded, the LED glows green. I found that the LED is not very bright in the fluorescent lighting in my station.

Breaking the instructions into steps:

1. Make all connections. (Selection of the second antenna [**AUX ANT**] to be discussed shortly.)
2. Adjust the **GAIN** control so the noise appears to have the same amplitude on both antennas.
3. Adjust the **PHASE** knobs for minimum noise.
4. Continue repeating steps 2 and 3 until you have maximized the noise reduction.

You may have to tune off-frequency to make sure you are eliminating more noise than the desired signal. However, control adjustment did not seem overly critical and I could make larger frequency changes without readjustment than with another unit I previously used.

Antenna Selection and Placement

Suppose your main antenna, some 50 feet up in the air, picks up the signal you want to hear, along with some amount of noise. The second antenna (perhaps a short piece of wire) could pick up the noise as well, but the strength of the desired signal would be much lower. Then the noise in common to the two antennas can be nulled out in the QRM Eliminator, while the desired signal will not null out because its amplitude is much greater on the main antenna.

The included instruction sheet briefly discusses the antenna functions and notes that the second antenna should be far enough from the main one that it does not pick up enough signal when transmitting to damage the QRM Eliminator. The second antenna must be stationary for the noise to null out properly, because the relative amplitude and phase coming from both antennas should stay constant, or else the controls will need to be readjusted. Even so, a stationary truck, for example, could produce noise that can be nulled out, but if it is moving, the noise will not null as well at the same settings. It is also possible that rigidly mounted antennas can pick up noise that can be nulled, but noise picked up by an antenna swinging wildly in the wind might not.

Figure 8 — QRM Eliminator rear panel.

Using the QRM Eliminator

Let's start with the conclusion: The QRM Eliminator works, and works well, sometimes. "Sometimes" is not a criticism, but just the result of understanding the advantages and disadvantages of the technique used to suppress noise.

When testing a receiver or transmitter, if you set the controls and connections one day, shut down, and then come back the next day, you expect to get the same performance day to day. Noise, on the other hand, generally comes from sources that are random or not well defined, that may vary from day-to-day or hour-to-hour or even minute-to-minute.

To test the QRM Eliminator, I used my home station transceiver, an Icom IC-7300, with the AGC turned off and an oscilloscope connected to the audio output. Since human hearing is not linear, I thought monitoring the results on a scope in addition to listening would give more insight to the results.

I used CW and SSB on the 80 to 15 meter bands. On 80 and 20 meters, I found a number of weak carriers outside the ham bands that also served as test signals. My main antenna is an 80 meter horizontal dipole at about 40 feet, supported by two trees. A 10-foot piece of coax in the station feeds a balun mounted on the outside wall of my house. From there, a length of ladder line connects the balun to the dipole. The second antenna (**AUX ANT**) was a VHF/UHF discone, also about 40 feet in the air. I used it in two ways, first as a coax-fed discone to sample noise with a short element, and next by connecting the coax shield and center conductor together in the station to act as a vertically polarized 40-foot wire.

I did get one surprising result. My station is about 300 feet from a major commuter highway (cars only, not trucks). Several years ago, I monitored the noise from passing cars and could see a spike during commuter rush hour. This time, despite heavier traffic, there was no spike, and while the audible noise has gone up, the RF noise has decreased considerably.

Varying Results

As for results, as expected, they varied considerably. When listening to pure noise (tuned away from any desired signal), noise suppression was usually very high. I could bring an S-9 noise level down to perhaps S-1 or S-2. With careful adjustment, when I tuned back to the desired signal, the noise decreased, but not as much. There was no question that in some cases, the noise suppression made a large difference; other times it did not. I could not give any general conclusions about using either of the auxiliary antennas. If you

can't really null the noise out, sometimes it's because there are two noise sources, and you would only get rid of one of the two.

Sometimes, it's hard to null a noise without affecting the desired received signals. This was very apparent when testing using the out-of-band weak carriers, where maximum noise suppression yielded maximum carrier suppression. I did not know the sources of these weak carriers, but this may have been caused by one antenna being vertically polarized and the other, horizontal.

There were two other results worth mentioning. The QRM Eliminator was tolerant of receiver frequency changes without having to readjust its controls. Also, the QRM Eliminator controls are quite tolerant of changes to the settings themselves while adjusting for good suppression.

If your results are disappointing, the manufacturer suggests a great deal of patience. I would second that recommendation. Again, how well it works depends on several factors, including the relative locations of antennas, antenna patterns, noise characteristics and perhaps very (if not most) important, the patience and skill of the operator.

If, however, you are convinced your unit is not working, the instruction sheet has a paragraph on how to test it. The test involves inserting the same signal into the two antenna ports and then adjusting the phasing controls to demonstrate nulling of the signal.

I also tested the QRM Eliminator with approximately 20 feet of wire, running out the window and loosely tied to a tree branch for the **AUX** antenna. I specifically wanted to see if antenna motion affected the nulling capability, and on one windy day, the answer for a small set of tests was definitely yes. The nulled noise went in and out!

Another Application

You can try to use this unit for signal enhancements. By coincidence, as this review was being prepared, a Technical Correspondence by Joe Ostrowsky, KI5FJ, published in the October 2021 issue of *QST*, described using a similar unit for diversity reception. I was not able to get similar results, but this was probably due to the antennas I used and signals I had available when testing. If you have two good HF antennas, one horizontally polarized and the other vertically, it is something to consider.

Manufacturer: WiMo Antennen und Elektronik GmbH, Herxheim, Germany; **www.wimo.com**. Available from DX Engineering, **www.dxengineering.com.** Price: $200.

Monitor Sensors Power and SWR Meter

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The most commonly used accessory in a ham radio station is probably the SWR/power meter. Many hams rely on inexpensive ones for accurate indications of what is really going on in their stations, and while the SWR indication is generally adequate, accuracy of the transmit power measurements can vary, based on the actual power level and the factory calibration accuracy of the meter. Accuracy issues have been addressed by Monitor Sensors, an Australian company, with their Power and SWR Meter.

Overview

The Power and SWR Meter measures power and SWR up to 2000 W from 160 to 10 meters, up to 100 W on 2200 meters (135.7 – 137.8 kHz), and up to

Bottom Line

The Monitor Sensors Power and SWR Meter will accurately read RF power down to 10 mW up to 2000 W, and it will measure SWR at power levels as low as 50 mW.